ALEXA
Software Update Packet 7.0

USER MANUAL

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1 Disclaimer

Before using the products described in this manual be sure to read and understand all respective instruction.

The ARRI ALEXA is only available to commercial customers. The customer grants by utilization that the ARRI ALEXA or other components of the system are deployed for commercial use. Otherwise the customer has the obligation to contact ARRI preceding the utilization.

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This product meets CE regulations.

2 Scope

This instruction manual applies to the following hardware, software and firmware versions:

ARRI ALEXA, ARRI ALEXA Plus, ARRI ALEXA Plus 4:3, ALEXA M with ARRI EVF-1 electronic viewfinder;

ARRI ALEXA Studio with optical viewfinder or ARRI EVF-1 electronic viewfinder:

- Camera software update packet (SUP): 7.0
- EVF-1 software packet: 1.34

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4.0	K5.72550.0	2031-00-00-00-99-D	K7817	05th Jul 2011
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5.0	K5.72550.0	2031-00-00-00-99-F	K7874	16th Nov 2011
5.0 + 5.1	K5.72550.0	2031-00-00-00-99-G	K7890	19th Dec 2011
5.0 + 5.1	K5.72550.0	2031-00-00-00-99-H	K8005	26th Jan 2011
5.1 + 6.0	K5.72550.0	2031-00-00-00-99-I	K8021	12th Feb 2012
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7.0	K5.72550.0	2031-00-00-00-99-K	K8128	19th Nov 2012

3 What's new in 7.0

This chapter gives an overview of what has changed with SUP 7.0.

Equipment/Accessories Supported

CLM-4 Support

All ALEXA models with integrated motor drivers for ARRI Controlled Lens Motors will support the compact and powerful CLM-4 in addition to CLM-2 and CLM-3. As for CLM-3, the motor torque is adjustable for smoother operation of lens rings with more resistance.

Imaging

Sensor Readout Size for ProRes 2K Recording (see Chapter SxS Cards on page 87)

When the camera is switched from HD to 2K resolution in-camera recording, the size of the captured frame changes slightly. This is necessary so that the de-bayering can work with an optimized downscale factor and deliver the best possible 2K image quality.

- Recording ARRIRAW 16:9, HD-Video, ProRes HD and DNxHD uses 2880 x 1620 photosites with a frame size of 23.76 x 13.365 mm
- ProRes 2K 16:9 uses 2868 x 1612 photosites (23.661 x 13.299 mm)
- ARRIRAW 4:3 uses 2880 x 2160 photosites (23.76 x 17,82 mm)
- ProRes 2K 4:3 uses 2868 x 2150 photosites (23.661 x 17,738 mm)

When recording ARRIRAW and ProRes 2K in parallel, it is important to note that the ARRIRAW frame holds a few more columns and lines of pixels. This is taken into account in the latest release of the ARRIRAW SDK, where the user can select which ARRIRAW frame size will be used to create a 2K image.

Image Processing/Look Files

New Standard Speed De-bayering Algorithm

ADA-3 HW, a new and improved de-bayering and downscale algorithm is now available for all ALEXA models. The new algorithm produces cleaner high contrast edges and crisp fine detail, which results in sharper images. The camera uses ADA-3 HW for HD-SDI, ProRes and DNxHD output at up to 60 fps.

Note: The ARRIRAW Converter and ARRIRAW SDK additionally provide ADA-3 SW, a more sophisticated software version of the new algorithm.

New High Speed De-bayering Algorithm

The High Speed de-bayering algorithm provides the same overall image characteristics as the regular speed de-bayering algorithm. The new version improves the rendition of flat color fields and delivers a cleaner overall image. It is used for HD-SDI monitoring and ProRes or DNxHD output from 60 to 120 fps.

Note: In certain situations, saturated objects with little or no texture may exhibit a faint checkered pattern in the red and blue color channel. This artifact was clearly visible in the previous SUP release and is now considered to be reduced to a degree where it does no longer pose a problem.

Low Contrast Curve (see Chapter ARRI Look Files on page 70)

The LCC ARRI Look File is now part of the SUP. It is always available in the camera menu, even after a factory reset.

SxS Onboard Recording

ProRes 2K recording (see Chapter SxS Cards on page 87)

Recording 2K resolution to the camera storage module is only possible in one of the QuickTime ProRes codecs. ProRes recording in HD and 2K resolution put very similar requirements on the recording media. A 64 GB SxS Pro card allows recording up to 60 fps in 16:9 aspect ratio and up to 48 fps in 4:3 aspect ratio. It will hold approximately 19 minutes of ProRes 2K 4:3 and approximately 25 minutes in 16:9. ProRes 2K recording is not available in High Speed mode.

Outputs

MON OUT clone (see Chapter REC OUT on page 90)

The REC OUT output can optionally be configured to show a cloned output from the MON OUT output. This is the only mode available in High Speed mode since SUP 6.1 and can now optionally be activated for all other sensor and recording resolution configurations in regular speed mode.

The MON OUT clone option can be found at MENU > Recording > REC OUT > HD-SDI format.

Electronic Viewfinder and MON OUT

Redesign of Status Display on EVF and MON OUT (see Chapter Status Info Overlays on page 128)

The status display in the electronic viewfinder and the MON OUT image has been redesigned.

- New icons indicating SxS recording resolution, screen grab, RET IN active, settings for MON OUT and EVF, application of ARRI Look File
- In 16:9 sensor mode, the camera image is scaled to fit inside the status info border

- In 4:3 sensor mode, a few lines on top and bottom of the camera image are covered by translucent status info bars
- The electronic horizon, the LDS info and reel and clip number, when active, extend into the camera image in all sensor modes

ARRI 1.85 2K DCI Frame Lines (see Chapter Frame Lines on page 125)

The frame size of a 2K DCP container is 2048 x 1080 pixels. A DCI-compliant 2K image with 1.85:1 aspect ratio has a resolution of 1998 x 1080 pixels. When recording ProRes 2K, it is therefore necessary to either scale down the recorded image to get to the DCI size, or to crop it from the frame.

ALEXA offers frame lines called ARRI 1.85 2K DCI. These were created to show the proper framing when a 2K 1.85:1 DCI image shall be cropped from the captured image.

Metadata and Time Code

External Time Code

The camera will no longer REGEN or JAM time code while it is recording, as this is suspected to have caused single underexposed frames.

Lens Metadata

The lens metadata is now recorded as both raw lens encoder information and interpreted LDS information.

Remote Control

3D on ALEXA M

3D sync features are now available without license key on all ALEXA M cameras.

User Interface

GUI Homescreen and Menus Updates (see Chapter Main Controls on page 54)

- Sensor mode (16:9 and 4:3), SxS/ProRes recording resolution and remaining recording time are now indicated on the camera menu's home screen
- The color settings "DCI P3" and "Film Matrix On" were removed
- "Vari Flag" and "SDI Rec Flag" were removed as options and are now permanently enabled
- The "Electronic level" option was renamed to "Electronic horizon"
- The "Tropical" sensor temperature setting was renamed to "High humidity"
- A progress bar now indicates the remaining time for switching between regular and high speed mode
- The WNA-1 menu was removed
- The RUN beeper indicates when the camera has reached speed

- The Project menu was extended to show sensor mode (16:9 or 4:3), SxS resolution (2K or HD) in addition to active codec, project frame rate, camera index, next reel count and production info
- It is now possible to enter upper- and lower case characters for all user-created items (e.g. user setup)
- One additional USER button. Pressing the jog wheel opens the edit menu
- New USER button options for:
  - MON OUT look
  - EVF look
  - Color bars on MON OUT and REC OUT
  - *Grab GUI* to store a .png of the current menu screen (use operator side buttons 1-3)
  - *Mirror shutter* to leave the shutter spinning or stop in VIEW or GATE position when stopping the recording (ALEXA Studio only)

4 Introduction to the ALEXA

The ALEXA is a 35mm-format, film-style digital camera made by ARRI, the world leader in professional cinematographic imaging. It combines leading-edge digital technology with film-camera features that have been refined over more than 90 years of ARRI history. The result is a camera that allows cinematographers with a film background to shoot digitally without the need for extensive training.

People who are used to shoot digitally will experience a camera like they never did before, providing more powerful features than in any other camera available today.

Handling

The camera is a true ARRI. It has a high-precision integrated housing with an ergonomic design. It is rugged, reliable, flexible and sealed to make it splash-proof. It also has mounting points for accessories, as ALEXA integrates well with existing ARRI accessories. In addition, a new range of accessories specifically designed for ALEXA is available.

Operation

ALEXA features a unique user interface, designed to make camera operation easier than ever, while giving easy access to a large number of controls.

There are three different control interfaces:

- The main user interface on the right side gives access to every camera parameter through a graphical display and a button panel.
- The operator user interface on the left side for basic control, adjustable to the operator's individual needs by supplying assignable buttons in addition to function buttons.
- The viewfinder user interface for adjusting the most important image parameters with buttons on the viewfinder and the interface graphics overlayed to the viewfinder image.

Power management

The camera accepts any input voltage from 10.5-34 V DC. Different power sources can be connected to the camera simultaneously. The camera's power management ensures that the power source with the highest voltage level is used. Power sources are hot-swappable to minimize the risk of sudden power loss.

ALEV III sensor

The ALEV III sensor has a horizontal pixel count of 3.5K resulting in true 2K resolution. It covers the full Super-35 format and it provides a latitude of 14 stops and a base sensitivity of 800 ASA.

The sensor temperature is kept stable by a Peltier element to ensure optimum image quality under all operating conditions.

AIT - ARRI Imaging Technology

ARRI imaging technology ensures the most organic, film-like image quality of any digital camera with natural color rendition and pleasing skin tones.

Thermal concept

The camera electronics are fully sealed to protect them from dirt and moisture. Camera heat is transported via heat pipes to a radiator which is cooled by a fan. The fan itself is very silent, so the camera noise level is below 20 dB (A)* - this is the same as with ARRI sync-sound film cameras. If the fan noise level starts to increase due to fan aging, the fan can be swapped in a matter of minutes by a trained technician.

*at 24 fps and ambient temperature < 25°C

EVF-1 electronic viewfinder

ARRI is redefining electronic viewfinders with LED lighting, high resolution and a viewing experience that comes as close to an optical viewfinder as possible.

Internal recording

ALEXA can internally record Quicktime movie clips with Apple ProRes™ or MXF files with AVID DNxHD codecs to Sony **SxS PRO** cards. The cards deliver high data rates and are very robust. ProRes™ can be natively edited in Apple FinalCutPro, eliminating the need to transcode. ProRes 422 (HQ) and ProRes 4444 deliver visually lossless compressed images with a color depth of 10 bit for ProRes 422 and 12 bit for ProRes 4444.

DNxHD can be natively edited in AVID MediaComposer without transcoding.

Quicktime movie clips and and MXF files can be played back in the camera with output on REC OUT, MON OUT and the electronic viewfinder.

Audio recording

Analog 2-channel audio can be recorded as 24 bit 48 kHz PCM in the Quicktimes, as well as embedded to the HD-SDI signals.

Licensed features

By adding license keys, new camera features can be enabled that go beyond the initial camera specification.

High speed image capture

In Regular Speed mode, ALEXA has a frame rate range from 0.75 to 60 fps. By adding a license key for High Speed mode, the frame rate range of the camera can be extended up to 120 fps.

4.1 About This Manual

ARRI recommends that all users of the ALEXA read the manual in its entirety prior to use. For experienced users, the manual's structure also provides quick access for reference.

In this manual:

- Layout of the ALEXA
- Safety Guidelines
- General Precautions
- Power Supply
- Camera Support
- Connectors
- Lens Mounting
- User Interface
- Operation of the ALEXA

How to Use This Manual

All directions are given from a camera operator's point of view. For example, camera-right side refers to the right side of the camera when facing toward the front of the camera.

Connectors are written in all capital letters, for example, REC OUT. Menus and screens on the Main Camera Controls are written in all capital letters, for example, RECORDING menu and HOME screen. Buttons are written in bold typeface capital letters, for example, **PLAY** button.

The appendix at the back of the manual contains useful reference material including ALEXA specifications, connector pin-out diagrams, a false color display explanation, error and warning message explanations, ALEXA dimensional drawings and a menu structure tree.

5 Layout of the ALEXA

Figure 1: ALEXA right

Figure 2: ALEXA left

Figure 3: ALEXA top

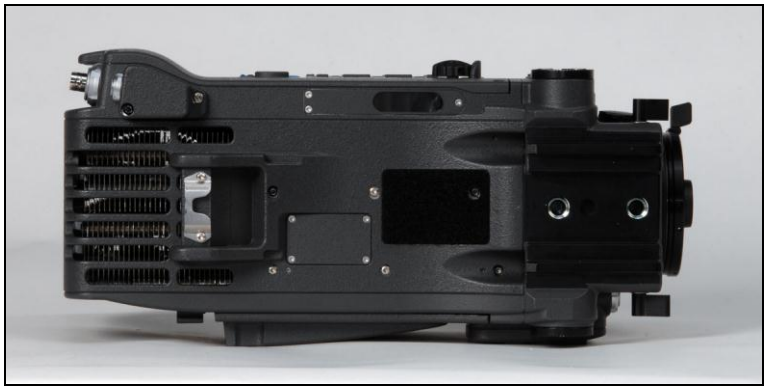


Figure 4: ALEXA bottom

Figure 5: ALEXA front

Figure 6: ALEXA back

6 Safety Guidelines

Any violation of these safety instructions or non-observance of personal care could cause serious injuries (including death) to users and affiliates and damage to the equipment or other objects.

6.1 Explanation of Warning Signs and Indications

Indicates a possible risk of injury or damage to the equipment

Indicates the risk of electric shock or fire danger that could result in injury or damage to the equipment.

Note: Indicates further information or information from other instruction manuals

6.2 General Safety Guidelines

- Always follow these guidelines to ensure against injury to yourself or others and damage to the system or other objects.
- This safety information is in addition to the product specific operating instructions in general and must be strictly observed for safety reasons.
- Read and understand all safety and operating instructions before you operate or install the system!
- Retain all safety and operating instructions for future reference.
- Heed all warnings on the system and in the safety and operating instructions before you operate or install the system. Follow all installation and operating instructions.
- Do not use accessories or attachments that are not recommended by ARRI, as they may cause hazards and invalidate the warranty!
- Do not attempt to repair any part of the system! Repairs must only be carried out by authorized ARRI Service Centers.

6.3 Specific Safety Instructions

- Do not remove any safety measures from the system!
- Do not operate the system in areas with humidity above operating levels or expose it to water or moisture!
- Do not cover the fan openings at the camera back top and bottom!
- Do not subject the system to severe shocks!
- Do not place the system on an unstable trolley/hand truck, stand, tripod, bracket, table or any other unstable support device! The system may fall, causing serious personal injury and damage to the system or other objects.
- Operate the system using only the type of power source indicated in the manual! Unplug the power cable by gripping the power plug, not the cable!
- Never insert objects of any kind into any part of the system if not clearly qualified for the task in the manual, as objects may touch dangerous voltage points or short out parts! This could cause fire or electrical shock.
- Unplug the system from the power outlet before opening any part of the system or before making any changes to the system, especially the attaching or removing of cables!
- Do not use solvents to clean!
- Do not remove any stickers or paint marked screws!
- Always place a lens or a protective cap in the lens mount receptacle!
- Never run a camera with a mirror shutter without a lens or a protective cap in the lens mount receptable!
- Changing camera lenses should be done in a dry and dust-free environment. If this is not possible, take extra care that no dust enters the camera while the lens is off!
- When no lens is attached to the camera, immediately place the protective on the lens mount to avoid contamination of the sensor cover glass!
- After changing lenses, always perform a dust check to make sure no dust has settled on the sensor cover glass!
- Clean optical lens surfaces only with a lens brush or a clean lens cloth. in cases of solid dirt or grease, moisten a lens cloth with pure alcohol. Discard contaminated lens cloth after use! Never attempt to clean a lens brush with your fingers!
- NEVER USE CANS WITH COMPRESSED AIR OR GAS TO BLOW OFF THE DUST! This can severely damage optical elements.
- If the sensor cover glass has been contaminated by solid dirt or grease, special optical cleaning kits should be used for dirt removal under very high care! If the contamination cannot be removed, the camera should be taken to an ARRI service center for cleaning.

- THE USE OF METHANOL TO CLEAN OPTICAL SURFACES IS NOT RECOMMENDED!
- NEVER USE ACETONE TO CLEAN OPTICAL SURFACES!
- NEVER TRY TO REMOVE THE SENSOR COVER GLASS!
- DO NOT POINT THE CAMERA INTO DIRECT SUNLIGHT, VERY BRIGHT LIGHT SOURCES, OR HIGH-ENERGY LIGHT SOURCES (e.g. laser beams)! This may cause permanent damage to the camera image sensor.
- DO NOT POINT THE VIEWFINDER INTO DIRECT SUNLIGHT, VERY BRIGHT LIGHT SOURCES, OR HIGH-ENERGY LIGHT SOURCES (e.g. laser beams)! This may cause permanent damage to the viewfinder display and optical elements.

7 General Precautions

7.1 Storage and Transport

- Use a lens port cap to prevent damage to the sensor cover glass and sensor whenever there is no lens attached.
- Unplug all cables when transporting the Alexa in a camera case.
- Do not store the camera in places where it may be subject to temperature extremes, direct sunlight, high humidity, severe vibration, or strong magnetic fields.

7.2 Electromagnetic Interference

ALEXA meets EC regulations by fulfilling the specifications of the European Directive 2004/108/EC (15th December 2004).

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Complies with the canadian ICES-003 Class A specifications. Cet appareil numérique de la Classe A est conformé à la norme NMB-003 du Canada.

This device complies with RSS 210 of Industry Canada. This Class A device meets all the requirements of the Canadian interference-causing equipment regulation. Cet appareil numérique de la Class A respecte toutes les exigences du Réglement sur le matérial brouilleur du Canada.

7.3 Condensation

When moving the camera from a cool to a warm location or when the camera is used in a damp environment, condensation may form inside the lens port, on the sensor cover glass, between the sensor and the sensor cover glass, and on internal or external electrical connections.

- Operating the camera while condensation is present may result in personal injury or damage to the equipment.

Condensation on the optical components may have a visible effect on the output images. To reduce the risk of condensation:

- Find a warmer storage location.
- Attach the ARRI air-drying cartridge (silica bottle) to the PL-Mount of the camera during storage
- Note: Do NOT leave the air-drying cartridge attached to the PL-Mount during transportation of the camera!
- If camera needs to be stored in a place that is considerably cooler than the location where it will be used, consider keeping the camera powered from a mains unit in addition to using the air-drying cartridge.
- In ambient temperatures above 30°C/86°F and/or humidity above 60%, always attach the air-drying cartridge to the PL-Mount of the camera when not in use. This not only applies to storage, but also to shooting breaks and situations when the camera remains without an attached lens for an extended time.
- MAKE SURE THE SILICA BOTTLE IS SECURELY FASTENED. UNDER NO CIRCUMSTANCES SPILL SILICA INTO THE LENS PORT!

8 Power Supply

- Use only ARRI-recommended power supply solutions.
- Manipulation of power supplies could result in serious injury or death, or damage to the ALEXA.

The ALEXA accepts an input voltage range from 10.5 to 34 V DC. The camera can be powered through the BAT connector or battery adapters accepting V-Lock or Gold Mount batteries.

The power supply should deliver an output of more than 90 W to power the camera sufficiently. The power draw of the camera in basic configuration is about 85 W.

A 12 to 15 V battery should have at least 6 A maximum output current.

Note: when powering accessories through the camera, the total power draw of the camera is increased by the amount of power drawn by the accessories.

8.1 Power Management

When using the BAT connector and one or more onboard battery adapters simultaneously, the camera's power management system ensures that the power source with the highest voltage level is used. When the voltage level of one power source drops below the level of the other, or a power source is disconnected from the camera, the power management system automatically switches to the other power source, avoiding shutdown of the camera.

For example, a 12 V onboard battery can be used as backup for the main 24 V battery. Using a 12 V onboard battery in addition to the main 24 V battery also allows for quick switchover to handheld mode—the power cable can simply be disconnected from the BAT connector.

When using two onboard battery adapters (with batteries in parallel—one on top and one on the back), the camera will treat them as a single source. When used this way, the load is spread across two batteries, creating a strong power source.

8.2 BAT Connector

The BAT connector is the primary power input on the ALEXA. It is a Fischer 2-pin socket located at the back of the camera on the camera-right side.

The socket accepts power cables KC-20S and KC-29S. The cables can either be connected to the mains unit NG 12/26R or to 24 V cine-style batteries with three-pin XLR outputs.

Figure 7: BAT connector

8.3 Mains Unit NG 12/26 R

Use of the mains unit is recommended for shooting in the studio and when using electronic accessories with high power consumption.

To power the ALEXA using the Mains Unit NG 12/26 R:

1. Set the correct mains voltage on the mains unit using the fuse on the back of the unit. For example, set it to 220 V if the AC mains power source is 220 V.
2. Connect the mains unit to AC mains power.
3. Ensure that the camera power is turned off.
4. Set the voltage switch on the mains unit to 26 V.
5. Connect the battery cable KC-20S or KC-29S (spiral cable) to the power supply socket on the camera and the 26 V socket on the mains unit.

Note: The NG 12/24 R was the original design that provided 12 & 24 volts output – it was superseded by the NG 12/26 R, which outputs 12 & 26 volts. The NG 12/24 R can easily be upgraded to NG 12/26 R specification at an ARRI service center.

8.4 Cine-Style Batteries

Any 24 V cine-style battery with a three-pin XLR output can be used to power the camera through a KC-20S or a KC-29S.

The Anton/Bauer CINE VCLX/2 battery (280 Wh) with charger is available from ARRI.

To connect the battery to the camera:

6. Ensure that the main switch on the camera is off.
7. Connect the battery cable KC-20S or KC-29S (spiral cable) to the power supply socket on the camera and the 28V output on the battery.

Note: When the battery voltage drops below the warning level, the **BAT1** level in the camera display will start flashing. A white **i** will appear, signaling more information is available on the **INFO** screen. For more information on setting the low battery warning level, see *Menu>System>Power* (on page 102).

To charge the battery

1. Connect the charger to AC mains power.
2. Plug the charger cable into the charge input socket of the battery.
3. Charge the battery until complete. Fully charged batteries can be left connected to the charger until required for shooting.

Note: For more information, refer to the Anton/Bauer CINE VCLX/2 manual.

8.5 Onboard Batteries

The camera can be equipped with adapters for either V-Lock or Gold Mount video-style batteries. When a battery equipped with the TI-protocol for battery communication is used, the ALEXA will display remaining capacity as a percentage on the Home screen. For these batteries, the user does not need to set the battery warning level.

Four different adapters are available:

- BAB-G: Back-mount adapter Gold Mount batteries
- BAB-V: Back-mount adapter V-Lock batteries
- BAT-G: Top-mount adapter Gold Mount batteries
- BAT-V: Top-mount adapter V-Lock batteries

Note: Adapters must be installed by a trained technician!

8.5.1 V-Lock Batteries

V-Lock batteries from different manufacturers may be used on the ALEXA. When batteries from manufacturers such as ID-X and Bebop, are used, their remaining capacity will be displayed as a percentage on the Home screen.

To attach a V-Lock battery:

1. Align the v-shaped wedge on the battery with the v-shaped notch on the battery plate.

2. Press the battery downwards until you hear a click.
3. Check that the battery is securely mounted on the battery plate.

To release a V-Lock battery:

1. Press the release button on the camera-left side or top of the battery (manufacturer dependent).
2. While pressing the release button, slide the battery upwards.

Figure 8: ALEXA with BAB-V and V-Mount battery

Note: Not all V-Lock batteries deliver enough power to supply the camera. Use only batteries with a capacity of 90 Wh or more to prevent damage to the battery and unpredictable camera behavior. Any camera-battery combination should be tested prior to use, especially when accessories are powered through the camera.

8.5.2 Gold Mount Batteries

If the ALEXA is equipped with a Gold Mount, Anton/Bauer batteries can be used. Their remaining capacity will be displayed as a percentage on the Home screen.

To attach a Gold Mount battery:

1. Align the three pins on the back of the battery to the three corresponding holes on the battery plate.
2. Press the battery to camera-right until you hear a click.

3. Check that the battery is securely mounted on the battery plate.

To release a Gold Mount battery:

1. Press the release button on the camera-left side of the battery plate.
2. While pressing the release button, slide the battery camera-left, and pull it straight out.

Figure 9: Camera with BAB-G and a Gold Mount battery

Note: Not all Gold Mount batteries deliver enough power to supply the camera. Use only batteries with a capacity of 90 Wh or more to prevent damage to the battery and unpredictable camera behavior. Any camera-battery combination should be tested prior to use, especially when accessories are powered through the camera.

8.6 Power Outputs

The ALEXA has two 24 V power outputs and one 12 V power output for accessories. ALEXA Plus, ALEXA Plus 4:3 and ALEXA Studio models have three 24 V power outputs and one 12V power output.

Figure 10: 24 V outputs (RS) and 12 V output

8.6.1 Powering 12 V Accessories

One 12 V output with a 2-pin LEMO connector is located on the right side of the camera. It is limited to 12 V and can supply a device with a current of up to 2.2 A, depending on the camera power supply.

8.6.2 Powering 24 V Accessories

Two 24 V remote start/stop (RS) outputs with 3-pin Fischer connectors are located on the right side of the camera. They can supply two devices with a combined load of up to 2.2 A (shared with the EXT connector power out), depending on the camera power supply. When the camera is powered from a source with a voltage below 24 V, they output 24 V. If the camera's power source supplies more than 24 V, this voltage level is also present on the RS outputs.

Besides powering accessories, the RS outputs can also be used to send a remote start/stop signal to the camera.

9 Camera Support

9.1 Minimum Equipment Recommended For Operation

- ARRI ALEXA camera body including **SxS** module and Lens Adapter PL mount without LDS (LA-PL-1)
- EVF-1 Electronic Viewfinder
- VMB-1 Viewfinder Mounting Bracket
- KC 150-S Viewfinder Cable short 0.35m/1.2ft
- CCH-1 Center Camera Handle
- BP-12 Bridge Plate with base plate, or BPA-1 with BP-5/BP-8 Bridge Plate and base plate, or WA-1 Wedge Adapter and Quick Release HD Baseplate
- SD card
- Compatible power supply
- Sony **SxS PRO** card for recording

9.2 Tripod and Remote Heads

Tripod and remote heads must have adequate load ratings to support the ALEXA and attached accessories. See the following table for camera and component weights.

Note: Always check the payload limits of a remote head and crane before mounting a camera.

In applications where the camera mount is subject to high forces (e.g. car or helicopter mounts) the camera must be additionally secured with appropriate safety restraints. All mount screws must be tightened firmly with an appropriate screwdriver (not with the commonly used coin!).

Camera weight	**lbs**	**kg**
ARRI ALEXA incl. **SxS** module, EVF-1, VMB-1, CCH-1, KC-150S	16.85	7.65
ALEXA camera body including **SxS** module	13.79	6.26
Electronic Viewfinder EVF-1	1.65	0.75
Viewfinder Mounting Bracket VMB-1	0.55	0.25

Viewfinder Cable short KC-150S	0.26	0.12
Center Camera Handle CCH-1	0.60	0.27

9.3 Electronic Viewfinder EVF-1

The electronic viewfinder EVF-1 employs a liquid crystal on silicon (LCOS) imaging device with a temperature-stabilized LED light source to provide a bright, accurate view of the sensor image in all operating conditions. Each EVF-1 is calibrated to precisely match the image on the ALEXA's HD outputs.

The EVF-1 has a resolution of 1280x720 pixels, with 32 additional lines of resolution above and 32 below the image to display camera status information. The EVF-1 can also display a 10% surround view area of the sensor to help the operator track unwanted elements before they enter the recorded image area. Focus can be checked by temporarily zooming into the image with a magnification factor of 2.25x. The low-latency interface of the EVF-1 has a delay of less than 1 frame.

The EVF-1 has button controls for false color check and zoom, as well as buttons and a jogwheel to control EVF and camera settings.

Connect the viewfinder to the camera using the viewfinder mounting bracket VMB-1.

Figure 11: Camera with EVF-1

Note: Do not point the viewfinder eyepiece at direct sunlight or bright light sources, as this could damage the LCOS imaging device. If possible, cover the eyepiece when not in use to prevent any damage.

9.3.1 Viewfinder Cables

The viewfinder cables are unidirectional with a male plug to connect to the camera and a female plug to connect to the viewfinder.

Cables are available in the following lengths:

Model	Length (m / ft)	Suggested use
KC-150-S	0.35 / 1.2	For use of EVF-1 on camera left side in handheld mode
KC-151-S	0.65 / 2.1	For use of EVF-1 on camera right side or when using Viewfinder Extension Bracket VEB-1
KC-152-S	2.00 / 6.6	Longest possible length for use with specialty rigs

Figure 12: EVF cables: KC-150S (center), KC-151S (middle), KC-152S (outer)

9.3.2 Viewfinder Mounting Bracket

The Viewfinder Mounting Bracket VMB-1 / VMB-2 is attached to the camera using two captive 3mm hex socket head screws on top of the camera at the front. Attach the EVF-1 to the Viewfinder Mounting Bracket by sliding the dove tail into the receptacle and closing the lever on the EVF-1.

The position of the EVF-1 can be adjusted by loosening the levers on the Viewfinder Mounting Bracket, adjusting the position as desired and closing the levers to retighten.

The EVF-1 can be mounted on the camera-right side by unscrewing the threaded end cap on the side-to-side adjustment rod, removing the rod itself and inserting it from the other side. Remember to reattach the threaded end cap.

Note: Camera-right operation is not possible with the standard EVF cable KC-150-S. Instead, the longer cable KC-151-S is needed.

Figure 13: VMB-1 on camera

The Viewfinder Extension Bracket VEB-1 extends the mounting point of the EVF-1 further back. It can be attached to a tripod head for use with geared heads or greater comfort when using fluid heads using itsstandard attachment point for the ARRI Eyepiece Leveler EL-3. To avoid damage to the VMB-1/VMB-2 when using the VEB-1 with an eyepiece leveler, loosen the friction on VMB-1/VMB-2's rotating assembly.

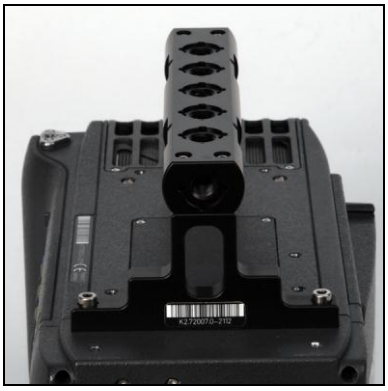
Figure 14: EVF extension bracket

Figure 15: Camera with EVF-1 on extension and cable KC-151S

9.4 Center Camera Handle CCH-1

The Center Camera Handle CCH-1 is attached to the camera top with three captive 3mm hex socket head screws (two at the front and one at the back). Ensure that the CCH-1 is securely fastened before attempting to lift the camera from it.

Figure 16: Camera with CCH-1, side view



The Handle Extension Block HEB-2 mounts to the front end of the CCH-1 and adds one more focus hook to the camera in a high position, allowing the tape measure to clear the matte box.

9.5 Side Camera Handle SCH-1

The Side Camera Handle SCH-1 is used in conjunction with a BAT-V or BAT-G top-mounting battery adapter, or with third-party onboard recorders. It is attached to the camera using three captive 3mm hex socket head screws (two at the front and one at the back). Ensure that the SCH-1 is securely fastened before attempting to lift the camera from it.

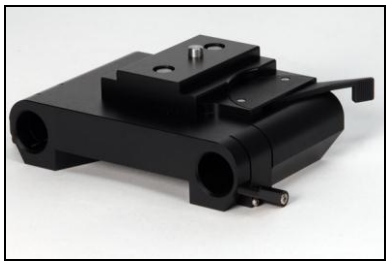
If a tall battery or a tall third-party onboard recorder is used, the adjustable center grip of the SCH-1 can be replaced by the taller Adjustable Center Grip Tall (ACG-2).

Figure 17: SCH-1

Figure 18: Camera with SCH-1, side view

9.6 Bridge Plates BP-12/BP-13

The bridge plate BP-12 for 19 mm studio rods has been newly developed for ALEXA. It mounts directly to the camera body using two 3/8"/16 screws and ensures that support rods, matte boxes and follow focus units are positioned properly in regards to the optical center of the camera, just like all other ARRI cameras.



The bridge plate BP-13 is equivalent to the BP-12, but for 15 mm studio rods.

Note: Make sure bridge plates are tightened firmly with a screwdriver, not the commonly used coin!

9.7 Bridge Plate adapter BPA-1

The bridge plate adapter BPA-1 can be used to attach a BP-3/BP-5/BP-8/BP-9 to ALEXA. First attach the BPA-1 to the camera with the two screws. Then attach the bridge plate to the adaptor with its two screws. Make sure the screws are tightened firmly with a screwdriver.

9.8 Wedge Adapter WA-1 and Quick-Release Plate QR-HD-1

The WA-1 can be mounted at the same position as a bridge plate. It has a dove tail that slides into the counter part of a quick-release plate, like the ARRI QR-HD-1. The quick-release plate has a pin at its back, which fits into the pin receptacle at the back of the camera base.

Figure 19: ARRI QR-HD-1

9.9 Leveling Block LB-1

The Leveling Block LB-1 attaches to the bottom of the ALEXA in the pin receptacle on the back foot. It prevents the camera from resting on a rear-mounted battery when a bridge plate is attached and the camera is placed on a flat surface.

Attach the LB-1 by inserting its pin into the pin receptacle at the end of the shoulder arc in the camera base. Twist the knob clockwise to tighten.

Figure 20: Leveling Block LB-1

9.10 Shoulder Pad SP-3

The camera base has an integrated arch to fit to the operator's shoulder. For extended handheld shots, the newly designed shoulder pad SP-3 can be attached to the base of the camera with velcro.

Note: The SP-3 can only be used with a BP-12 and 19 mm rods or with 15 mm rods and a Wedge Adapter WA-1 and a Quick-Release Plate QR-HD-1 . When using the BPA-1 with a BP-5/BP-8, the bridge plate has to be removed prior to attaching the SP-3.

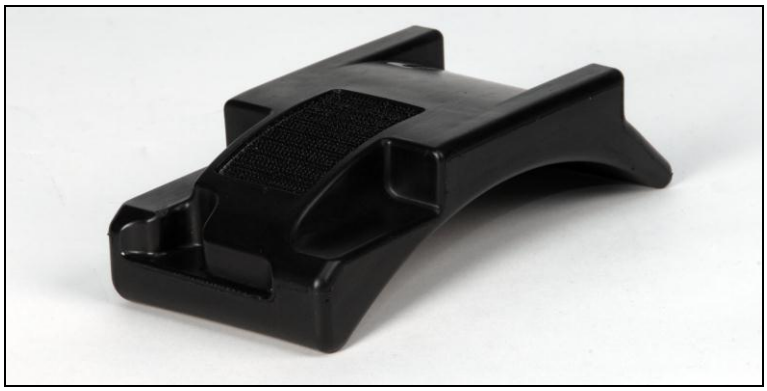


Figure 21: SP-3 shoulder pad

Figure 22: SP-3 below camera

10 Connectors

Camera back

Figure 23: Connectors at back

From top to bottom: MON OUT, RET/SYNC IN, EXT, REC OUT 1, REC OUT 2, BAT, ETHERNET

Camera right

Figure 24: Connectors on right side

From left to right, top to bottom: 2x RS (24 V) out, AUDIO OUT, TC, 12V out, AUDIO IN, SD CARD (camera bottom)

Camera left

Figure 25: Camera left

Top to bottom: **SxS** slot 1, **SxS** slot 2

Camera front

Figure 26: Camera front

EVF connector

10.1 BAT

The BAT connector can be used to power the camera from an external power source with cables KC-20S and KC-29S.

It is located at the back of the camera on the camera-right side.

10.2 REC OUT 1 + 2

The REC OUT consists of two BNC connectors capable of carrying 1920x1080 1.5G or 3G HD-SDI signals with frame rates from 23.976 to 60 fps according to SMPTE standards 274M, 292M, 372M and 425M (Level B). In addition, it outputs ARRIRAW in a proprietary format that is supported by a range of third-party recorders. RGB 444 at frame rates of 48, 50, 59.94 and 60 fps is output in a proprietary format utilizing two 3G connections. The signal format can be changed in the **Recording** menu.

The connectors are located at the back of the camera on the camera-right side.

10.3 RET/SYNC IN

A return signal from another image source can be fed into the ALEXA's RET connector for displaying on EVF and/or MON OUT. The signal must be a 1920x1080 422 1.5G single link according to SMPTE 274M and 292M. The output routing of the RET in signal can be set in the Monitoring menu.

The connector is located at the back of the camera on the camera-right side.

10.4 MON OUT

The MON OUT is a single BNC connector capable of carrying a 1920x1080 422 YCbCr 1.5G HD-SDI signal with frame rates of 23.976, 24, 25, 29.97 or 30 fps according to SMPTE standards 274M and 292M. The signal format can be changed in the Monitoring menu.

The connector is located at the back of the camera on the camera-right side.

10.5 EXT

The EXT connector is a multi-pin accessory connector that carries signals for communication with various accessories and 24V power. The maximum power output is 2.2A, shared with the RS outputs.

Cables are currently available for:

- Connecting a UMC-3 remote motor controller

(model UMC Connection Cable (0.80m/2.6ft) K-UMC3-ALEXA)

- Connecting two ALEXA cameras for synchronized operation
  (model EXT to EXT Cable (2.00m/6.6ft) KC 155-S)

The connector is located at the back of the camera on the camera-right side.

10.6 ETHERNET

Standard ethernet connectors can deliver neither the power nor the durability and reliability required by ARRI, so the ALEXA uses a specially designed 10-pin LEMO connector. The ARRI KC-153-S cable is required to connect the Ethernet socket to a standard RJ-45 Ethernet port.

The ethernet port can be used to operate two ALEXA cameras with synced settings by connecting the cameras with a KC 156-S cable, or to connect the Remote Control Unit RCU-4 to the camera.

The ethernet connector can output 24 V with 1.2 A power.

The connector is located at the back of the camera on the camera-right side.

10.7 EVF

The EVF connector connects the camera to an EVF-1 electronic viewfinder. The signals on this connector are proprietary and can only be used to drive an EVF-1. This proprietary signal assures low latency for the viewfinder image.

The connector is located at the front of the camera on the camera-left side.

10.8 AUDIO IN

2-channel analog line-level audio can be fed to the camera via the 5-pin XLR connector located at the front of the camera on the camera-right side.

The ALEXA converts the audio signal from analog to 24 bit 48 kHz PCM.

10.9 RS

The two RS connectors supply external accessories with at least 24 V power and a combined load of up to 2.2 A (shared with the EXT connector power out). The sockets also accept an ARRI remote start/stop trigger.

The connectors are located at the front of the camera on the camera-right side.

10.10 12 V

The 12 V connector supplies an external accessory with 12 V power and up to 2.2 A current.

The connector is located at front of the camera on the camera-right side.

10.11 TC

The TC connector is a 5pin LEMO socket. It accepts and distributes a Longitudinal Time Code (LTC) signal.

It can be used to

- jam-sync the ALEXA's time code to a Clockit, TC Slate or another camera
- transmit the ALEXA's time code to a Clockit, TC Slate or another camera
- tune the frequency of the ALEXA's crystal oscillator with an Ambient ACC Clockit Controller

The connector is located at the front of the camera on the camera-right side.

10.12 AUDIO OUT

The AUDIO OUT is a 3.5mm TRS connector (headphone jack), which outputs audio fed to the 5-pin XLR AUDIO IN connector with a maximum power of 2.5 dBm.

The connector is located at the front of the camera on the camera-right side.

Note: Connecting a headphones to the camera while recording can cause a short audio signal interruption due to static electricity.

10.13 SD Card

The ALEXA saves data such as user setups, frame grabs and system logs to an SD card. Firmware, additional frame lines and ARRI Look Files are loaded onto the camera from the SD card. The SD card slot is located on the bottom of the camera on the camera-right side. To access the SD card slot, slide the door towards the front of the camera.

SD Card Requirements

- SD or SDHC card (most brands are compatible)
- maximum capacity of 4GB

- FAT or FAT32 format

Note: Keep the SD card slot door closed to prevent dirt and moisture from entering the camera.

The SD card can be formatted on the ALEXA or the following folder structure can be created manually on a computer. The SD card must be properly formatted prior to its first use.

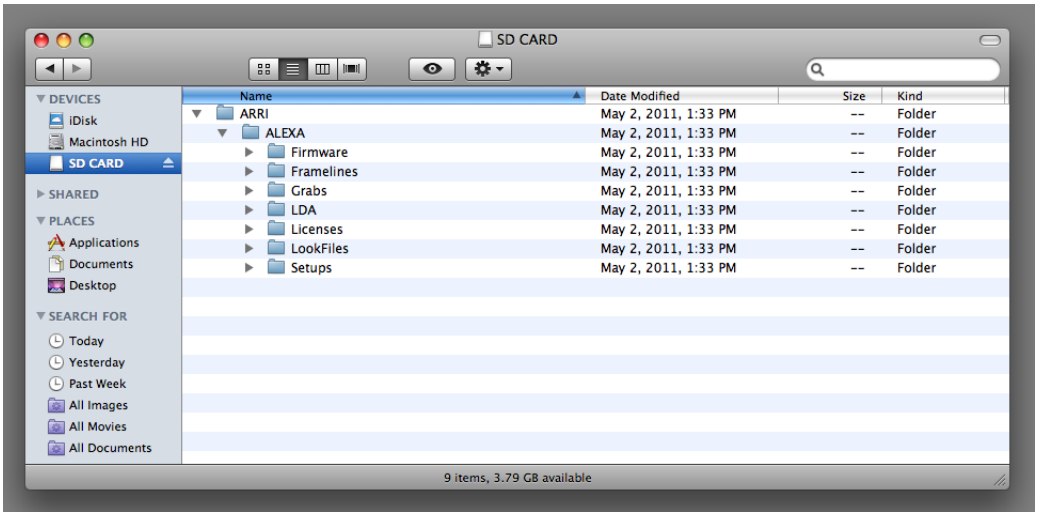


Figure 27: Folder structure required for SD card

To format an SD card on the ALEXA:

1. Press the **MENU** button.
2. Using the jogwheel, select System.
3. Select SD Card.
4. Select Format + prepare SD card.
5. Press both **FORMAT** buttons simultaneously. The ALEXA will create the required folder structure on the SD card after formatting.

Note: Formatting the SD card will irreversibly remove all data on the SD card.

To create the required folder structure on the SD card in the ALEXA without formatting:

1. Press the **MENU** button.
2. Using the jogwheel, select System.
3. Select SD Card.
4. Select Prepare SD card. The ALEXA will create the required folder structure on the SD card without formatting or deleting any data.

Note: Firmware update files are recognized by the camera anywhere within the structure, but it is recommended to copy the them into the Firmware folder.

10.14 SxS Slots

The ALEXA records clips using the **SxS** module on the camera-left side. The two **SxS** card slots can be accessed by opening the **SxS** door towards the camera body. The **SxS** door was designed for accessibility when the ALEXA is operated in confined spaces or mounted on rigs such as remote heads.

Note: Keep the **SxS** slot door closed to prevent dirt and moisture from entering the camera.

To load an SxS card:

1. Insert the **SxS PRO** card into the **SxS** slot with the contacts facing the front of the camera and the label facing out (away from the camera body).
2. Push the card in against the spring until the lock engages.
3. Close the **SxS** door.

Note: Do not force an **SxS PRO** card into the slot backwards or with the label-side in—the contacts in the **SxS** module and the **SxS PRO** card could be damaged.

Note: Do not force the **SxS** door closed if the **SxS PRO** card is not fully inserted and the lock engaged.

To release an SxS card:

- Push the **SxS PRO** card in until the lock disengages, taking care to prevent the card from dropping out of the **SxS** slot.

SxS PRO cards do not have to be mounted or unmounted—they can be inserted or removed whenever the camera is not recording to the **SxS** module. If a card is removed during recording, only the last second of the current clip will be lost. All clips on the card will remain accessible and the card will remain fully functional.

Note: If the recording process is interrupted by power loss or card removal, transfer all the data from the **SxS PRO** card and format it before using it again.

To toggle between SxS slots:

- With the **SxS** door open, press the metal card select button located between the **SxS** slots. The active **SxS** slot is indicated by the LED in the **SxS** window.

Explanation of SxS LED States

Each card has an LED that signals the **SxS PRO** card's state to the user.

LED state	Card state
Off	No card present Card is unreadable (e.g. wrong file system) Card is inactive
Solid green	Card is selected and ready
Solid red	Card is accessed (read/write) *DO NOT REMOVE THE CARD!*

Note: Only Sony **SxS PRO** cards can be used with ALEXA. Sony **SxS-1** cards are not supported.

11 Lens Mounting

The ALEXA is equipped with an interchangeable lens mount. Available adapters include:

- Lens Adapter PL Mount LA-PL-1
- Lens Adapter Panavision Mount LA-PV-1

Note: Lenses must cover an image circle of at least 30 mm in diameter to prevent vignetting.

11.1 Lens Adapter PL Mount LA-PL-1 (no LDS)

The Lens Adapter LA-PL-1 is the standard lens mount delivered with the ALEXA. It can be used to attach any modern PL-mount lens to the camera.

To mount a PL-mount lens:

1. Turn the bayonet ring anti-clockwise until it stops.
2. Remove the lens port cap.
3. Carefully insert the lens into the lens port. Align the notch in the lens flange with the index pin on the mount, keeping the lens rotated into a position where the lens markings are visible from either side of the camera.
4. Press the lens flange flat onto the lens mount.
5. Turn the bayonet ring clockwise until the lens is locked securely.
6. Ensure that the lens is properly mounted.

Note: When no lens is attached to the camera, use the lens port cap to prevent dust from entering the lens cavity.

Note: The sophisticated design principle of the camera's optical module delivers outstanding images with a cinematic look and feel, but also makes the imager sensitive to contamination. Dust particles that have settled on the sensor cover glass during a lens change may become visible as dark spots in the output image, similar to lint leaving marks on exposed film. The degree of this effect depends on the aperture of the lens.

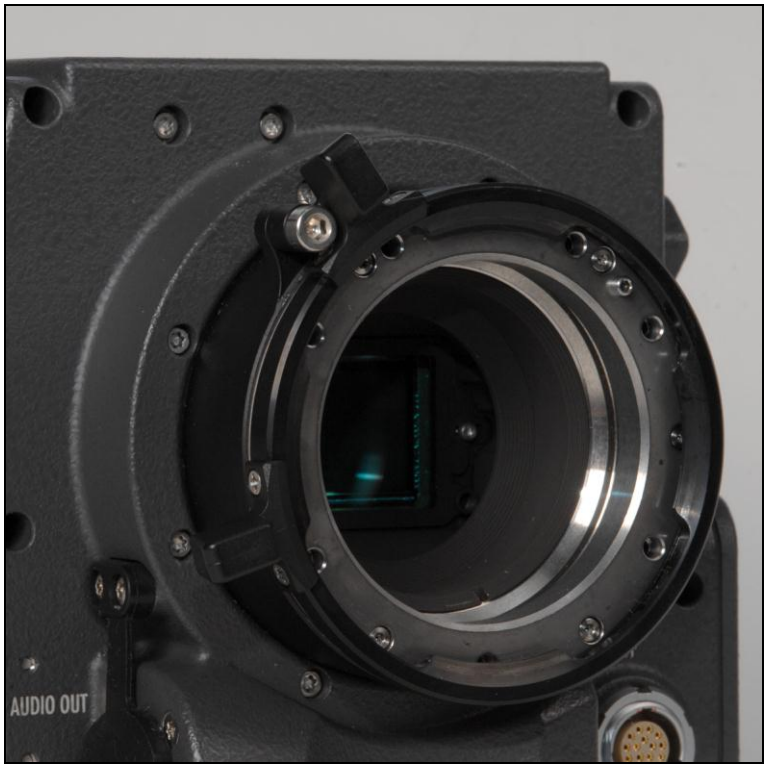


Figure 28: PL mount LA-PL-1 with index pin

11.2 Lens Support

Heavy lenses may require additional lens support. Using a lens support guarantees that the weight of the lens will not influence the flange focal depth and reduces stress on the lens mount.

To support a lens use 15mm studio or 19mm studio rods and an appropriate lens bridge. 15mm studio rods require a bridge-plate with 15mm studio rod support, such as a BP-3/BP-9 + BPA-1, while 19mm studio rods require a bridge-plate with 19mm studio rod support, such as a BP-12 or BP-5/BP-8 + BPA-1.

Mount the lens bridge LS-10 for 15 mm studio rods by pushing it onto the rods from the front. Mount the lens bridge LS-9 for 19 mm studio rods by clipping it on the rods from the top.

Slide the bridge into position on the rods directly under the lens support ring on the lens, and fix it in place by tightening the lever on its side. Align and tighten the center screw in the lens support ring, adjusting the height of the center screw with the lever on the back of the lens bridge.

Figure 29: Camera with BP-12, 19mm studio rods and lens bridge

12 Camera Controls

The ALEXA can be controlled through three user interfaces:

Main controls	Location: camera-right side Interface: 3-inch LCD-screen with floating-function buttons, a jogwheel to navigate through menus and adjust parameters, and a range of fixed-function buttons.
Operator controls	Location: camera-left side Interface: three assignable function buttons plus three fixed-function buttons for easy operator access.
EVF controls	Location: Electronic Viewfinder EVF-1 Interface: fixed function buttons and a jogwheel for adjustment of viewfinder parameters and primary shooting parameters.

12.1 Main Controls

The main controls can be used to set all camera parameters.

Figure 30: Main controls

12.1.1 Display

The 3-inch LCD has a resolution of 400x240 pixels. The back-lit, transflective display has exceptional contrast even in bright sunlight.

To adjust the LCD brightness:

- On the HOME screen, rotate the jogwheel while pressing the **BACK** button.

A removable plastic shield protects the display from scratches. It can be removed by pulling it off the four pins.

12.1.2 Screen Buttons

Six screen buttons are located above and below the LCD display. Their function varies depending on the screen content and is shown directly above or below each button. If no function is shown above or below a button on the LCD, it has no function for that screen.

As a failsafe, operations that cannot be reversed and can result in the loss of data require pressing two buttons simultaneously to confirm the operation.

12.1.3 HOME screen

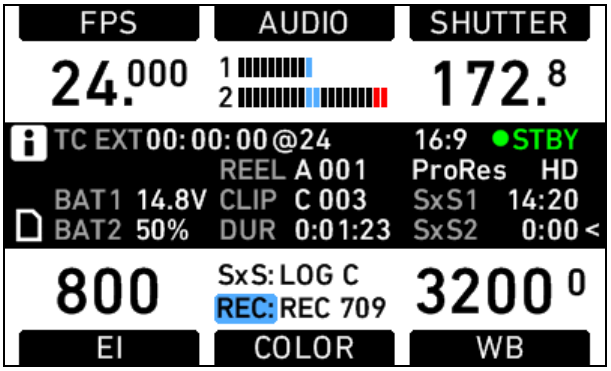


Figure 31: HOME screen

The HOME screen is the ALEXA's default screen. It shows the most important camera parameters and gives quick access to changing them through the screen buttons. To return to the HOME screen from any menu in the camera, press the **HOME** button.

Note: To adjust the LCD brightness from the HOME screen, rotate the jogwheel while pressing the **BACK** button.

Screen buttons

Button	Function
FPS	Sets the frame rate of the sensor, adjustable from 0.750-60.000 fps in Regular Speed Mode, and from 60.000-120.000 fps in High Speed Mode. Note: High Speed Mode can only be activated with a valid High Speed license key installed in the camera.
AUDIO	Shows the current audio level. If AUDIO is set to Off, the audio input is switched off: no audio is embedded in the HD-SDI outputs, and no audio tracks are recorded on the **SxS PRO** cards. The same applies if AUDIO is disabled, which is the case if the sensor frame rate is different from the project fps setting (for example, while over- or undercranking).
SHUTTER	Sets the shutter angle of the sensor, adjustable from 5.0-358.0°. Shutter angle and sensor fps determine exposure time of the sensor in seconds by the following equation: angle/(360*fps). *Note: In High Speed mode, the shutter angle is limited to a maximum of 356.0°.*
EI	Sets the exposure index rated in ASA. The ALEXA has a base sensitivity of 800 ASA. The camera's EI rating can be adjusted from 160 to 3200 ASA.

Note: ASA rating is identical to ISO rating.

Note: Exposure Index is not applied to ARRIRAW signals.

COLOR	Opens the color screen, where gamma and look settings for **SxS**, REC OUT, MON OUT and EVF can be changed.
WB	Sets the camera's white balance. This is the color temperature of the light source that the ALEXA is currently adjusted for. The white balance can be adjusted from 2000 to 11000 Kelvin in steps of 100 Kelvin. In addition to the red/blue correction of the white balance, the ALEXA can also compensate for a green/magenta tint. This value, called CC (color compensation), is shown as an exponent of the WB value. Positive values are marked with a "+" and negative values with a "-". The user can execute an automatic white balance by pressing the **AUTO WB** button in the **WB** screen.

Camera Status Section

TC	Displays the current time code including the source (INT: internal, EXT: external source). Frames are not displayed. The timebase of the time code is shown after the @ sign.
MASTER	Camera is set to Ext sync: MASTER
SLAVE	Camera is set to Ext sync: SLAVE
	Settings sync is active
BAT 1	The voltage level of the power source present at the BAT connector, or the remaining capacity of an attached battery in percentage if it transmits this information.
BAT 2	The voltage level of a battery attached to the onboard battery adapter, or the remaining capacity of an attached battery in percentage if it transmits this information.
REEL	Identifies the current reel with the camera index letter, such as A or B and the reel number.
CLIP	Identifies the current clip with the clip index and clip number.
DUR	Displays the duration of the current clip during recording or the length of the last recorded clip while in standby in the format **h:mm:ss**.
SxS1 14:20	Capacity of the currently active **SxS PRO** card in minutes. It is calculated for the current framerate and codec.*
<	Marks the active **SxS PRO** card.
STBY	The camera is in standby and ready to record.
REC	The camera is recording.
ERROR	An error occurred and recording is not possible. Press the **INFO** button for more information. If nothing is shown, the camera has detected no errors, but no **SxS PRO** card is present for recording.

* Note: When **SxS** recording is set to ProRes™, the value shown is the minimum available recording time for the current sensor frame rate and codec combination.

Apple ProRes™ is a variable bit rate codec, so the actual remaining recording time depends on the image content.

When using Avid's DNxHD, the remaining recording time is accurate.

Icons

Name	Icon	Description
General Warning		Important information is waiting on the INFO screen.
General Error		An error has occurred. Check the INFO screen for more information.
Temperature Warning		There is a minor sensor-temperature offset. Image quality may be slightly affected.
Temperature Error		There is a substantial sensor-temperature offset. Image quality may be seriously affected.
Lock		The Main Controls are locked.
SD Card		An SD card is present. The icon turns orange when the card is accessed.
Grab		The GRAB icon flashes while a still frame is being taken and written to the SD card.
High Humidity Mode		The sensor is in High Humidity mode (i.e. the sensor is kept at 40° C sensor temperature to avoid condensation).
Radio		The WRS radio is active (ALEXA Plus only).

Note: A sensor temperature warning or error after boot-up is normal as the sensor takes a few seconds to reach its preset temperature.

12.1.3.1 Lists and User Lists

On the HOME screen, press the **FPS**, **SHUTTER**, **WB** (white balance) and **EI** (exposure index) buttons to open lists of preconfigured values for each setting.

User-defined values can be added to the FPS, SHUTTER and WB lists. The EI list is fixed and user-defined values cannot be added. It contains values from 160-3200 ASA in steps of 1/3 stops.

Setting a list value

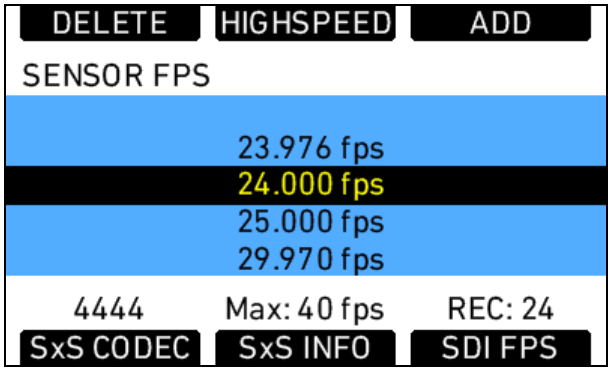


Figure 32: SENSOR FPS screen

Any value in a list may be set. Invalid values will appear grayed out.

To set a list value:

1. Rotate the jogwheel to select the desired list value.
2. Press the jogwheel to set the list value.

Adding a list value

If the desired list value does not appear in the list, a user-defined value can be added.

To add a list value:

1. Press the **ADD** button.
2. On the **ADD** screen, use the jogwheel and **+** or **–** buttons to enter a new list value.
3. When you are finished entering the new list value, press the jogwheel to add it to the list.

Note: Each list supports a maximum of 16 entries. To add new user-defined list values to a full list, you must delete previously added user-defined list values.

Deleting a list value

User-defined list values that are no longer required can be deleted.

To delete a list value:

1. Press the **DELETE** button.
2. On the **DELETE** screen, use the jogwheel to select the user-defined value you wish to delete.
3. Press both **DELETE** buttons simultaneously.

Note: Preconfigured values cannot be deleted and will appear grayed out on the DELETE screen.

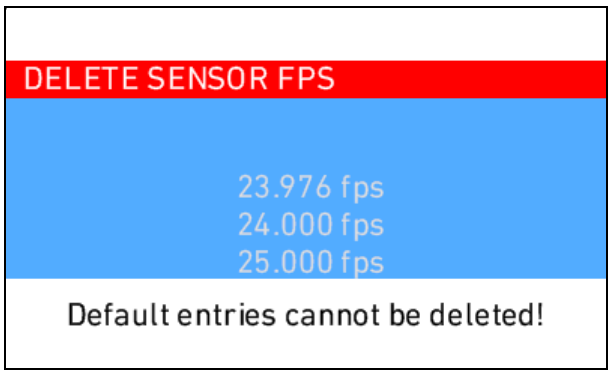


Figure 33: DELETE SENSOR FPS screen

Note: The EI list is static and cannot be changed by the user. It contains ASA values from 160-3200 ASA in steps of 1/3 stop.

12.1.3.2 FPS

Press the **FPS** (frames per second) button on the HOME screen to open the **SENSOR FPS** list screen, which lists the default frame rates as well as user-defined frame rates.

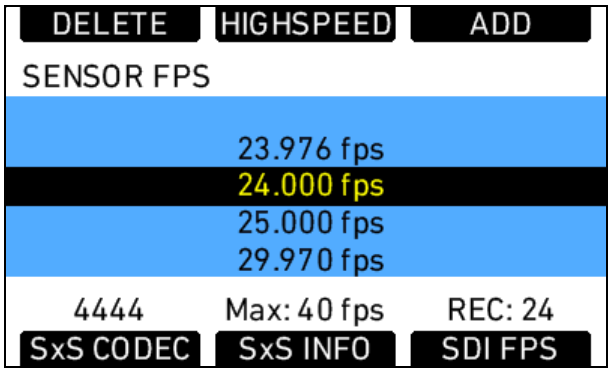


Figure 34: SENSOR FPS screen

Note: Access to this screen is disabled during record.

The maximum frame rate that can be set is dependent on the type of **SxS PRO** card and the codec.

The following table shows the maximum available frame rate for all codec/card combinations.

Codec	SxS PRO **8-32 GB**	SxS PRO **64 GB**
16:9 HD		
ProRes 422 Proxy	60 fps (120 fps)[1]	60 fps (120 fps)[1]
ProRes 422 LT	60 fps (120 fps)[1]	60 fps (120 fps)[1]
ProRes 422	60 fps	60 fps (120 fps)[1]
ProRes 422 HQ	60 fps	60 fps (120 fps)[1]
ProRes 4444	40 fps	60 fps
DNxHD 115/120/145	60 fps	60 fps (120 fps)[1]
DNxHD 175x/185x/220x	60 fps	60 fps (120 fps)[1]
16:9 2K		
ProRes 422 Proxy *through* 422 HQ	60 fps	60 fps
ProRes 4444	40 fps	60 fps
4:3 2K		
ProRes 422 Proxy *through* 422	48 fps	48 fps
ProRes 422 HQ	40 fps	48 fps
ProRes 4444	30 fps	48 fps

[1]By installing a High Speed licence, the maximum available frame rate can be increased to 120 fps.

If the desired frame rate cannot be set because it is grayed out, change the **SxS** codec to one with a lower data rate. For example, when using a 32 GB **SxS PRO** card and the ProRes 4444 codec, 60.000 fps will be grayed out. Set the ProRes 422HQ codec to enable 60.000 fps.

There are shortcut buttons on the **FPS** screen for **SxS CODEC**, **SxS INFO** and **SDI FPS**. In the **SDI FPS** screen, both MON OUT and REC OUT frame rates can be adjusted within the limits of their current format.

Setting sensor fps through REC OUT fps

When the **FPS** button is pressed on the HOME screen and the sensor frame rate is linked to the REC OUT frame rate, a message appears instead of the list. While this setting is active, the sensor frame rate can only be set by setting the REC OUT frame rate.

To link or unlink the sensor frame rate to the REC OUT frame rate:

1. Press the **MENU** button.
2. On the **Recording** menu, use the jogwheel to select **REC OUT**.
3. Select **REC OUT fps sets sensor fps** and set **On** or **Off**.

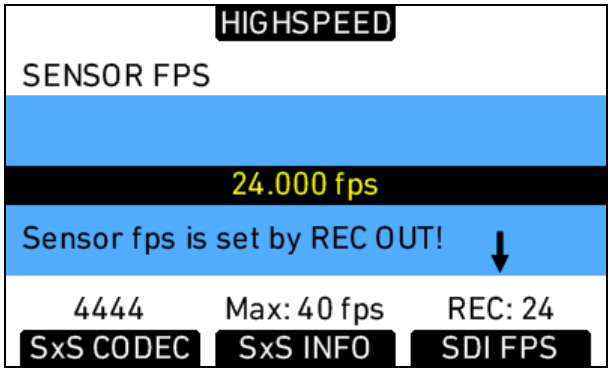


Figure 35: SENSOR FPS screen with linked sensor frame rate

Setting the correct frame rates when recording with external devices

When recording ARRIRAW or the 444 signal from the ALEXA to an external recorder, correct frame-rate settings are critical. Mismatched sensor and REC OUT frame rates could result in dropped frames and lost footage.

Setting the sensor frame rate determines the number of frames per second generated by the sensor. The range is 0.750 to 60.000 frames per second. The images are then processed by the camera electronics for the different output paths.

The REC OUT is the recording output path, which transmits images to an external recorder. The REC OUT frame rate is limited to standard speeds.

Ideally, the REC OUT frame rate matches the sensor frame rate. If the REC OUT frame rate is lower than the sensor frame rate, the images cannot be output as fast as they are created by the sensor, resulting in dropped frames and loss of data.

Note: If the REC OUT frame rate is lower than the sensor frame rate, a **!** warning will appear over the **SDI FPS** button.

If the REC OUT frame rate is higher than the sensor frame rate, duplicate frames are output over the REC OUT. For example, if the sensor is set to 10 fps and the REC OUT is set to 30 fps, every image is output three times, resulting in two duplicate frames following every active frame. A standard recorder would record these duplicate frames, which would have to be removed in post.

To prevent this extra step, the ALEXA marks the duplicate frames with a Variflag. If the recorder supports Variflag recording, it will discard the duplicate frames and only record the active frames. This saves valuable storage space and post-production work.

The MON OUT should match the sensor and the REC OUT frame rate. If the sensor frame rate exceeds the available MON OUT frame rates, set the MON OUT to half the sensor frame rate if possible to maximize the smoothness of the image when panning and tilting.

To correctly set frame rates for the REC OUT:

1. Press the **MENU** button.
2. Using the jogwheel, select the **Recording** menu.
3. Select **REC OUT**.
4. Set **Frame rate** to the desired frame rate. This frame rate should match the frame rate setting on the external recorder.
5. If the desired sensor frame rate is a standard speed, set **REC OUT fps sets sensor fps** to **On**.
6. Press the **HOME** button to exit.

To correctly set frame rates for the MON OUT:

1. Press the **MENU** button.
2. Using the jogwheel, select the **Monitoring** menu.
3. Select **MON OUT**.
4. Set **Frame rate** to the same frame rate as the REC OUT. If the REC OUT frame rate exceeds the range of the available MON OUT frame rates, set the MON OUT frame rate to half the value of the REC OUT frame rate.
5. Press the **HOME** button to exit.

To set a non-standard frame rate for the REC OUT:

1. Press the **MENU** button.
2. Using the jogwheel, select the **Recording** menu.
3. Select **REC OUT**.
4. Set **REC OUT fps sets sensor fps** to **Off**.
5. Press the **HOME** button to exit.
6. On the HOME screen, press the **FPS** button.
7. Select the desired frame rate from the list or add a user-defined frame rate (see Adding a list value in Lists and User Lists).

High Speed Mode

If a valid High Speed license key is installed on the ALEXA, frame rates from 60.000 to 120.000 fps are available in High Speed mode. Frame rates below 60.000 fps are not available. Exit High Speed mode to record frame rates lower than 60.000 fps. Default frame rates in the FPS list are 60.000, 72.000, 75.000, 90.000, 96.000, 100.000 and 120.000 fps.

High Speed mode recording is possible only to SxS PRO cards. When High Speed mode is loaded, the REC OUT outputs switch output paths and carry the MON OUT signal with a maximum frame rate of 30 fps.

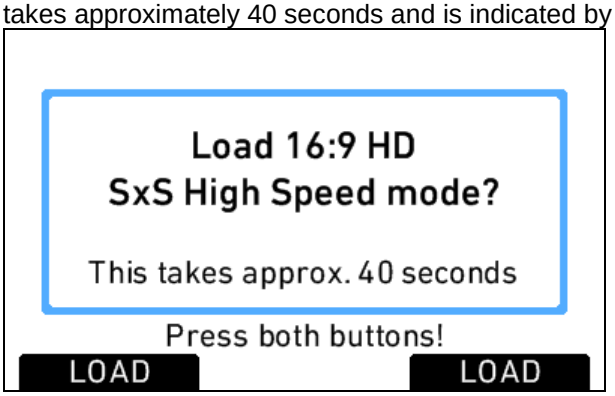
Note: High Speed mode recording is possible in ProRes HD codecs only. The maximum frame rate in ProRes 2K is 60 fps in 16:9 sensor mode and 48 fps in 4:3 sensor mode.

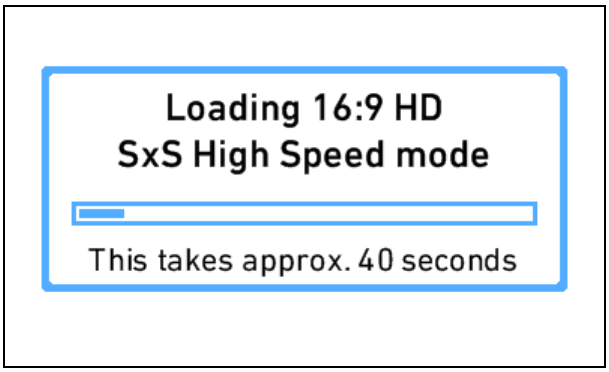
ARRI recommends using only Sony **SxS PRO** 64 GB cards in High Speed mode, as only these allow recording at sensor frame rates from 60-120 fps with all High Speed codecs. When using Sony **SxS PRO** 32 GB cards with codecs ProRes 422, ProRes 422 HQ, DNxHD 115/120/145 and DNxHD 175x/185x/220x, the sensor frame rate is limited to 60 fps maximum.

Note: When using the ALEXA Studio, ALEXA Plus 4:3 and ALEXA M, High Speed mode is only available in 16:9 Sensor mode and ProRes HD codecs.

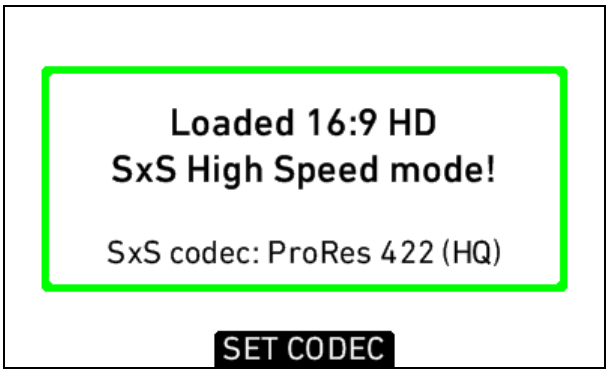
To load High Speed mode:

1. On the HOME screen, press the **FPS** button.
2. On the **FPS** screen, press the **HIGHSPEED** button.
3. Press both **LOAD** buttons simultaneously. Loading High Speed mode takes approximately 40 seconds and is indicated by a progress bar.





4. After loading, the current High Speed codec is displayed. Press the SET CODEC button to set a different codec.



To exit High Speed mode:

1. On the HOME screen, press the **FPS HS** button.

2. On the **FPS HIGHSPEED** screen, press the **EXIT HS** button.
3. Press both **EXIT** buttons simultaneously. Exiting High Speed mode takes approximately 40 seconds and is indicated by a progress bar.

12.1.3.3 AUDIO

Press the **AUDIO** button on the HOME screen to open the AUDIO screen. This screen shows the ALEXA's two audio channel levels. The audio levels are displayed from -45 dBFS to 0 dBFS.

Note: No audio meters are displayed on the HOME screen or AUDIO screen when audio is set to Off or audio is disabled. Audio is disabled when the sensor frame rate does not match the project frame rate.

Light blue markers show reference levels of -20, -18 and -9 dB FS.

Red markers at levels -1 and 0 dBFS warn of clipping. With a proper audio signal levels, the red markers should almost never be visible.

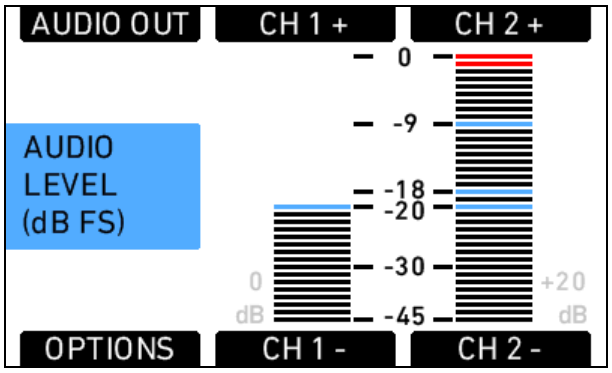


Figure 36: Audio screen

Gain can be applied to the audio channels by turning the jogwheel to set both channels, or by pressing the **CH 1+**, **CH 1-**, **CH 2+** and **CH 2-** buttons. The amount of gain applied by the camera is indicated next to the levels as light gray numbers.

Press the **OPTIONS** button to open the AUDIO IN>OPTIONS screen and set audio parameters.

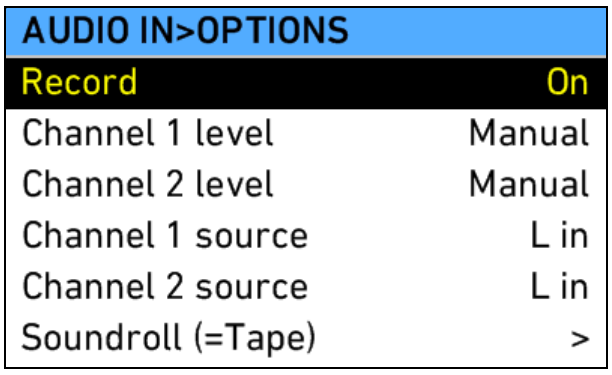


Figure 37: AUDIO IN>OPTIONS screen

Option	Description
Record	Turns audio recording **On** or **Off**. If audio recording is switched off, no audio is recorded on **SxS** cards, the HD-SDI contains no audio and the Audio out is muted.
Channel 1 level	Manual allows the user to manually apply gain to the input signal on channel 1 to reach a correct level. Unity matches a 4 dBu input signal to -20 dBFS. This setting leaves enough headroom for recording and avoids audio clipping. When Unity is selected, audio levels cannot be adjusted by the user.
Channel 2 level	Manual allows the user to manually apply gain to the input signal on channel 2 to reach a correct level. Unity matches a 4 dBu input signal to -20 dBFS. This setting leaves enough headroom for recording and avoids audio clipping. When Unity is selected, audio levels cannot be adjusted by the user.
Channel 1 source	Select the left or right input signal as the source for Channel 1.
Channel 2 source	Select the left or right input signal as the source for Channel 2.
Soundroll (=Tape)	Enter a name for the sound roll (also known as Tape in the menus of some recorders) of an external audio recorder, for easier sound synching in post-production. The name will be written to the FCP XML file and the Avid Log Exchange (ALE) file on the **SxS PRO** cards.

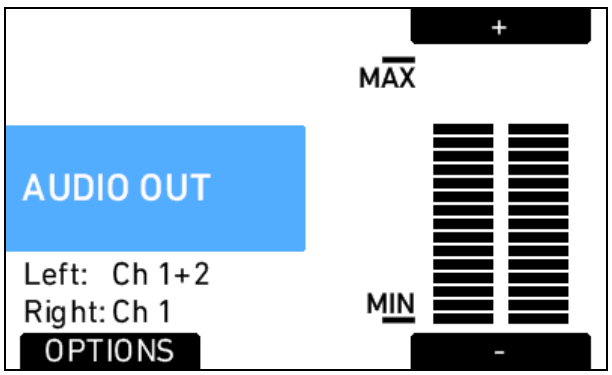


Figure 38: Audio out screen

Press the **AUDIO OUT** button to open the AUDIO OUT>OPTIONS screen where the global volume for both Audio out channels can be adjusted. The **OPTIONS** button opens a list of AUDIO OUT options.

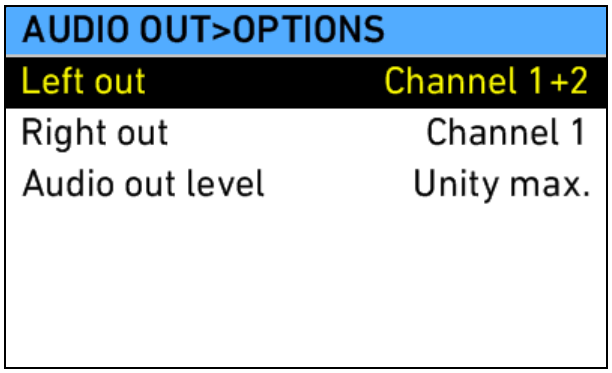


Figure 39: AUDIO OUT>OPTIONS

Left out	Sets which channel is routed to the left output.
Right out	Sets which channel is routed to the right output.
Audio out level	Set the level of the audio out channels manually, or set it to fix the maximum output.

Note: These settings do not influence the audio signal embedded in the HD-SDI connectors or recorded in QuickTime clips. They only affect the AUDIO OUT connector!

Note: ALEXA automatically determines the internal signal run time and matches audio and images so they are always in sync. When changing sensor fps or project fps, it may take up to 2 seconds for the camera to resync image and audio signals.

12.1.3.4 SHUTTER

Press the **SHUTTER** button in the HOME screen to open the SHUTTER ANGLE screen.

Note: Access to this screen is disabled during record.

The list of default shutter angles includes 11.2°, 22.5°, 45.0°, 90.0°, 172.8°, 180.0°, 270.0° and 358.0°. User-defined shutter angles can be set by pressing the **ADD** button. The exposure time for the current frame rate and shutter angle is indicated in seconds at the bottom of the SHUTTER ANGLE screen.

The shutter angle range is 5.0° to 358.0°. In High Speed mode, the shutter angle is limited to a maximum of 356.0°.

Below the list, the actual exposure time at the currently set frame rate is shown.

Note: Be aware that the combination of long exposure times (a low sensor frame rate

and large shutter angle) and high exposure indexes can lead to image artifacts!

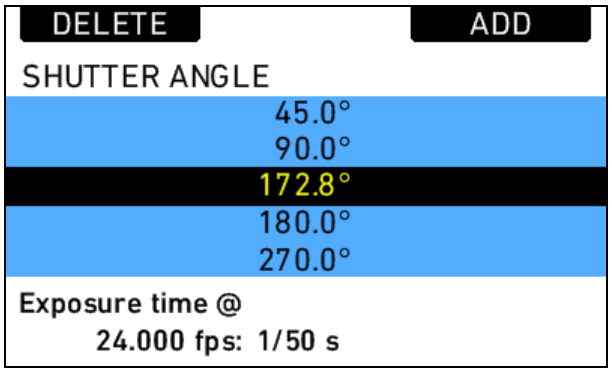


Figure 40: Shutter list

12.1.3.5 EI

The Exposure Index (EI) is the applied sensitivity of the camera.

The ALEXA has a base sensitivity of 800 ASA. This means that the dynamic range is almost evenly distributed above and below neutral gray with low noise in the shadows and clean, smooth clipping behavior in the highlights.

Due to its high dynamic range, the ALEXA's sensitivity can be set from 160 to 3200 ASA in steps of 1/3 stops while maintaining high image quality.

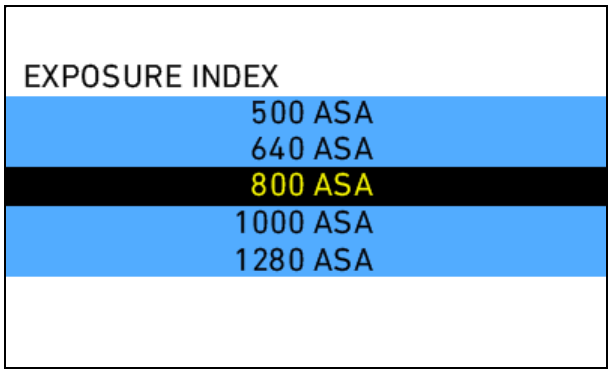


Figure 41: Exposure Index screen

Note: The Exposure Index list has fixed content, meaning that it cannot be changed by the user.

Applying the exposure indexes at the extremes of the range will nonetheless have an influence on the images. At low exposure indexes, such as 160 ASA, the dynamic range below neutral gray increases, reducing noise even further. At the same time, the dynamic range above neutral gray is slightly reduced. Highlight clipping itself is not influenced by this, but the shoulder of the gamma curve will get slightly steeper, reducing the smoothness of the clipping.

At high exposure indexes, such as 1600 ASA, the images behave in the opposite way. Noise is increased, which makes it important to judge shadow detail, while the highlight clipping behavior will be even smoother.

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 $^{+9.4}_{-4.6}$

Figure 42: Exposure Indexes and latitude above and below neutral gray

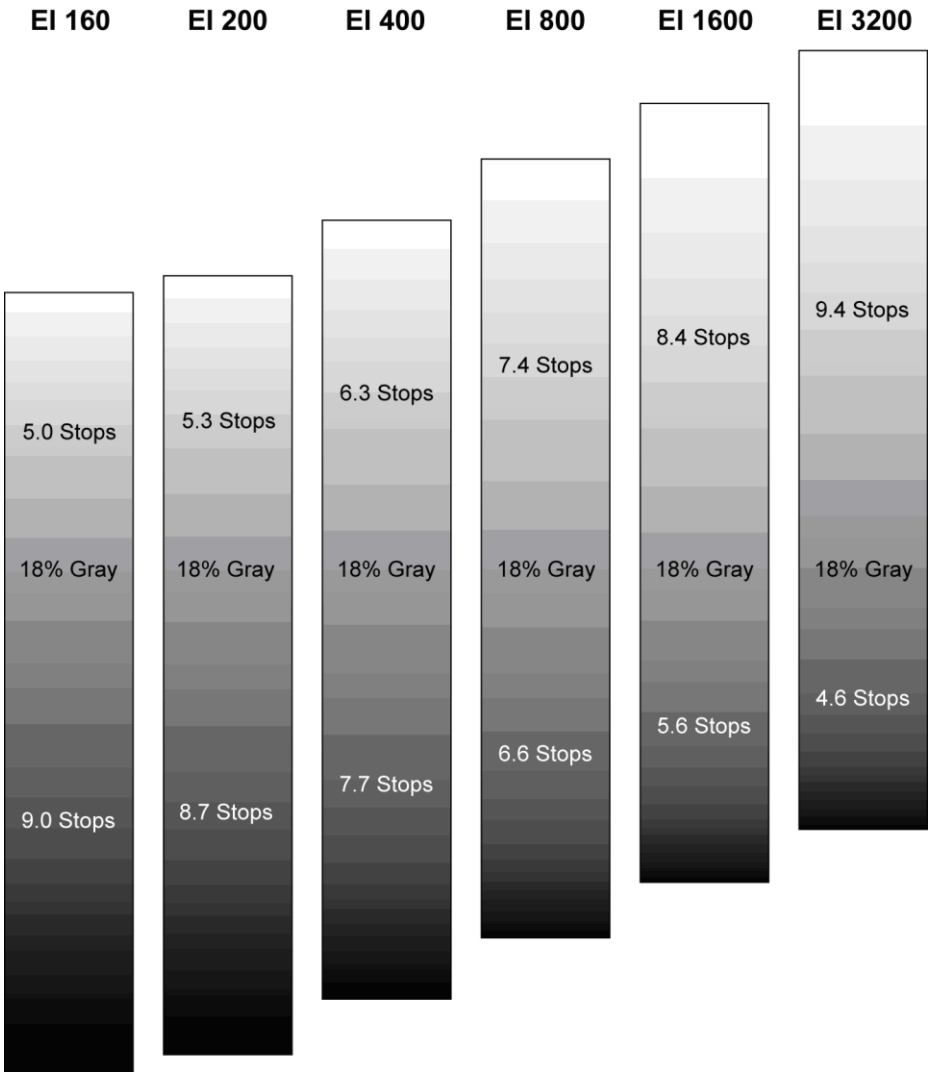


Figure 43: Graphical comparison of latitude at different exposure indexes

12.1.3.6 COLOR

Press the **COLOR** button to open the COLOR screen. The COLOR screen displays a graphical overview of the color management settings applied to the camera's output paths, including:

- the current gamma setting of the EVF, MON OUT, REC OUT and **SxS**
- which ARRI Look File is set
- which output paths the Look File is applied to

The COLOR screen also has buttons for opening the GAMMA screen, selecting a Look File, and applying Look Files to the camera's output paths.

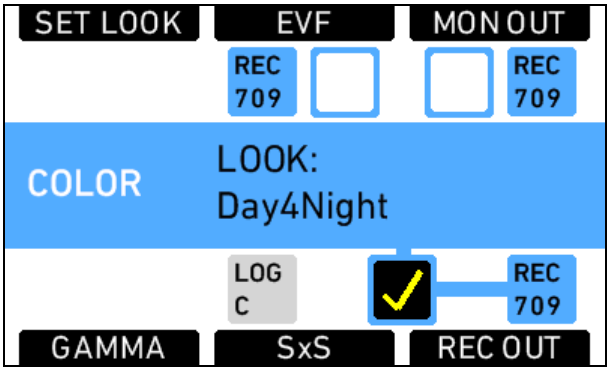


Figure 44: COLOR screen

Gamma

Press the **GAMMA** button to open the GAMMA screen and set the gamma of the **SxS**, REC OUT, MON OUT and EVF image paths.

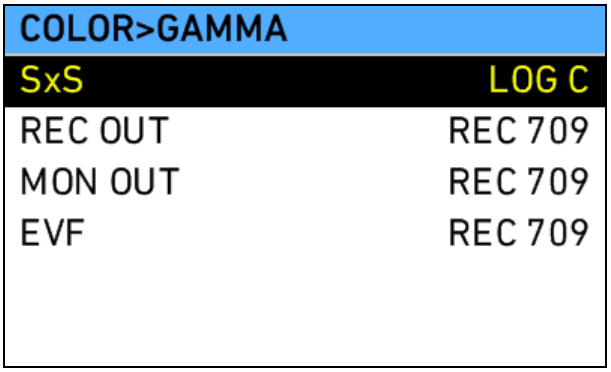


Figure 45: GAMMA screen

Gamma defines the contrast curve that is applied to the image. In the ALEXA, there are two gamma settings available:

- LOG C
- REC 709

Note: Starting with SUP 7.0, DCI P3 is no longer available as a gamma option.

LOG C	LOG C is a Cineon-specification gamma for output to film print or digital intermediate. Color-grading is a required post-production step in the LOG C workflow. Standard broadcast monitors cannot properly display LOG C images so a conversion look up table (LUT) is necessary for display, dailies and editing proxies. LOG C images will appear flat and desaturated when displayed on standard broadcast monitors. ALEXA preview LUTs can easily be generated using the ARRI LUT Generator, a web application available on www.arridigital.com.
REC 709	REC 709 is a video display gamma that complies with the ITU.R-BT709 standard. REC 709 images can be displayed on standard broadcast monitors.

Note: In High Speed mode, a gamma setting cannot be applied to the REC OUT as the MON OUT output path is rerouted to the REC OUT.

ARRI Look Files

ARRI Look Files are a way for the user to alter the parameters the ALEXA uses when converting the sensor image data to a video color space. This can be described as applying a custom "look" to the different image output paths. The Look File can be applied directly to the recorded image (destructive workflow), or just to the monitoring paths and included in the clip as metadata only (non-destructive workflow).

The ALEXA contains one preloaded Look File called Low Contrast Curve (LCC). This Look File contains a custom tone map curve that creates a video image with lower contrast compared to the standard REC 709 output. As a result, the image holds as much dynamic range information as possible, without using LOG C encoding. Highlight and shadow detail that would be lost in the typical REC 709 tone mapping can still be accessed.

ARRI LOOK Creator, a free application from ARRI, and some third-party applications can be used to create ARRI Look Files from DPX-format frame grabs taken on the ALEXA.

To apply a Look File:

1. On the HOME screen, press the **COLOR** button.
2. Press the **SET LOOK** button.
3. Using the jogwheel, select a Look File from the list on the LOOK FILES screen. The default preloaded Look File is LCC.
4. Press the jogwheel to set the Look File.

On the COLOR screen, press the **EVF**, **MON OUT**, **SxS** and/or **REC OUT** buttons to apply the Look File to the desired output paths. An applied Look File is indicated by a check mark in the box corresponding to each output path. Look Files can only by applied to output paths that are set to REC 709 gamma.

Note: If the **SxS** or REC OUT paths are set to REC 709 gamma and a Look File is

applied, the recorded image on the **SxS Pro** card or external recording device will be permanently altered by that Look File.

Note: If both the **SxS** and REC OUT paths are set to REC 709 gamma, a Look File can only be applied to either both or none of them.

Note: In High Speed mode, a Look File cannot be applied to the REC OUT as the MON OUT output path is rerouted to the REC OUT.

Additional Look Files can be added to the ALEXA from the SD card. The Look Files must be copied into the **LookFiles** folder on the SD card. The required folder structure on the SD card can be created via **MENU>System>SD card>Prepare SD card**.

To add a Look File to the camera:

1. On the HOME screen, press the **COLOR** button.
2. Press the **SET LOOK** button.
3. Press the **ADD** button.
4. Using the jogwheel, select a Look File from the list on the LOOK FILES (SD CARD) screen.
5. Press the jogwheel to add the Look File. The Look File will be added to the list on the LOOK FILES screen.

To delete a Look File from the camera:

1. On the LOOK FILES screen, select a Look File from the list.
2. Press the **DELETE** button.
3. Press both new **DELETE** buttons simultaneously. The Look File will be deleted from the camera but will remain on the SD card.

Playback and Look Files

The Look File applied to the camera outputs also applies to clips during playback. A clip recorded in REC 709 with or without Look File will be played back "as is", even if the output is set to LOG C.

Please note that the currently active Look File is applied to the clip, not the one that was active at the time of recording. It is the responsibility of the user to make sure the correct Look File is applied during playback.

12.1.3.7 WB

White Balance (WB) is the color balance of the camera according to the lighting in use. There are three options for setting the white balance:

- white balance presets
- user-defined white balance
- automatic white balance

On the HOME screen, press the **WB** button to open the WHITE BALANCE screen. The ALEXA has the following white balance presets:

Tungsten	3200K 0CC
Fluorescent	4300K 0CC
Daylight	5600K 0CC
Daylight Cool	7000K 0CC

White balance is a red-blue adjustment of the image. To adjust the green-magenta balance, use the color compensating (CC) adjustment.

For example, a fluorescent source will have peaks in its spectrum that cannot be corrected with the traditional white balance. The CC shift can correct these peaks up to a full green or full magenta gel. One step of CC SHIFT is equal to 035 Kodak CC values or 1/8 Rosco values.

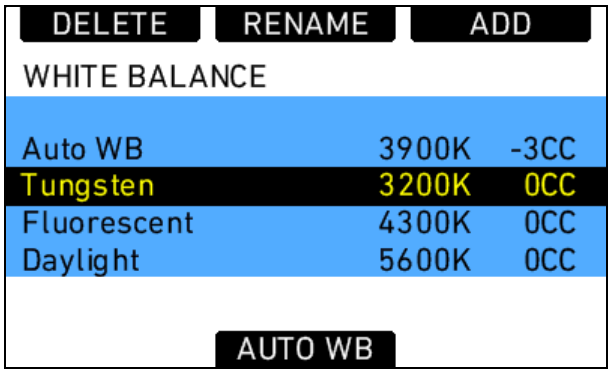


Figure 46: WHITE BALANCE screen

ARRI recommends adjusting white balance and color compensation using appropriate measuring equipment such as a vectorscope with calibrated gray card or a color meter.

If the desired white balance setting does not appear in the WHITE BALANCE list, a user-defined white balance can be added.

To add a white balance:

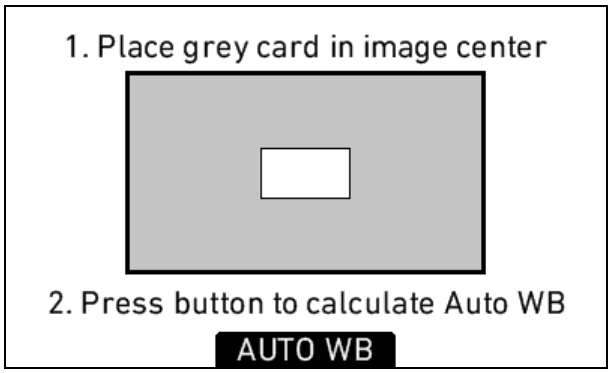
1. On the HOME screen, press the **WB** button.
2. Press the **ADD** button.
3. Rotate the jogwheel to adjust the white balance value in steps of 100K or press the + 1000K and – 1000K buttons.
4. Press the jogwheel or <> button to select the CC adjustment.
5. Rotate the jogwheel to adjust the CC value.
6. Press the jogwheel to add the new white balance to the WHITE BALANCE list.

To perform an automatic white balance:

1. On the HOME screen, press the **WB** button.
2. Press the **AUTO WB** button.
3. Place a well-lit gray card in the center of the image and press the **AUTO WB** button. The ALEXA will calculate the white balance and color compensation values and set these values for the "Auto WB" entry in the list.

Note: The automatic white balance will be overwritten each time a new one is calculated.

Note: If the gray card is significantly over- or underexposed, the ALEXA may not be able to calculate a white balance value and will display an error message.



To rename a white balance:

1. On the HOME screen, press the **WB** button.
2. Using the jogwheel, select the name of the white balance you wish to rename.
3. Press the **RENAME** button.
4. Use the jogwheel to enter a new name.
5. Press the **DONE** button to save the new name.

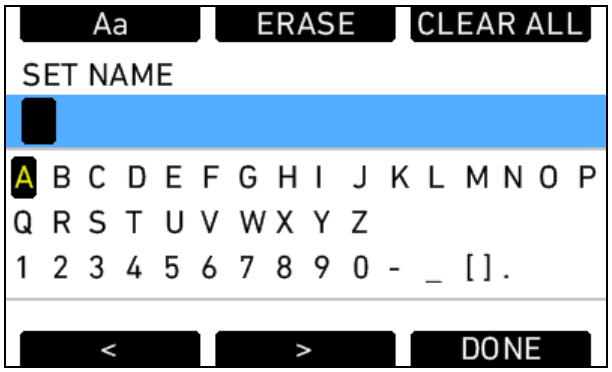


Figure 47: WB SET NAME screen

Note: Default white balance values cannot be renamed.

12.1.4 Function Buttons

The main controls feature the following function buttons:

ON/OFF	Press once to switch the camera on. Press and hold for 5 seconds to switch off the camera. A countdown will be displayed on the HOME screen. If the button is released before the countdown has elapsed, the camera does not switch off.
REC	Press to start and stop internal recording to **SxS PRO** cards and send start and stop record signals over the REC OUT to an external recording device.

LOCK	Press and hold for 3 seconds to lock or unlock the main camera controls and function buttons. The recessed function buttons **USER**, **REC** and **ON/OFF** cannot be locked and remain available. A lock symbol on the HOME screen indicates that the lock is engaged.
GRAB	Press to take a still frame and write it to the SD card. The write process is indicated by a flashing camera icon, followed by a flashing SD card icon on the HOME screen. When writing is finished, a new still frame can be taken.
TC	Press to open the TIMECODE screen.
WRS	Press to open the Wireless Remote System screen. Available on ALEXA Plus, ALEXA Studio and ALEXA M only.
PLAY	Press to open the playback screen and activate playback on MON OUT and EVF. When the playback screen is opened, the last clip on the **SxS PRO** card that is on active standby will be loaded automatically.
INFO	Press to open the LIVE INFO screen. The LIVE INFO screen displays the camera's current system state and any current error messages. On the LIVE INFO screen, there are buttons to access the following additional information screens: • VERSION • SxS CARDS • SYSTEM • SAVE TO SD (press to save a log file) • FPS INFO
USER	Press to open the USER BUTTONS screen. There are six user buttons that can be assigned by the user. Buttons 1, 2 and 3 are shared with User Buttons 1, 2, and 3 in the operator controls. Press the jogwheel to see a complete list of user button options.
MENU	Press to open the MENU screen, where most camera settings can be adjusted.
BACK	Press to go back to the previous menu or screen when navigating. Press to cancel settings adjustments and revert to the previous setting.
HOME	Press to return to the HOME screen from any menu or screen.

12.1.4.1 TC

Press the **TC** button to open the TIMECODE screen. The TIMECODE screen displays the current timecode and timecode format settings.

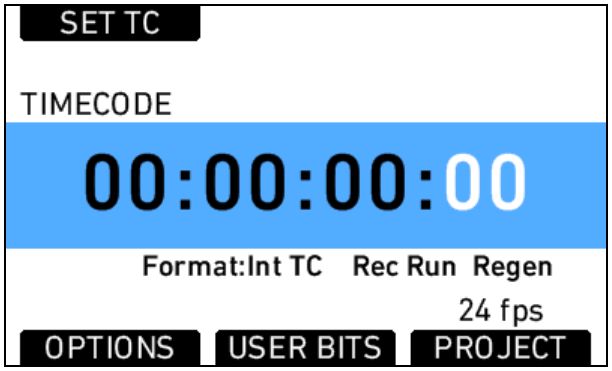


Figure 48: Timecode screen

Note: Individual frame values are not shown but are still counted.

Press the **SET TC** button to set the TC counter (only when the timecode source is set to Int TC). On the SET TIMECODE screen, press the **SET 2 TIME** button to match the counter to the camera's system clock. Press the **RESET** button to reset counter to zero.

The **PROJECT** button is a quick link into the PROJECT menu screen, where project fps can be adjusted. Project fps sets the time base of the time code.

TIMECODE OPTIONS

Press the **OPTIONS** button to open the TIME CODE OPTIONS screen.

Select **Source** to choose the timecode source. Available sources are:

Int TC	Internal TC counter
Ext LTC	TC is read from the LTC input. Only possible with Mode set to Free Run, and the project frame rate must match the sensor frame rate.

Select Mode to define how the timecode is counted. Available modes are:

Rec Run	TC will only run while recording. The TC value increases with every frame generated by the sensor while recording in the project time base.
Free Run	TC runs free. If the source is set to Int TC, and the sensor frame rate does not match the time base of the TC, the value counts up with every new frame generated by the sensor in the project time base.

Select **Generator** to set the camera's timecode generator. Available generators are:

Regen	Rec Run TC is regenerated from the last valid TC value. When set to Ext LTC, the camera continuously reads the TC signal at the LTC connector as long as it is present. Upon disconnection or loss of signal, the camera continues counting on its own. When the external signal is reconnected, the camera uses the values of the external signal again. When set to Int TC, the value increases with each new frame generated by the sensor.
Jam sync	Only Ext LTC can be jam sync'd. This means that the external TC source is connected to the camera, then the camera reads the external TC count and continues counting on its own. The precise crystal oscillator in the ALEXA will count accurately for up to eight hours. After eight hours, re-jam sync the camera to prevent timecode offset. The camera can be sync'd to TC signals whose time base differs from the camera's project time base, as long as both are integer (24, 25 and 30 fps) or non-integer (23.976 and 29.97 fps) signals. It is not possible to mix integer and non-integer signals.

Note: It is recommended to jam-sync after every shooting break to avoid the risk of losing timecode sync during a shot.

Note: The camera will keep its TC for about 10 minutes after disconnection from the power source. If a power source is connected, the camera will remember its TC for as long as the power source is connected, even if it is switched off.

Select **User bit source** to set the source of the user bits. Available user bit sources are:

Internal	User bits are set manually in the User Bit screen.
UB in Ext TC	When the timecode source is set to Ext LTC, the user bits are sampled from the external signal.

Note: The camera will force timecode to *Int TC* and *Regen* if the sensor frame rate does not match the project frame rate.

Note: Non-integer TC time base settings 23.976 and 29.97 are always counted as non-dropframe time code.

USER BITS

Press the **USER BITS** screen button to access the USER BITS screen. For each user bit, values from 0 to 9 and A to F can be set.

Press the **SET UB** button to start editing the user bits values.

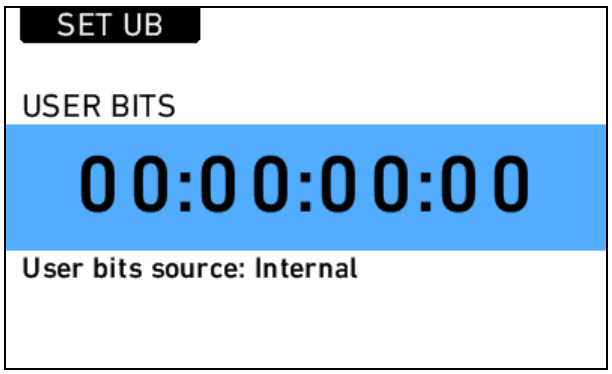


Figure 49: USER BITS screen

Note: On HD-SDI out, the last two digits of the user bits contain the Variflag. Full user bits are only stored on the **SxS** cards.

12.1.4.2 INFO

STATUS Info

The STATUS INFO screen displays information about the current state of the camera system. *System state: Good* means that all components in the ALEXA are functioning normally. Other messages can contain error messages prefixed with *E:*, or warnings prefixed with *W:*. For more information about error messages and warnings, see *A.4 Error Messages and Warnings* in the Appendix.

Press the **SAVE TO SD** button to save a system log to the SD card. This may take up to one minute.

Note: It is only necessary to save a system log if the camera experiences multiple error messages or other abnormal behavior. The system log is not a human-readable file and should be sent to an ARRI Camera Service center for analysis.

VERSION Info

Cam serial no.	The serial number of the camera.
Cam ID	Translation of the camera serial number to Base36, with an additional prefix for 3D applications.
Firmware	Version number of the currently installed camera Software Update Packet (SUP).
EVF serial no.	The serial number of the Electronic Viewfinder EVF-1 attached to the camera.
EVF firmware	Version number of the Electronic Viewfinder EVF-1 firmware.

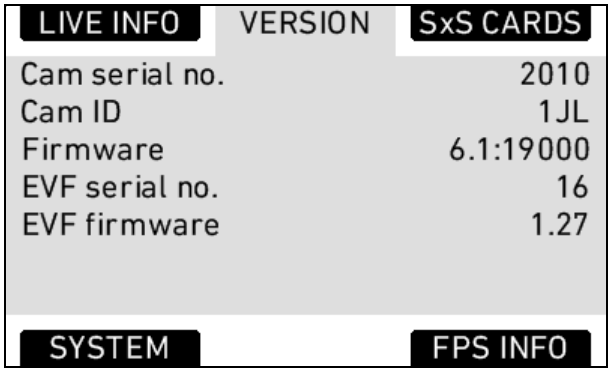


Figure 50: VERSION info screen

SxS CARDS Info

Codec	Current codec for internal recording.
Status	Current status of **SxS PRO** cards in slot 1 and 2.
Free capacity	Free storage space of **SxS PRO** cards displayed as a percentage.
Max. fps current	Maximum frame rate of the **SxS PRO** cards with current codec.
Card size	Total available storage space on **SxS PRO** card

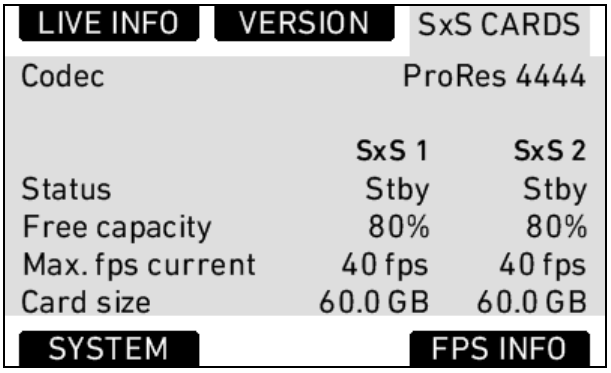


Figure 51: SxS CARDS info screen

SYSTEM Info

Time/Date	Current date and time. To set the date and time, press the **MENU** button, select **SYSTEM** and select **DATE/TIME**.
Fan speed	Speed of the camera's cooling fan in rotations per minute.
Sensor mode	Shows the active sensor mode: 16:9 or 4:3. 4:3 mode is only available on the ALEXA Plus 4:3, ALEXA Studio and ALEXA M.
Sensor temperature	Current temperature of image sensor. Target is 35°C in standard mode, 40°C in high humidity mode.
IP address	IP address of the camera's ethernet port.
Operating time	Shows the total operating time of the camera in hours (since first installation of SUP 4.0 or higher)

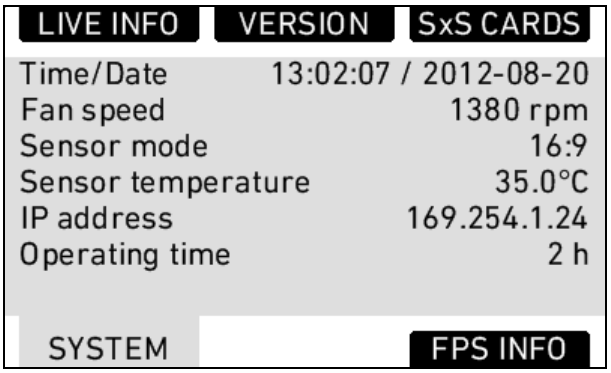


Figure 52: SYSTEM info screen

FPS Info

The FPS Info screen displays an overview of the current frame rates set in the camera and the maximum frame rate possible on the **SxS PRO** cards loaded in the camera at the current settings.

Sensor fps	Frames per second generated by the sensor

Project fps	Time base the camera will use for counting timecode and the frame rate used for on-camera playback of internally recorded clips
REC OUT frame rate	Frame rate output over the REC OUT HD-SDI
MON OUT frame rate	Frame rate output over the MON OUT HD-SDI
SxS CARD 1 max. fps	Maximum frame rate the **SxS PRO** card in card slot 1 can record at the current **SxS** codec.
SxS CARD 2 max. fps	Maximum frame rate the **SxS PRO** card in card slot 2 can record at the current **SxS** codec.

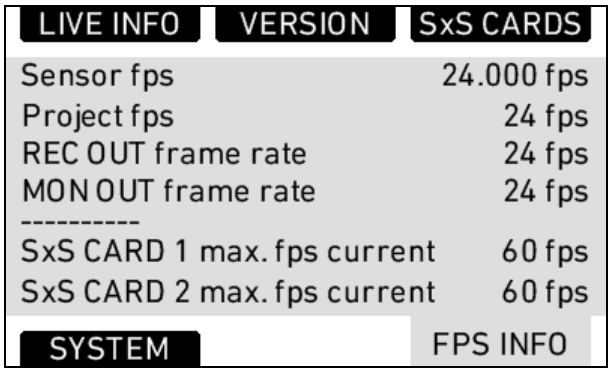


Figure 53: FPS Info screen

12.1.4.3 USER

Press the **USER** button to open the USER BUTTONS screen. There are six assignable user buttons. **Buttons 1, 2** and **3** are shared with **User Buttons 1, 2,** and **3** in the operator controls. Press the jogwheel to see a complete list of user button options.

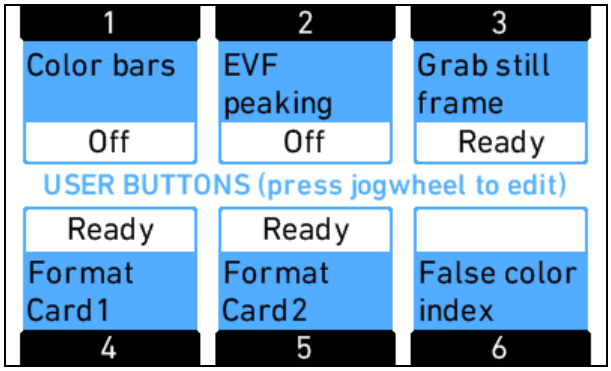


Figure 54: USER BUTTONS screen

Assign functions to the buttons by using the jogwheel.

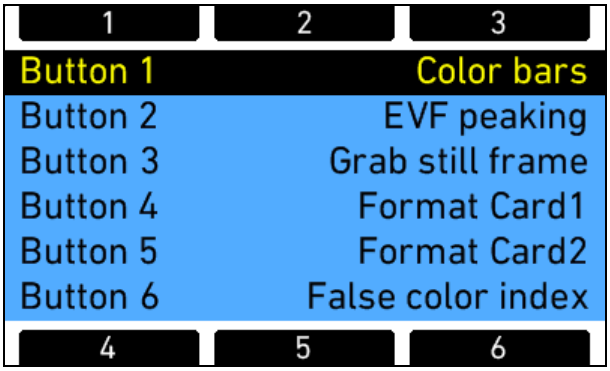


Figure 55: Edit User Button assignment

The following table lists all available functions and if they can be assigned to user buttons 1-3 (identical for on-screen and buttons on camera-left side), 4-6, or both:

Name	Description	1-3	4-6
None	button has no function	X	X
MON OUT surround	toggles surround view of the MON OUT on or off	X	X
MON OUT gamma	toggles gamma of MON OUT between REC 709 and LOG C (only when recording gamma is set to LOG C)	X	X
MON OUT look	toggles the ARRI Look File on the MON OUT on or off (only if Look File is set and the MON OUT is set to REC 709)	X	X
MON OUT frame lines	toggles frame lines on the MON OUT on or off	X	X
MON OUT status info	toggles status info on the MON OUT on or off	X	X
MON OUT false color	toggles false color display on MON OUT on or off	X	X
MON OUT peaking	toggles peaking on MON OUT on or off	X	X
MON anam. desqueeze	toggles anamorphic desqueeze options on MON OUT *Note: Requires a valid Anamorphic De-squeeze license key installed on camera*	X	X
Frame lines color	toggles the color of frame lines between White, Red, Green, Blue, Yellow and Black	X	X

Return in active	toggles the RET IN signal on or off on the EVF and MON OUT as set	X	X
Toggle SxS	toggles the active **SxS** slot between **SxS** slots 1 and 2. **SxS PRO** cards must be loaded in both.	X	X
Color bars	activates color bars on MON OUT and REC OUT	X	X
EVF surround	toggles surround view on the EVF image on or off	X	
EVF gamma	toggles gamma on the EVF between REC 709 and LOG C (only when recording gamma is set to LOG C)	X	
EVF look	toggles the ARRI Look File on the EVF on or off (only if Look File is set and the EVF is set to REC 709)	X	
EVF frame lines	toggles frame lines on the EVF image on or off	X	
EVF status info	toggles status info on the EVF image on or off	X	
EVF zoom	toggles the zoom function on the EVF	X	
EVF false color	toggles false color display on the EVF on or off	X	
EVF peaking	toggles peaking on the EVF on or off	X	
EVF anam. desqueeze	toggles anamorphic desqueeze options on EVF *Note: Requires a valid Anamorphic De-squeeze license key installed on camera*	X	
Grab still frame	takes a still frame and saves it to the SD card *Note: Disabled in High Speed mode*	X	
Check last clip	plays the last 5 seconds of the last clip, then returns to a live image	X	
Circle clip	marks the clip as a good take or a print during recording or playback	X	
Auto WB	Press once to open the AUTO WB sceen. Press again to perform an automatic white balance.	X	
Grab GUI	takes a still image of the current main camera control screen on the LCD and saves it to the SD card as a .png file in the *ScreenCaptures* folder	X	

Format Card 1	quick link to the **Format SxS CARD 1** screen	X
Format Card 2	quick link to the **Format SxS CARD 2** screen	X
False color index	displays the FALSE COLOR INDEX screen	X
Mirror shutter	toggles the mirror shutter between View position, Gate position, and running *ALEXA Studio only*	X

12.1.4.4 PLAY

Clips that have been recorded to the **SxS PRO** cards can be played back by the camera on the EVF, MON OUT and REC OUT.

Note: The REC OUT signal cannot be used for playback when it is set to ARRIRAW.

To play clips that have been recorded internally:

1. Press the **PLAY** button.
2. On the PLAY screen, the last clip recorded loads. Press the jogwheel to play the clip.
3. Press the jogwheel to pause the clip.
4. Rotate the jogwheel to advance the clip frame by frame, or in one second steps. Press the **STEPSIZE** button to toggle between seconds and frames.
5. Press the **+10%** and **–10%** buttons to advance or rewind the clip by ten percent of its duration.
6. Press the **HOME** button or **BACK** button to exit and output a live image over the output paths.

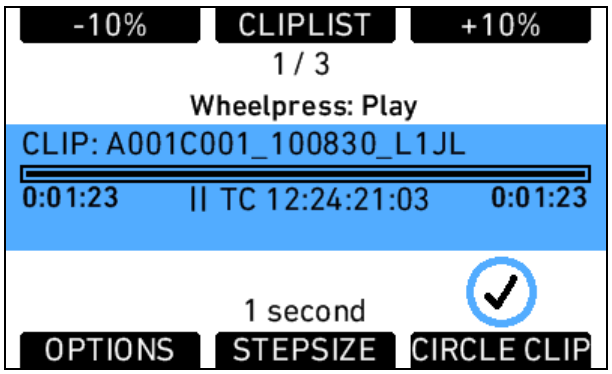


Figure 56: PLAY screen

PLAY screen buttons

STEPSIZE	Toggle the scrub step size between one frame and one second.
CIRCLE CLIP	Press to mark the clip as a circle take. This information will be embedded in the metadata of the clip.
+10%	Advance the current clip by ten percent of the clip duration.
-10%	Rewind the current clip by ten percent of the clip duration.

Note: Recorded clips do not contain the surround view portion of the EVF-1 or MON OUT image. When playing back clips, the surround view portion will not be visible.

The jogwheel can be used to scrub through the paused clip. The scrub stepsize is shown in the lower middle section of the screen.

Additional PLAY screen information:

- clip name
- playback progress bar with current playback position in time and total clip duration
- playback timecode

Note: Do not eject an **SxS PRO** card during playback.

OPTIONS

The OPTIONS screen button opens a list of general playback options.

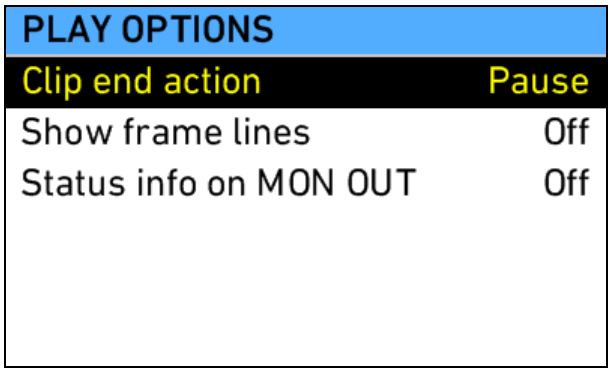


Figure 57: PLAY OPTIONS screen

Clip end action	Determines what happens when the end of a clip is reached. Options are Pause and Loop.

Show frame lines	Sets frame lines to On or Off during playback. Center mark is always switched off during playback.
Status info on MON OUT	Sets status info overlays on MON OUT during playback to On or Off.

CLIPLIST

Press the **CLIPLIST** button to open the SxS CLIPLIST screen and access all the clips recorded on an **SxS PRO** card.

To play a clip from the cliplist:

1. Press the **CLIPLIST** button.
2. Use the jogwheel to select a clip.
3. Press the jogwheel to load the selected clip.
4. Press the jogwheel to play the selected clip.

Additional CLIPLIST screen information:

- number of selected and total number of clips on the **SxS PRO** card
- codec of selected clip
- duration of selected clip

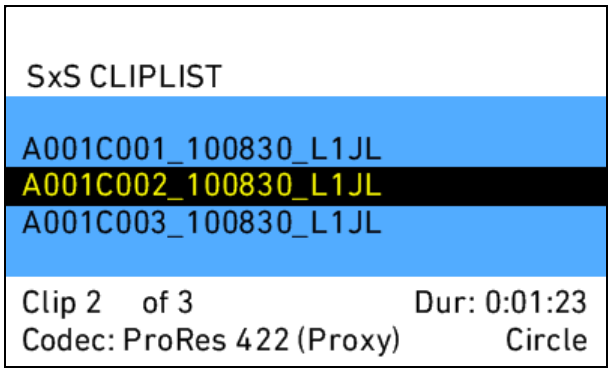


Figure 58: SxS CLIPLIST screen

Playback and Look Files

The Look File applied to the camera outputs also applies to clips during playback. A clip recorded in REC 709 with or without Look File will be played back "as is", even if the output is set to LOG C.

Please note that the currently active Look File is applied to the clip, not the one that was active at the time of recording. It is the responsibility of the user to make sure the correct Look File is applied during playback.

12.1.5 Menu

The menu contains parameters for basic camera setup. It has a tree structure and the current path in the menu is displayed across the top of every screen.

Press the **MENU** button to open the MENU screen. There are six submenus in the main menu for setting up the ALEXA:

- Recording
- Monitoring
- Project
- System
- Frame grabs
- User setups

Links to submenus can be identified by an arrow bracket character on the right side. To access a submenu, select the submenu link and press the jogwheel to open the submenu. Press the **BACK** button to step back one menu.

Menus also contain parameters with editable values. The parameter name is displayed on the left side of the menu, and the current value is displayed on the right side of the menu. To change a parameter value, select it with the jogwheel and press the jogwheel to start editing the value. Press the **BACK** button to cancel an edit. When a parameter is displayed in gray, it cannot be edited with current camera settings.

Press the **HOME** button from any menu or submenu to return to the HOME screen.

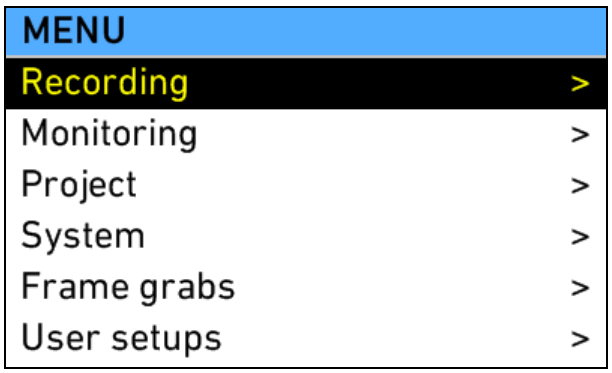


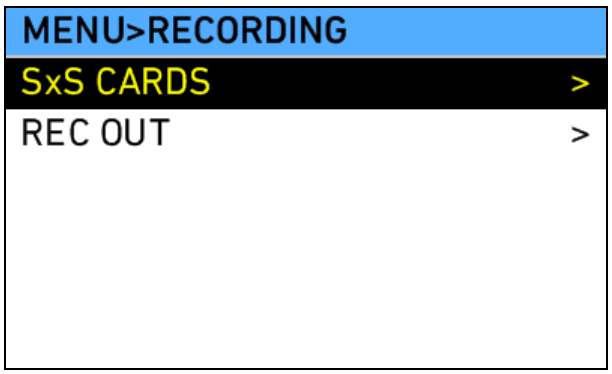
Figure 59: MENU

12.1.5.1 Recording

Select the Recording menu to adjust all recording parameters for recording to **SxS PRO** cards and to external recorders over the REC OUT outputs. The Recording menu contains two submenus:

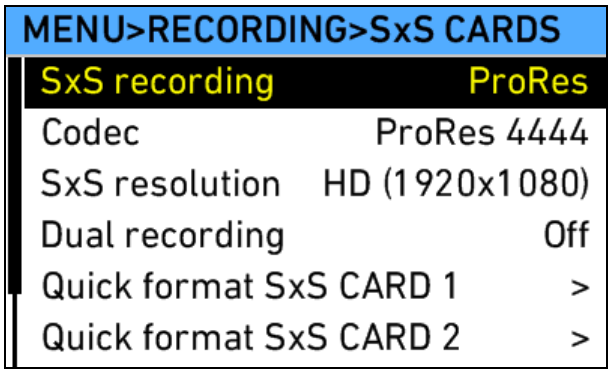
- SxS CARDS

- REC OUT



SxS CARDS

Select the SxS CARDS submenu to adjust parameters for recording internally to the **SxS PRO** cards.



SxS recording

Select for **SxS** recording options:

- Off,
- ProRes™
- DNxHD (requires license key)

With **SxS** recording off, power consumption is reduced by 15 W. Switching **SxS** recording on takes approximately 15 seconds.

Codec

Select to set the codec:

- full range of Apple ProRes™ codecs
- two types of Avid DNxHD codecs (requires license key).

Note: Not available in High Speed mode.

HS codec

Select to set the codec for High Speed mode:

- full range of Apple ProRes™ codecs
- two types of Avid DNxHD codecs (requires license key).

Note: Only available in High Speed mode.

SxS resolution

Select to set the **SxS** resolution:

- HD (1920x1080)
- 2K (2048x1152) in 16:9 mode.

	Note: In 4:3 mode, resolution is fixed at 2K (2048x1536). *Note: DNxHD codecs are only available in HD (1920x1080) resolution.*
Dual recording	Select to set simultaneous recording to two **SxS PRO** cards. Both cards must be of the same capacity and have matching formatting and content.
Quick format SxS CARD 1 and 2	Select to format an **SxS PRO** card. To complete the action, press both **FORMAT** buttons on the confirmation prompt. A quick format erases only the file allocation table.
Erase SxS CARD 1 and 2	Select to erase an **SxS PRO** card. To complete the action, press both **ERASE** buttons on the confirmation prompt. This action takes longer than the quick format, but ensures that all data on the card is erased. Erasing an **SxS PRO** card can increase its write speed.

Note: Before formatting or erasing an **SxS PRO** card, make sure the write-protect tab on the back edge of the **SxS PRO** card is disengaged. Do not engage or disengage the write-protect tab while the card is loaded in the **SxS** slot.

Note: Formatting or erasing an **SxS PRO** card removes all data irreversibly from the card. Follow data management best practices to prevent loss of data.

If an **SxS PRO** card without a valid file system is loaded in the camera, you will be prompted to format the **SxS PRO** card immediately. ARRI recommends immediate formatting of **SxS PRO** cards that trigger this warning.

Apple ProRes™ codecs

Apple ProRes™ codecs supported by the ALEXA:

Name	Color coding	Data rate @ 30 fps	Recording time on 32 GB SxS PRO @ 30 fps[2]
ProRes 422 (Proxy)	YCbCr	45 Mb/s	1 h 23 min
ProRes 422 (LT)	YCbCr	102 Mb/s	37 min
ProRes 422	YCbCr	147 Mb/s	25 min
ProRes 422 (HQ)	YCbCr	220 Mb/s	17 min
ProRes 4444[1]	RGB[1]	330 Mb/s	11 min

[1]Without alpha channel (444 only)

[2]Apple ProRes™ is a variable bit rate codec, meaning that the available recording time is subject to the image content. The number given in the table is the MINIMUM available recording time for a 32 GB card. When image content is easily compressed without loss of image quality, the available recording time may exceed the number given in the table.

Also note that the available recording time is listed for a 32 GB **SxS PRO** card at 30 fps. A lower sensor frame rate will increase the available recording time, while a higher sensor frame rate will decrease it.

For a detailed table of available frame rates and possible codec/card combinations, please refer to the Chapter *FPS* on page 59.

Avid DNxHD codecs

Avid DNxHD codecs supported by the ALEXA (when the required license key is installed):

Name	Color coding	Data rate @ 29.97 fps	Recording time on 32 GB SxS PRO @ 29.97 fps
DNxHD 115/120/145	YCbCr	145 Mb/s	29 min
DNxHD 175x/185x/220x	YCbCr	220 Mb/s	19 min

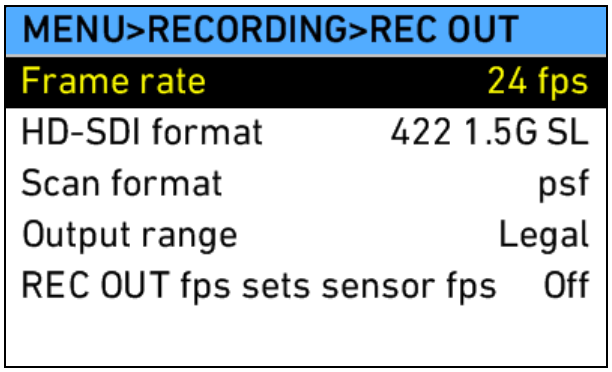
DNxHD 115/120/145 has a bit depth of 8 bit. DNxHD 175x/185x/220x has a bit depth of 10 bit. The listed recording times are not dependent on image content.

DNxHD is a fixed bitrate codec. The codec naming convention indicates the codec's project frame rate:

- DNxHD 115 = 23.976/24 fps
- DNxHD 120 = 25 fps
- DNxHD 145 = 29.97 fps (30 fps is not available)
- DNxHD 175x = 23.976/24 fps
- DNxHD 185x = 25 fps
- DNxHD 220x = 29.97 fps (30 fps is not available)

For a detailed table of available frame rates and possible codec/card combinations, please refer to the Chapter *FPS* on page 59.

REC OUT



Select the REC OUT submenu to adjust parameters for recording to external recorders over the HD-SDI REC OUT outputs.

Note: Only use double shielded HD-SDI cables for recording to ensure error free data transmission!

Frame rate	Select to set the frame rate of the REC OUT outputs (independent of sensor frame rate).
HD-SDI format	Select to set the format of the REC OUT outputs (see below for details): • 422 (1.5G DL, 3G SL, 3GDL) • 444 (1.5G DL, 3G SL, 3GDL) • ARRIRAW (1.5G DL, 3G SL, 3GDL) • MON OUT clone
Scan format	Select to set the type of scan: • p: Progessive. Images are transmitted line by line from left to right, starting at the top-left pixel. • psf : Progressive segmented. Images are first split into fields, which are then transmitted line by line from left to right. *Note: Frame rates over 30 fps are only available in progressive scan. This complies with SMPTE standards.*

Output range	Select to set which bit range of the full 10 bit range (0-1023) is used to transmit image data. • Legal: Uses values 64-940 for RGB and Y signals, and values 64-960 for CbCr signals. This complies with SMPTE 274M 8.7. • Extended: uses values 5-1019, which results in about 10% more steps. This complies with SMPTE 274M 8.12 (called undershoot/overshoot). *Note: Check which mode your recorder supports. If you set the camera to extended, but your recorder only supports legal, you will end up with clipped images!*
REC OUT fps sets sensor fps	If set to "On", the sensor will always follow the REC OUT frame rate setting. This ensures no frames are dropped on the output.

Note: Both REC OUT and MON OUT carry a flag in their data stream to signal an external recorder that the camera has started or stopped recording internally. When **SxS** recording is switched off, the REC button will only send the flag to trigger the external recorder—it will not start or stop internal recording to **SxS**. Additionally, the Vari flag marks duplicate images in the HD-SDI stream. A recorder that supports the Vari flag can detect these frames and discard them. This ensures that no duplicate frames are recorded if HD-SDI is set to a higher frame rate than the sensor.

HD-SDI formats and corresponding frame rates

Format	Links Used	Image Raster	Sampling Structure	Color Mode	Possible Frame Rates (fps)
422 1.5G SL	1	1920x1080	4:2:2	YCbCr	23.976, 24, 25, 29.97, 30
422 1.5G DL	2	1920x1080	4:2:2	YCbCr	48, 50, 59.94, 60
422 3G SL	1	1920x1080	4:2:2	YCbCr	48, 50, 59.94, 60
444 1.5G DL	2	1920x1080	4:4:4	RGB	23.976, 24, 25, 29.97, 30
444 3G SL	2	1920x1080	4:4:4	RGB	23.976, 24, 25, 29.97, 30
444 3G DL[1]	2	1920x1080	4:4:4	RGB	48, 50, 59.94, 60
ARRIRAW 1.5G DL[2]	2	2880x1620	Bayer	Bayer	23.976, 24, 25, 29.97, 30

ARRIRAW 3G SL[2]	2	2880x1620	Bayer	Bayer	23.976, 24, 25, 29.97, 30
ARRIRAW 3G DL[2]	2	2880x1620	Bayer	Bayer	48, 50, 59.94, 60
MON OUT clone[3]	1	1920x1080	4:2:2	YCbCr	23.976, 24, 25, 29.97, 30

[1]Proprietary signal format, as no SMPTE standard supports RGB 444 with frame rates higher than 30 fps. Only supported by some recorders.

[2]The RAW sensor image is transmitted wrapped as 1920x1080 RGBA. This signal can only be recorded with ARRIRAW T-Link certified recorders. Some recorders only support certain types of ARRIRAW T-Link.

[3]When in High Speed mode, REC OUT is always set to MON OUT clone.

30-60 fps recording with ALEXA over HD-SDI

Unlike the ARRIFLEX D-21, which used a proprietary mode for recording frame rates between 30-60 fps, the ALEXA complies with the SMPTE 372M standard for image transmission in 422 1.5G DL and 3G SL formats.

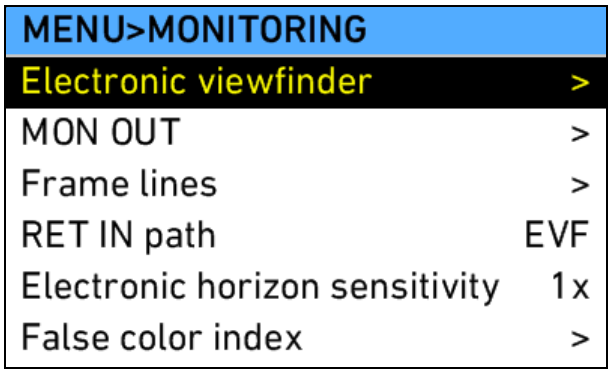
This means that images are split into fields, and every field is transmitted over one link. The second field of every image is transmitted over the other link, so that every link carries an interlaced signal in field integration mode. The recorder realigns the images correctly into a progressive sequence.

Two proprietary formats allow transmission of 444 RGB or ARRIRAW images at frame rates between 30-60 fps. These are 444 3G DL for RGB and ARRIRAW 3G DL for raw images. These formats do not comply to a SMPTE standard and are only supported by a few recorders. Please refer to the manual of your recorder to see if it supports these formats.

12.1.5.2 Monitoring

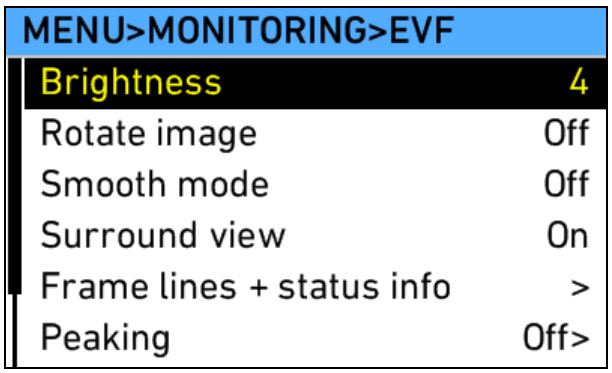
Select the Monitoring submenu to adjust parameters for monitoring on the EVF-1 and over the MON OUT output. These outputs are meant for monitoring and not recording.

Frame lines set in the Frame lines submenu apply to both MON OUT and EVF-1. Select the Electronic viewfinder and MON OUT submenus to switch the set frame lines on or off individually.



Electronic viewfinder	Select to adjust EVF-1 settings.
MON OUT	Select to adjust MON OUT settings.
Frame lines	Select to set up frame lines.
RET IN path	Select to set which of the monitoring output paths carries the signal at the RET IN connector as Return in active is toggled via a **USER** button.
Electronic horizon sensitivity	Select to adjust the sensitivity of the electronic horizon. *Note: Available on ALEXA Plus, ALEXA Plus 4:3, ALEXA Studio and ALEXA M only*
False color index	Select to open the FALSE COLOR INDEX screen which has a reference chart explaining the false color coding for EVF and MON OUT.

Electronic Viewfinder



Brightness	Select to adjust the brightness of the EVF.

Rotate image	When mounting the EVF to the right side of the camera, the image can be flipped to orient the image correctly in the viewfinder. Affects only the EVF image, MON OUT and recording images are not rotated.
Smooth mode	Select to set Smooth mode On or Off. With smooth mode on, the EVF image shutters less when panning. *Note: Smooth mode is only possible with frame rates up to 30 fps and shutter angles of 180.0 or less.*
Surround view	Select to set Surround view on the EVF-1 On or Off. When set to on, the additional pixels outside the recorded image area on the ALEXA's ALEV III sensor are displayed, allowing the operator to see outside the recorded image and keep unwanted objects, such as microphone booms, out of the shot. To view only the recorded image, set Surround view to off.
Frame lines + status info	Select to set frame lines, surround mask, center mark and status info overlays to On or Off in the EVF.
Peaking	Select to set peaking in the EVF to On or Off, and the strength of peaking to low, medium or high.
Anamorphic desqueeze	Select to set Anamorphic desqueeze to 1.3x, 2.0x and 2.0xmag. The desqueeze corrects the image for 1.3x and 2.0x anamorphic lenses. With 2.0x lenses, the user can choose between viewing the full sensor image (2.0x), or only the relevant image area (2.0xmag) where left and right sides of the EVF-1 image outside the 2.39 aspect area are cropped. *Only available if a license for anamorphic desqueeze is active in the camera.*
Zoom position	Select to set the Zoom position to Centered or Eye level. Press the **ZOOM** button on the EVF-1 to magnify: • Centered – the center of the image is magnified for focus check • Eye level – the image is magnified for focus check along a line approximately one third from the top, where an actor's eyes are commonly located in image composition.

Frame lines + status info screen

Frame lines	Select to set frame lines to On or Off. Frame lines are a reference for framing that typically consist of an image frame, a center mark and an aspect ratio reference. See the appendix for more information on the ALEXA frame line format.
Surround mask	Select to adjust the Surround mask settings. If surround view is set to "On", it must be separated from the recorded image area to allow proper framing. Users can choose:

- Black line
- Color line
- Mask 25%
- Mask 50%
- Mask 100%

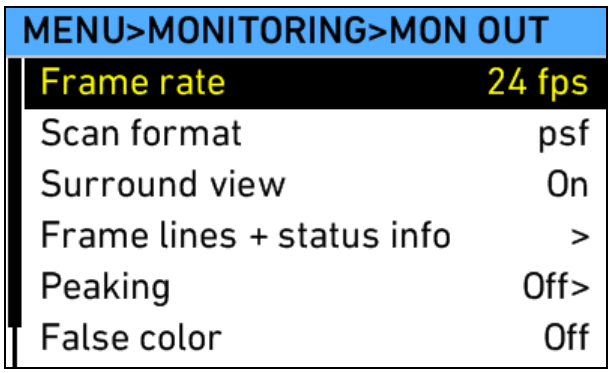
Center mark	Select to set the Center mark to Off, Dot or Cross to aid in image framing.
Status info	Select to set Status info to On or Off. When set to On, camera shooting parameters are displayed across the top of the EVF-1's image, outside the active image area and camera status information is displayed across the bottom of the EVF-1's image, outside the active image area.
Electronic horizon	Select to set the electronic horizon level to On or Off. *Only available on ALEXA Plus, ALEXA Plus 4:3, ALEXA Studio and ALEXA M.*
LDS info	Overlay showing LDS lens info. *Only available on ALEXA Plus, ALEXA Plus 4:3, ALEXA Studio and ALEXA M.*

MON OUT

The MON OUT is a 422 1.5G single link HD-SDI output. The output range is fixed at legal range.

Frame rate	Select to set the MON OUT frame rate to 23.976, 24, 25, 29.97 or 30 fps. The frame rate should, if possible, match the sensor frame rate to avoid dropped frames or duplicate frames on the output, which would result in jittery images during camera movement or when image subjects are moving.
Scan format	Select to set the type of scan: • p: Progessive. Images are transmitted line by line from left to right, starting at the top-left pixel. • psf: Progressive segmented. Images are first split into fields, which are then transmitted line by line from left to right.
Surround view	Select to set Surround view on the MON OUT On or Off. When set to on, the additional pixels outside the recorded image area on the ALEXA's ALEV III sensor are displayed, allowing the operator to see outside the recorded image and keep unwanted objects, such as microphone booms, out of the shot. To view only the recorded image, set Surround view to off.
Frame lines + status info	Select to set frame lines, surround mask, center mark and status info overlays to On or Off on the MON OUT.

Peaking	Select to set peaking on the MON OUT to On or Off, and the strength of peaking to low, medium or high.
False color	Select to activate the false color display on the MON OUT. The false color display is an exposure tool that overlays the image with color coding to highlight areas with significant luminance values.
Anamorphic desqueeze	Select to set Anamorphic desqueeze to 1.3x, 2.0x and 2.0xmag (only available if a license for anamorphic desqueeze is active in the camera). The desqueeze corrects the image for 1.3x and 2.0x anamorphic lenses. With 2.0x lenses, the user can choose between viewing the full sensor image (2.0x), or only the relevant image area (2.0xmag) where left and right sides of the MON OUT image outside the 2.39 aspect area are cropped. *Only available if a license for anamorphic desqueeze is active in the camera.*



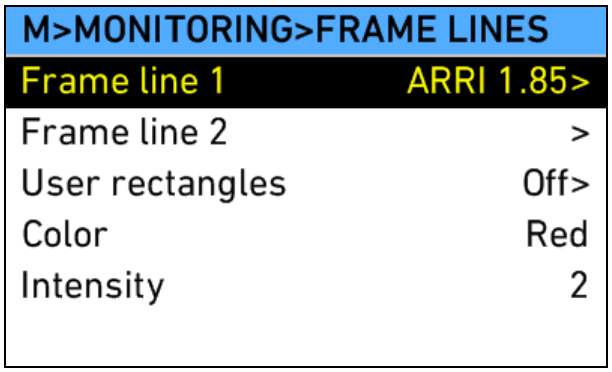
Note: Only use double shielded HD-SDI cables for monitoring to ensure error free data transmission!

Frame lines + status info screen

Frame lines	Select to set frame lines to On or Off. Frame lines are a reference for framing that typically consist of an image frame, a center mark and an aspect ratio reference. See the appendix for more information on the ALEXA frame line format.
Surround mask	Select to adjust the Surround mask settings. If surround view is set to "On", it must be separated from the recorded image area to allow proper framing. Users can choose: • Black line • Color line • Mask 25% • Mask 50% • Mask 100%
Center mark	Select to set the Center mark to Off, Dot or Cross to aid in image framing.

Status info	Select to set Status info to On or Off. When set to On, camera shooting parameters are displayed across the top of the MON OUT image, outside the active image area and camera status information is displayed across the bottom of the MON OUT image, outside the active image area.
Electronic horizon	Select to set the electronic horizon level to On or Off. *Only available on ALEXA Plus, ALEXA Plus 4:3, ALEXA Studio and ALEXA M.*
LDS info	Select to set the LDS lens information overlay to On or Off. *Only available on ALEXA Plus, ALEXA Plus 4:3, ALEXA Studio and ALEXA M.*
Show reel + clip info	Select to display reel and clip numbers on the MON OUT image.
Camera index letter	Select to display the camera index letter in the top left corner of the MON OUT image.

Frame Lines



Frame lines are an image overlay that can be applied to either the EVF image, the MON OUT image, or both.

ALEXA frame lines are stored as XML files that define the frame lines' aspect ratio, marker style, line width, center marker and more. The color of the frame lines is set on the camera.

The following default frame lines are loaded onto the ALEXA:

- 1.33:1
- 1.66:1
- 1.78:1
- 1.85:1
- 2.39:1
- 2.39:1 2.0x anamorphic

Additional frame lines can be loaded from the SD card. To create additional frame lines, use ALEXA Frameline Composer, a free web tool at http://www.arri.com/camera/digital_cameras. Save the new frame lines as XML files to an SD card formatted on the ALEXA, in the Frame lines folder. The ALEXA supports up to 16 frame line templates.

To load additional frame lines:

1. In the FRAME LINES menu, select Frame line 1 (or Frame line 2).
2. Press the **ADD** button.
3. On the FRAME LINES (SD CARD) screen, use the jogwheel to select the frame line you wish to add.
4. Press the jogwheel to add it to the FRAME LINES list.
5. Using the jogwheel, select the new frame line in the FRAME LINES list.
6. Press the jogwheel to set the new frame line.

Frame line 1	Select to set the primary frame line template.
Frame line 2	Select to set a secondary frame line, if desired.
User rectangles	Select to open the User rectangles menu, where two custom user rectangle overlays can be adjusted.
Color	Select to set the color of the frame lines. In the frame lines definition file, lines can either be given a fixed color, or they can have the color specified as "User". If "User" is chosen for a line, the setting chosen in this menu section is applied to the line.
Intensity	Select to set the intensity of the frame lines. The higher the number, the brighter the frame lines appear.

User rectangles screen

User rectangles	Select to set user rectangles to Off, Rect 1, Rect 2 or Rect 1&2. The ALEXA can display up to two additional rectangles that can be adjusted manually.
Set rect 1	Select to set the shape of rectangle 1. Activate it through User rectangles.
Set rect 2	Select to set the shape of rectangle 2. Activate it through User rectangles.

Note: Default frame lines have "User" specified as color for all content.

False Color Index

Select False color index to display a reference chart showing the relationship between the color overlays, signal level in percent and descriptions. False color is available on the EVF-1 and over the MON OUT outputs.

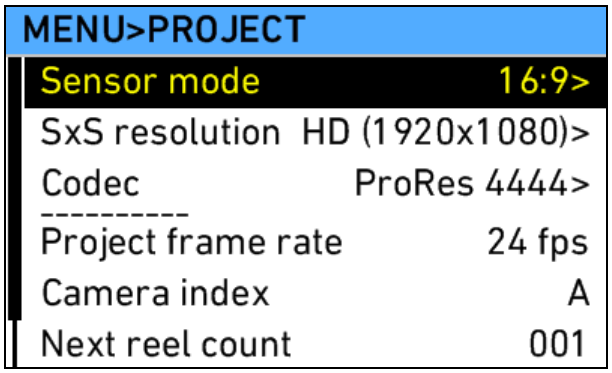
What	Signal Level	Color
White clipping	100% - 99%	red
Just below white clipping	99% - 97%	Yellow
One stop over medium gray (Caucasian skin)	56% - 52%	pink
18% medium gray	42% - 38%	green
Just above black clipping	4.0% - 2.5%	blue
Black clipping	2.5% - 0.0%	purple

Figure 60: False Color Encoding

12.1.5.3 Project

Sensor mode	Select to set which sensor mode is active, 4:3 or 16:9. *Note: Only on ALEXA Plus 4:3, ALEXA Studio and ALEXA M.*
SxS resolution	Select to set the current **SxS** recording resolution. Links to MENU>Recording>SxS CARDS.
Codec	Select to set the current **SxS** recording codec. Links to MENU>Recording>SxS CARDS. *Note: When* **SxS** *is switched off, the currently active REC OUT format is shown.*
Project fps	Select to set the timebase of the time code, which determines how many frames the time code counts per second and the frame rate of Quicktime clips recorded to **SxS PRO** cards during playback.
Camera index	Select to set the camera indentifier. Identifies the individual camera unit in clips and is reflected in clip names on **SxS PRO** cards.
Next reel count	Select to set the reel number assigned to the next new **SxS PRO** card used for recording. The ALEXA automatically advances the reel number every time a new **SxS PRO** card is formatted on the camera. The reel number is reflected in clip names on **SxS PRO** cards.
Production info	Select to open the PRODUCTION INFO screen where the user can enter metadata information specific to the production.

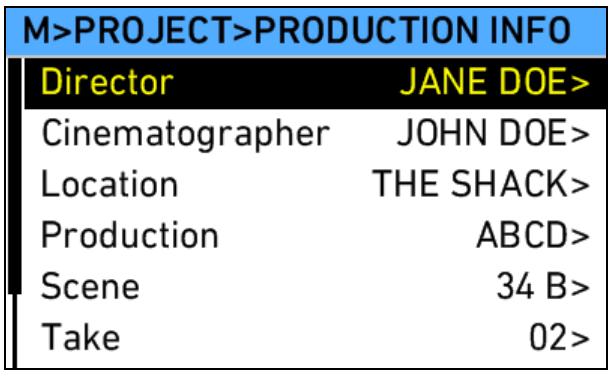
Note: The user should set the value of the Next reel count to 001 at the beginning of a shoot.

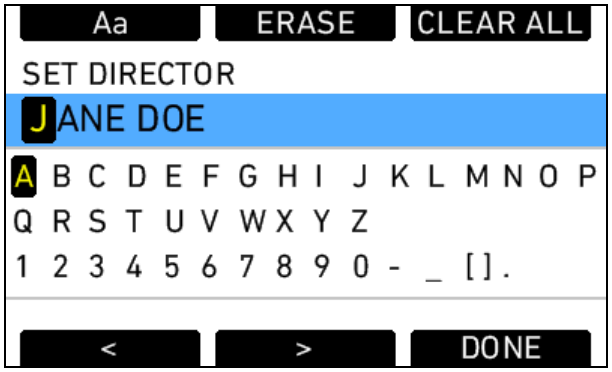


Production Info

The PRODUCTION INFO screen has fields to enter metadata information specific to the production. The user can enter the names of the director, cinematographer, location, production, scene and take. Two additional fields allow to enter other data.

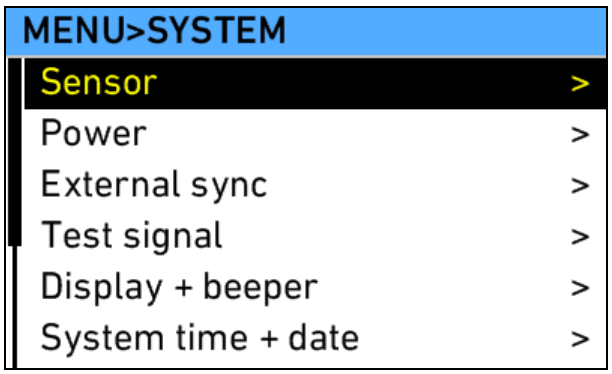
Director	Enter the name of the director
Cinematographer	Enter the name of the cinematographer
Location	Enter the name of the location
Production	Enter the name of the production
Scene	Enter the name of the scene
Take	Enter the name of the take
User Info 1	Enter other info
User Info 2	Enter other info





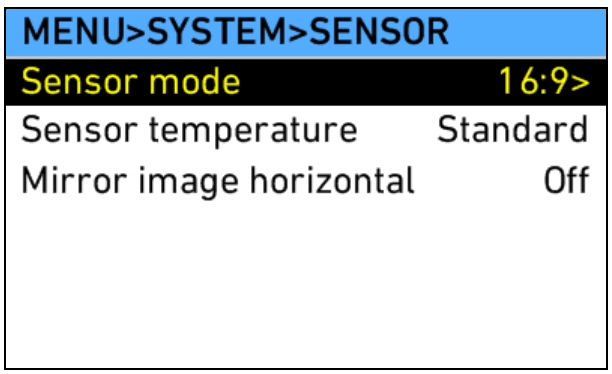
12.1.5.4 System

The System menu contains submenus of system settings.



Sensor

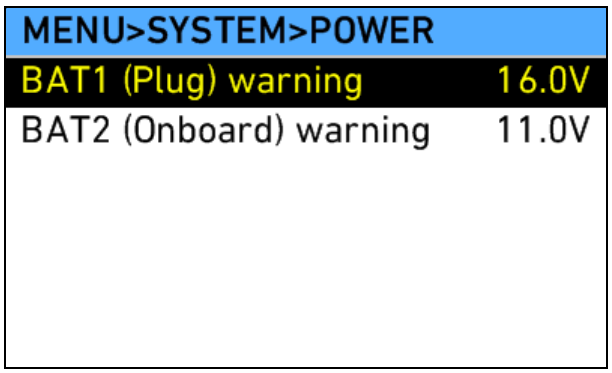
Sensor temperature	Select to set the sensor temperature to Standard (default) or High humidity. When shooting in tropical conditions with high temperature and high humidity, the sensor temperature can be changed from Standard to High humidity to prevent condensation from forming on the sensor coverglass.
Mirror image horizontal	Select to mirror the image horizontally on all image paths.



Power

BAT1 (Plug) warning	Select to adjust the voltage level at which a power warning is displayed for the power source connected to the BAT plug. The level can be adjusted to match the battery type used. The default value is 21.0V.
BAT2 (Onboard) warning	Select to adjust the voltage level at which a power warning is displayed for the onboard battery. The level can be adjusted to match the battery type used. The default value is 12.0V.

Note: When the voltage level reaches a point 10% below the warning level set in the POWER menu, the ALEXA displays a battery error message and recording is unavailable. The camera will read the voltage level as insufficient.

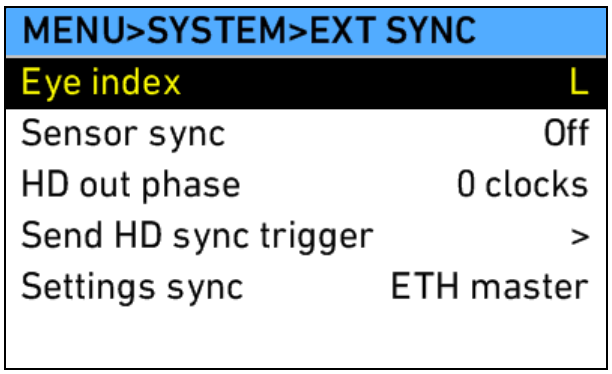


Smart batteries that transmit their remaining load to the camera emit a warning at 10% remaining capacity and an error at 5% remaining capacity. Currently, batteries made by ID-X, Bebop, Anton Bauer and any battery using the TI-protocol support this feature.

External Sync

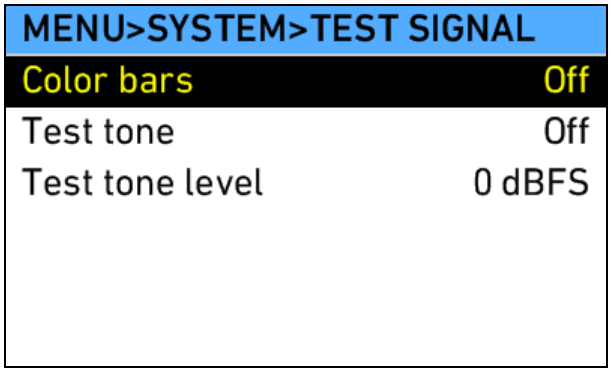
Eye index	Select to set the Eye index to left (L) or right (R). The first letter of the Camera ID will be changed to L or R for stereoscopic productions to identify left and right eye cameras. The eye index is reflected in clip names on **SxS** cards
Sensor sync	Select to sync the sensors of two ALEXAs. See *Sensor sync* (on page 131) for more information. • Off: The camera is in non-synced mode for regular use. • EXT master: The camera sends signals to an EXT SLAVE camera via the EXT connector containing sync clock and TC signals. • EXT slave: The camera receives signals from an EXT MASTER camera containing sync clock and TC signals through the EXT connector.
HD out phase	Select to adjust the phase of the REC OUT output in

	the range of -30 to +30 HD clocks (1 HD clock = 13.4 ns). This can be necessary for 3D applications with external recorders that require the slave signal to arrive after the master signal. Shift the phase backwards (+) on a slave camera or forwards (-) on a master camera to achieve the correct signal order.
Send HD sync trigger	When using two cameras in sensor sync mode without settings sync, the EXT MASTER camera must send a trigger to the EXT SLAVE camera to ensure the HD outputs of the cameras are synced. Press the jogwheel to send the trigger.
Settings sync	ALEXA cameras can be operated in synced-settings mode, where the settings of two cameras can be synced via Ethernet. See *Settings sync* (on page 132) for more information.



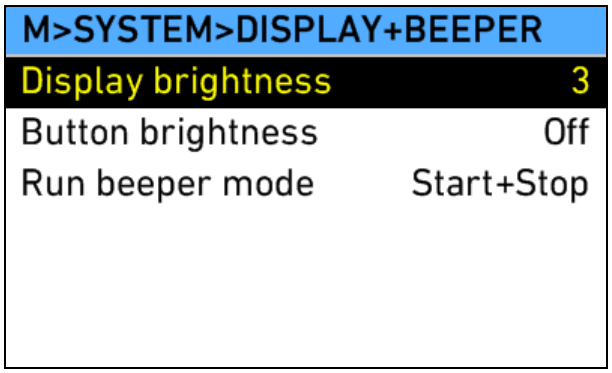
Test Signal

Color bars	Select to activate SMPTE color bars on MON OUT and REC OUT. The color bars are a 10-bit signal according to SMPTE RP 219-2002. *Note: Color bar is switched off when recording is started.* *Note: When REC OUT is set to ARRIRAW, REC OUT is set to black while color bar is active.*
Test tone	Select to activate a 1 kHz audio test tone on all channels when color bar is active. *Note: Test tone is only active when audio recording is on and possible.*
Test tone level	Select to sets the level of the audio test tone to 0 dbFS, -9 dBFS or -18 dBFS.



Display + Beeper

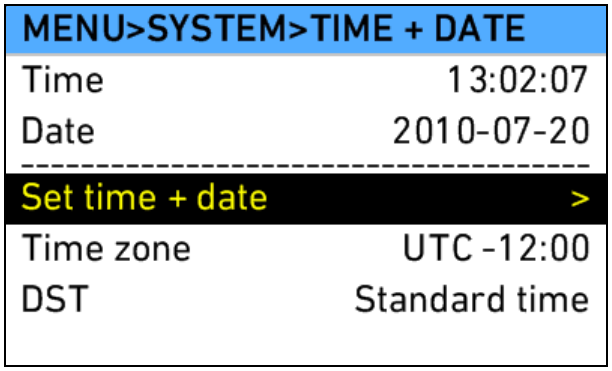
Display brightness	Select to adjust the brightness of the LCD display on the camera-right side. To adjust the display brightness when the HOME screen is displayed, press and hold the **BACK** button while rotating the jogwheel.
Button brightness	Select to adjust the brightness of the button illumination.
Run beeper mode	Select to set the Run beeper mode to: • Off • Start • Stop • Start+Stop



System Time + Date

Time	Displays the current time (read-only).
Date	Displays the current date (read-only).
Set time + date	Select to set time and date.
Time zone	Select to set the time zone to match your current location.
DST	Select to set daylight savings time.

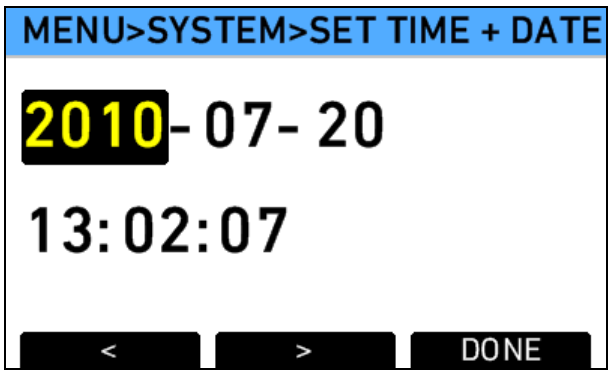
Set time + date



Use the lower screen buttons to navigate between the elements in the screen and to finish your setting.

To set the time and date:

1. In the System menu, select System time + date.
2. Select Set time + date.
3. Use the jogwheel to adjust the date value, starting with the year.
4. Press the **>** button to jump to the month, day, hour, minute and second. Press the **<** button to jump back one step.
5. Press the **DONE** button when finished.



Fan

Fan mode	Select to set the fan mode to Regular for locations with ambient temperatures up to 30°C (86°F). For locations with ambient temperatures higher than 30°C (86°F), set to Rec low.

SD card

Format + prepare SD card	Select to format the SD card and creates the required folder structure after confirmation. *Note: This erases all data present on the SD card.*
Prepare SD card	Select to create or complete the required folder structure on the SD card without erasing any data present on the SD card.

Firmware

To keep the ALEXA up to date with new features, the camera firmware can be updated by the user. Download the latest Software Update Packet (SUP) from http://www.arri.com/camera/digital_cameras and be sure to read the included instructions.

To update the camera to a new SUP:

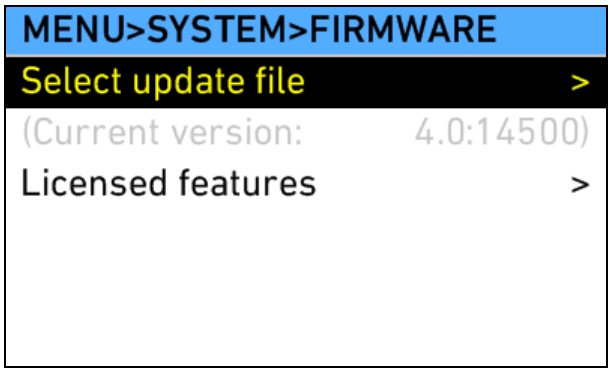
1. Copy the new SUP into the Firmware folder on an SD card formatted in the ALEXA. Load the SD card into the camera.
2. In the System menu, select Firmware.
3. Select Select update file.
4. Select the new SUP from the list on the FIRMWARE (SD CARD) screen.
5. Press both **UPDATE** buttons simultaneously to update the camera's firmware.

Note: Do not interrupt the update once it has started. Make sure the camera power supply will remain sufficient for the duration of the update (app. 15 minutes).

Select update file	Select to update the camera's firmware. If an SD card containing update files is loaded in the camera, you can select an update file from the list and perform an update.
Current version	Select to display the release code of current installed firmware.
Licensed features	Select to manage licensed features on the INSTALLED LICENSES screen.

Note: On rare occasions, the update process can fail. If the update procedure fails, try it again until you succeed.

Note: If **SxS** recording is switched off, switch it back on again before performing a firmware update.



12.1.5.4.1.1 Licensed Features

The capabilities of the ALEXA can be further enhanced through licensed features available for online purchase. Visit the ALEXA LICENSE SHOP at http://alshop.arri.de and follow the instructions for purchasing and downloading license keys. Available licenses include:

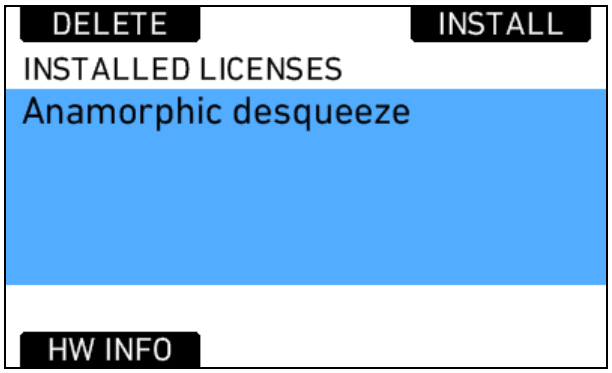
- DNxHD License Key
- High Speed License Key
- Anamorphic De-squeeze License Key

License keys are linked to each ALEXA's serial number and cannot be transferred from one camera to another. Before purchasing a license key, you must save the camera's hardware info file for upload during the purchasing process.

To save the hardware info file:

1. In the System menu, select Firmware.
2. Select Licensed features.
3. On the INSTALLED LICENSES screen, press the **HW INFO** button.
4. Press the **SAVE** button. The hardware info file will be saved on the SD card in the root directory. It will look like *sn####-AlexaHardware.ipkg*.

The INSTALLED LICENSES screen displays a list of installed licenses. New license can be installed from the SD card.



To install new licenses after purchase:

1. Copy the license key—it will have the suffix .lic—into the Licenses folder on an SD card formatted on the ALEXA. Load the SD card into the camera.
2. In the System menu, select Firmware.
3. Select Licensed features.
4. Press the **INSTALL** button.
5. On the LICENSE FILES (SD CARD) screen, select the license to be installed. The licensed feature enabled by the license key is described at the bottom of the screen for each license selected.
6. Press the jogwheel to install the license.

Note: Only license keys that have been created for the camera in use will appear in the SD card license list.

License keys can be deleted from the camera to prevent the use of the feature. The license can be reinstalled at any time.

To delete a license:

- On the INSTALLED LICENSES screen, press the **DELETE** button.
- Use the jogwheel to select the license you wish to delete.
- Press both **DELETE** buttons simultaneously.

Note: Keep an offline copy of the license key in a secure place! In the event of a lost license key, you can re-download it from your account in the ALEXA LICENSE SHOP.

12.1.5.5 Frame grabs

Still frames from the camera's sensor can be taken. The still images inherit the REC OUT gamma and Look File settings. Available still image formats include .jpg, .tif and .dpx when the REC OUT is set to 422 or 444 output formats. When the REC OUT is set to ARRIRAW, only .ari format still frames can be taken. When the REC OUT acts as a MON OUT clone, frame grabbing is not available.

To set the still frame format:

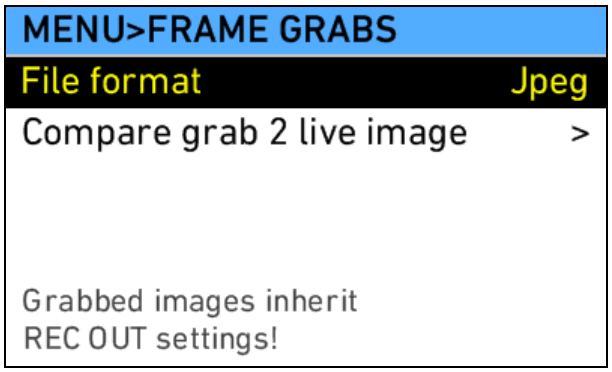
1. In the Frame grabs menu, select File format.
2. Use the jogwheel to select the desired format and press the jogwheel to set it. Unavailable formats are grayed out.

To take a still frame and save it to the SD card:

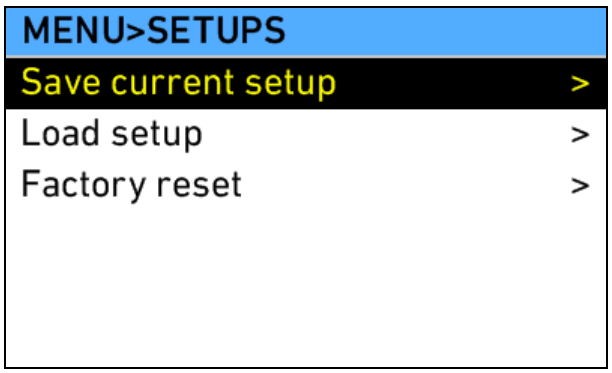
- Press the **GRAB** button. The time needed for saving the image to the SD card will vary, depending on the file format. Additional still frames may not be taken while saving.

Still frames can also be taken by assigning User buttons **1**, **2** or **3** to Grab still frame. This allows still frames to be taken from the operator's side of the camera (camera-left side).

Still frames will be saved in the Grabs folder on the SD card.



12.1.5.6 User Setups



A user setup is a profile of the current settings on the ALEXA that can be saved to the SD card. User setups can be given custom names, saved to the SD card and loaded onto multiple ALEXAs.

Rather than resetting the camera to its factory default settings, a user setup can be used to reset the camera to a user's default settings.

A user setup contains all parameters set in the camera except files that have been transferred via SD card, specifically frame lines and ARRI Look Files. These are not affected by loading a user setup and are only cleared by performing a factory reset.

Requirements:

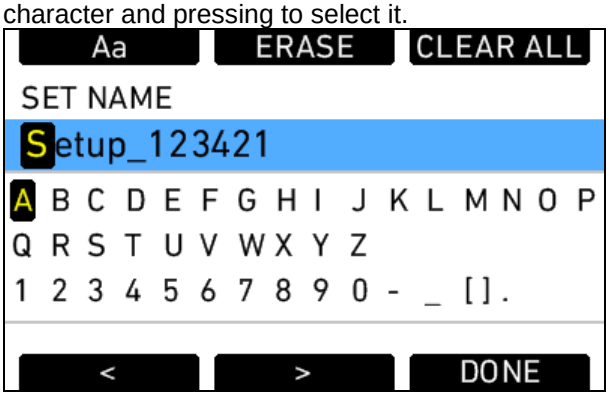
- formatted SD card loaded in the SD card slot on the ALEXA

To create a user setup:

- Set all the desired parameters on the ALEXA.

To save a user setup:

1. Press the **MENU** button.
2. Use the jogwheel to select User Setups.
3. Select Save current setup.
4. To apply a custom name to your user setup, press the **RENAME** button. Erase the default user-setup name by pressing the **CLEAR ALL** button.
5. Use the jogwheel to enter a new name by scrolling to the desired character and pressing to select it.

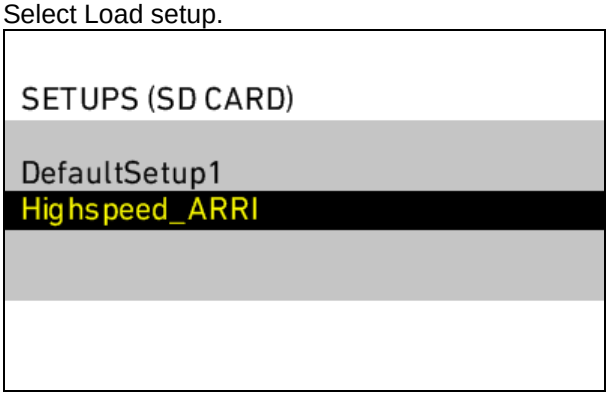


6. When you have finished entering the new user setup name, press the **DONE** button.

7. Press the jogwheel to save the new user setup to the SD card.

To load a user setup:

1. Press the **MENU** button.
2. Use the jogwheel to select User Setups.
3. Select Load setup.



4. Use the jogwheel to select the desired setup in the list and press the jogwheel to load the setup.
5. Press the **PROJECT** button to validate your project settings.

Note: User setups work only in the SUP version they are created in. After a SUP update, a new user setup must be created and saved.

A recommended procedure for working with user setups is as follows:

1. Before shooting, perform a factory reset to restore factory default settings.
2. Save a user setup named "Reset" or similar. This will be used instead of performing the ALEXA's factory reset.
3. Adjust the camera's shooting parameters and settings, and load the desired frame lines and ARRI Look Files.
4. Save another user setup with a descriptive name, such as "Show Title A-Cam".
5. To reset the camera to the default settings without losing the frame lines or ARRI Look Files, load the "Reset" user setup.

User setups can be used to ensure that cameras on multi-camera shoots have matching settings, or to transfer a show's setup onto daily cameras, to ensure they carry the same shooting specifications. User setups can also be created for regular speed and high speed modes, eliminating the need to change settings individually after switching modes. For example, to switch from regular speed mode to high speed mode, the user can simply load the high-speed mode user setup that he created, saving production time.

Note: You cannot switch between sensor modes by loading a user setup. To switch sensor modes, go to the SENSOR menu or PROJECT menu.

12.2 Operator controls

The operator controls are located on the camera left side and consist of three function buttons plus three assignable buttons.

1	User button 1. Can be assigned functions with the **USER** button on the Main controls.
2	User button 2. Can be assigned functions with the **USER** button on the Main controls.
3	User button 3. Can be assigned functions with the **USER** button on the Main controls.
REC	Press the **REC** button to start and stop internal recording. A red LED tally indicates recording.
PLAY	Press the **PLAY** button once to load the last clip. Press the **PLAY** button again to toggle between play and pause. Press and hold the **PLAY** button for 2 seconds to stop playback.
LOCK	Press and hold the **LOCK** button for 3 seconds (counted down on the main controls LCD) to lock the main and operator controls. A blue LED beside the **LOCK** button on the camera-left side indicates the lock is active. A lock icon on the LCD display on the camera-right side indicates the lock is active. Press and hold the **LOCK** button for 3 seconds to unlock the main and operator controls.

Figure 61: Operator UI

12.3 EVF-1 Controls

The EVF-1 controls are located on the electronic viewfinder. They consist of a number of function buttons and a jogwheel.

CAM	Press the CAM button to open the EVF-1's CAM menu.
EVF	Press the EVF button to open the EVF-1's EVF menu.
ZOOM	Press the **ZOOM** button to magnify the EVF-1 image 2.25x for focus check. The magnification ratio is 1:1, or one sensor pixel to one EVF-1 display pixel. Active magnification is indicated by an orange frame around the image. Frame lines are deactivated while zoom is active.
EXP	Press the EXP button to toggle false color display on and off.

When the **LOCK** button on the main controls is engaged, the CAM and EVF buttons are locked with the main controls and operator controls. The **ZOOM** and **EXP** buttons are not affected by the lock.

The message Button is locked! is displayed in the EVF-1 when the **CAM** or **EVF** button is pressed while the main controls are locked.

12.3.1 Viewfinder EVF menu

Press the **EVF** button to open a the Viewfinder EVF menu in the EVF-1 display and set the viewfinder parameters. Use the jogwheel on the EVF-1 to select and set menu options. Press the **EVF** button to exit the Viewfinder EVF menu.

Brightness	Select to set the brightness of the EVF from 1 (least bright) to 5 (brightest). A brightness level of 5 is recommended for normal shooting scenarios.

Rotate image	When mounting the EVF to the right side of the camera, the image can be flipped to orient the image correctly in the viewfinder. Affects only the EVF image, MON OUT and recording images are not rotated.
Smooth mode	Select to set Smooth mode On or Off. With smooth mode on, the EVF image shutters less when panning. *Note: Smooth mode is only possible with frame rates up to 30 fps and shutter angles of 180.0 or less.*
Surround view	Select to set Surround view on the EVF-1 On or Off. When set to on, the additional pixels outside the recorded image area on the ALEXA's ALEV III sensor are displayed, allowing the operator to see outside the recorded image and keep unwanted objects, such as microphone booms, out of the shot. To view only the recorded image, set Surround view to off.
Surround mask	Select to adjust the Surround mask settings. If surround view is set to On, it must be separated from the recorded image area to allow proper framing. Users can choose: • Black line • Color line • Mask 25% • Mask 50% • Mask 100%
Status info	Select to set Status info to On or Off. When set to On, camera shooting parameters are displayed across the top of the EVF-1's image, outside the active image area and camera status information is displayed across the bottom of the EVF-1's image, outside the active image area.
Framelines	Select to set frame lines to On or Off. Frame lines are a reference for framing that typically consist of an image frame, a center mark and an aspect ratio reference. See the appendix for more information on the ALEXA frame line format.
Select framelines 1	Select to set the main frame lines template from those stored in the camera.
Select framelines 2	Select to set the secondary frame lines template from those stored in the camera.
Center mark	Select to set the Center mark to Off, Dot or Cross to aid in image framing.
User rectangles	Select to display up to two additional user-editable rectangles in the EVF-1 image.
Edit user rectangles	Select to adjust the user rectangles.
Framelines color	Select to set the color of the frame lines.
Framelines intensity	Select to set the brightness of the frame lines.

12.3.2 Viewfinder CAM menu

Press the **CAM** button to open a the Viewfinder CAM menu in the EVF-1 display and set the camera parameters. Use the jogwheel on the EVF-1 to select and set menu options. Press the **CAM** button to exit the Viewfinder CAM menu.

FPS	Select to set the sensor frame rate. Preconfigured and previously added user-defined values can be selected in the FPS list.
SHUTTER	Select to set the shutter angle. Preconfigured and previously added user-defined values can be selected in the Shutter list.
EI	Select to set the exposure index. Settings from EI 160 to EI 3200 can be selected, in steps of 1/3 stop.
WB	Select to set the white balance. Preconfigured and previously added user-defined values can be selected in the WB list.

13 Operation of the Camera

This chapter covers tasks the user will encounter while using the ALEXA. While previous chapters contained specific procedures for basic use, this chapter will outline broader tasks and offer recommendations and best practices, including camera configuration.

13.1 Recording

13.1.1 Internal recording

This chapter contains information and recommendations for recording with **SxS PRO** cards. The user is encouraged to adapt the recommendations and workflow to individual and production needs.

Note: ARRI cannot be held responsible for the loss of any data in conjunction with internal recording!

The ALEXA records internally to Sony **SxS PRO** cards. The **SxS PRO** card uses the ExpressCard34 form factor and is available in 8, 16,32 and 64 GB capacities.

Card file format

SxS PRO cards must be formatted in the camera before they can be used for recording. ALEXA uses the Universal Disk Format (UDF) file system. This file system is read-only for computers, which means data can be copied from the card to another device, but the data cannot be manipulated on the card itself.

Card preparation

The typical usage cycle of a card is:

1. Format
2. Record
3. Copy
4. Back up
5. Verify data
6. Format

Format	Before recording, cards must be formatted in the camera. The camera always performs a blank format, which means that the cards contain no meta data and are not assigned a reel number prior to recording the first clip. The camera auto-detects cards with an invalid file system and asks the user to format the card. The ALEXA uses the UDF file system. This file system is read-only for computer systems, which minimizes the risk of data corruption.
Record	When the **REC** button is pressed, the camera starts to write a clip to the card. With the first clip, the card is a assigned a reel number. There is more information on file naming later in this chapter.
Copy	After recording to the card is finished, the data should be copied to another device to minimize the risk of data loss. The data should also be verified after copying using checksums to ensure that no errors have occurred during the copying process.
Backup	The data should ideally be copied to two physically separate destinations. The first copy should be the "working copy", and the second copy should be the "backup copy". These tasks can be done in parallel, as long as the end result is verified data on two independent devices.

Format	Only when the data has been copied to two independent devices and verified, should the card be formatted to remove all data from it. As a recommendation, the person who verifies the primary and back-up copies should also format the cards, so that the camera crew only receives empty cards. This functions as a failsafe—the crew will be alerted if they receive a card with valid data on it and can catch a card that might not have been copied and backed up. The card can be formatted with any file system, as it has to be reformatted by the camera anyway.

Codec

ALEXA can record both Apple ProRes™ as Quicktime files and Avid DNxHD as MXF (OP1A) files.

Note: Recording in Avid DNxHD requires license key.

The Apple ProRes™ codec family consists of 5 different codecs:

Name	**Color coding**	**Data rate @ 30 fps**	**Recording time on 32 GB SxS PRO @ 30 fps**[2]
ProRes 422 (Proxy)	YCbCr	45 Mb/s	1 h 23 min
ProRes 422 (LT)	YCbCr	102 Mb/s	37 min
ProRes 422	YCbCr	147 Mb/s	25 min
ProRes 422 (HQ)	YCbCr	220 Mb/s	17 min
ProRes 4444[1]	RGB[1]	330 Mb/s	11 min

[1]Without alpha channel (444 only)

[2]Apple ProRes™ is a variable bit rate (VBR) codec. This means that the available recording time depends on the image content. The recording time in the table is the minimum available recording time for a 32 GB **SxS PRO** card. When image content is easily compressed without loss of image quality, the available recording time can exceed the number given in the table.

Also note that the available recording time is given for a 32 GB **SxS PRO** card at 30 fps. A lower sensor frame rate will increase the available recording time, while a higher sensor frame rate will decrease it.

For a detailed table of available frame rates and possible codec/card combinations, please refer to the Chapter *FPS* on page 59.

DNxHD

The following Avid DNxHD codecs are available on an ALEXA with a valid DNxHD license installed:

Name	Color coding	Data rate @ 29.97 fps	Recording time on 32 GB SxS PRO @ 29.97 fps
DNxHD 115/120/145	YCbCr	145 Mb/s	29 min
DNxHD 175x/185x/220x	YCbCr	220 Mb/s	19 min

DNxHD 115/120/145 has a bit depth of 8 bit. DNxHD 175x/185x/220x has a bit depth of 10 bit. The listed recording times are not dependent on image content.

DNxHD is a fixed bitrate codec. The codec naming convention indicates the codec's project frame rate:

- DNxHD 115 = 23.976/24 fps
- DNxHD 120 = 25 fps
- DNxHD 145 = 29.97 fps (30 fps is not available)
- DNxHD 175x = 23.976/24 fps
- DNxHD 185x = 25 fps
- DNxHD 220x = 29.97 fps (30 fps is not available)

For a detailed table of available frame rates and possible codec/card combinations, please refer to the Chapter *FPS* on page 59.

Choosing a codec

Selecting the right codec for the production is a crucial task. Choosing a codec with a high data rate, such as ProRes 4444, delivers the highest image quality, but lowers the available recording time on an **SxS** card.

ProRes 422 (Proxy)	Use for on-set monitoring and proxy editing while the master is captured with an external device.
ProRes 422 (LT)	Use for on-set monitoring and proxy editing while the master is captured with an external device and higher quality is required.
ProRes 422	Use for basic television applications if images do not require color correction in post production.
ProRes 422 (HQ)	Use for high quality TV applications requiring color correction.
ProRes 4444	Use for cinema applications requiring color correction and visual effects work such as pulling mattes.
DNxHD 115/120/145	Use for basic television applications, if images do not require color correction in post production.

DNxHD 175x/185x/220x	Use for high quality TV applications requiring color correction.

Whenever possible, test the full workflow pipeline with the preferred codec before shooting.

Resolution

Shooting ProRes no longer limits the recording resolution to HD (1920x1080). Starting in SUP 7.0, two new 2K ProRes recording options are available.

In 16:9 sensor mode, available ProRes resolutions are:

- HD (1920x1080)
- 2K (2048x1152)

The 2K format is aimed at 2K DCI workflows and eliminates the need for up-scaling in post production.

In 4:3 mode, available ProRes resolutions are:

- 2K (2048x1536) only

Note: DNxHD only supports HD (1920x1080) resolution.

Card file format

SxS PRO cards must be formatted in the camera before they can be used for recording. The ALEXA uses the Universal Disk Format (UDF) file system. This file system is read-only for computers, which means data can be copied from the card to another device, but the data cannot be manipulated on the card itself.

CARD file structure

After formatting in the camera, **SxS** cards are named ARRI UDF until the first clip is recorded. Once a clip has been recorded, **SxS** cards are named with the camera index letter and reel number. Clips are stored in a folder with the same name as card.

In addition to the clips, recording writes an XML file that shares the card's naming convention and the folder extension _FCP (example: A001R1JL_FCP.xml). The XML file is adheres to the Final Cut Pro (FCP) XML specification. If the XML file is opened in Final Cut Pro directly from the card, all clips are imported as one bin. If the clips are copied from the card to another destination, the file paths in the XML file have to be adjusted to match the new file location.

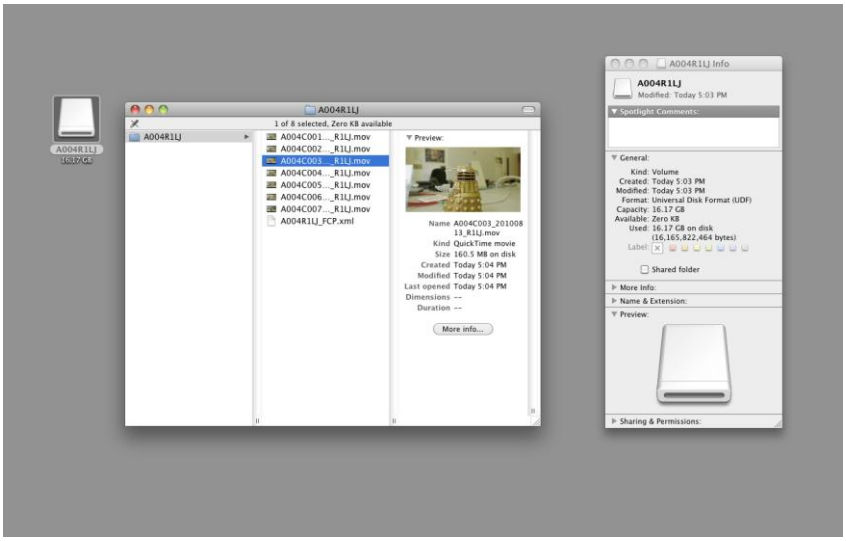


Figure 62: Example of ALEXA SxS card opened in Mac OS X

File naming scheme

ALEXA automatically names files as they are created on the **SxS** card. While it is possible to change the file names later on a computer, it is not recommended, as the ALEXA naming scheme has been developed to minimize the risk of duplicate file names.

The file name consists of 6 parts:

- Camera Index: One character, A-Z. User assignable, should match the camera unit. For example, the camera index A can be assigned to the A camera, and B to the B camera.

- Reel Counter: 3 characters, 001-999. Auto-assigned to each card, automatically advanced by one for each new card. The user can change the counter to for the next reel (card). This should only be done under special circumstances, such as after changing the camera body in the middle of a shoot.
- Clip Index: One character, fixed to C. Main use is to separate the reel counter from the clip counter. If more than 999 clips are recorded to one card (not likely to happen), it changes to D.
- Date: Current date, in order YYYYMMDD, as set in Menu>System/Time/Date
- Camera ID: Consists of a one letter prefix, user-adjustable between R and L, and the camera serial number encoded in 3 letters Base36 (0-9, A-Z).

The date is separated by underscores at the beginning and end.

The reel counter should be set to 001 at the beginning of a shoot. The camera will then automatically advance the reel number each time a new **SxS** card is loaded into the camera, formatted and recorded on. If a previously recorded card is reloaded in the camera (comparable to a short end of a film roll), this card will keep its reel number and the camera will remember how far it has counted. The next new **SxS** card will inherit the correct next reel number, To change the next reel number manually, select Next reel count in the Project menu. Note that this is only recommended for special circumstances.

Examples

A typical ProRes/Quicktime file name would look like this:

- A004C010_20100610_R1JL.mov

A typical DNxHD/MXF file name would look like this:

- A004C010_20100610_R1JL.mxf

The translation of this clip name is as follows:

- this clip was the tenth clip recorded on the fourth card used (reel number)
- this clip was recorded on June 10, 2010
- the camera assigned the Base 36 serial number 1JL, which translates into the decimal serial number 2001 (For a Base 36-to-decimal converter, visit http://www.translatorscafe.com/cafe/units-converter/numbers/calculator/decimal-to-base-36/ or conduct an internet search.)

Additional recommendations

To minimize the risk of lost data, ARRI suggests the following guidelines for **SxS** card and data management:

- Pre-format cards. Format all the **SxS** cards in the camera before shooting begins. This can save production time otherwise used formatting cards at every reload. Cards do not receive a reel number until the first clip is recorded, so there is no need to use the cards in the same order they were pre-formatted. Formatting a 32 GB card normally takes less than 10 seconds.
- Limit the recording time on each card. Codecs with lower data rates like ProRes 422 (Proxy) have long record times on high-capacity **SxS PRO** cards. Users should consider limiting the recording time to 30 minutes of material per card to make managing the data more efficient and reduce the impact on the production in the event of a problem.
- Download and back up data immediately after reloading the camera to minimize the time that data exists in a one place (the **SxS** card).
- When a full **SxS** card is removed from the camera, switch the card's write protect tab to on (red indicator) before sending it to the data wrangler.
- After an **SxS** card has been downloaded and backed up, switch the card's write protect tab to off before formatting.

Metadata

Metadata is stored in the index.xml file as well as the Quicktime file header. The most important metadata for post production workflow is the tape name, as it will be one of the primary identifiers used in the EDL. The term *tape name* is an existing post-production naming convention that is also used for nonlinear media. The term *reel name* may also be used.

The tape name of ALEXA files is limited to 8 letters to match the CMX 3600 EDL standard. It consists of the Camera Index, reel counter and the Camera ID. Based on the previous example, the tape name of the clip would be *A004R1JL*.

Even if the user forgets to assign different camera indices to two cameras on the same project, the Camera ID metadata guarantees unique tape names.

The Quicktime file carries a single timecode track.

In DNxHD/MXF files, metadata is stored as an .ale file on the **SxS** cards, and in an XML file embedded in the MXF.

For more information, please refer to the Metadata white paper available for download on the ARRI website.

Dual recording

The Dual recording function in the ALEXA allows recording to two **SxS PRO** cards in parallel, creating an instant backup at the time of recording. To enable dual recording, set Dual recording to On in the SxS CARDS menu (in Recording menu).

Requirements for dual recording:

The **SxS PRO** cards must be of the same capacity.

- When reloading, or changing reels, both cards must be formatted.

- The **SxS PRO** cards must have identical file structure.

Follow the procedures for normal recording to a single **SxS PRO** card, but manage the **SxS** cards as a set. Download and back up one card and keep the other card as an additional backup.

13.1.2 External recording

In addition to internal recording, the ALEXA can also output uncompressed HD and unprocessed ARRIRAW data to external recorders over the REC OUT.

Choose the preferred output format based on the following basic guidelines:

- 422 1.5G: use for television applications that require only color correction and high-speed capture above 30 fps.
- 444 1.5G: Use for high-quality television applications that require color correction and visual effects work such as pulling mattes, and for cinema applications.
- ARRIRAW: Use for high-quality cinema applications destined for multi-format distribution.

422 1.5G YCbCr

422 is a format in which color is sub-sampled, meaning that the camera-native RGB image is transformed to a YCbCr color space. Y represents luminance, while Cb and Cr are color difference signals. Cb and Cr are sampled with only half the horizontal resolution, as the human eye is less sensitive to color resolution than to luminance resolution. 422 is a good balance of lower bandwidth in transmission and high quality visual results.

For frame rates up to 30 fps, 422 1.5G is transmitted over a single HD-SDI cable. REC OUT 1 and REC OUT 2 carry the identical signal independently. When shooting frame rates higher than 30 fps, the signal is split across both REC OUT 1 and REC OUT 2 and requires connecting two HD-SDI cables.

422 3G YCbCr

3G is an improved HD-SDI format that can transmit signals over a single cable which previously required two cables. It transports the same signal as 422 1.5G YCbCr dual link, but over one cable with a higher clock rate. REC OUT 1 and REC OUT 2 carry the identical signal independently.

444 1.5G RGB

444 is still in the RGB color space, with each color at its full resolution. This is important when chroma keying, as these composites rely on color resolution.

444 1.5G is transmitted over two HD-SDI cables, with each cable carrying part of the image data. It is important to

- connect REC OUT 1 on the camera with record input 1 (or A) on the external recorder and REC OUT 2 on the camera with record input 2 (or B) on the external recorder
- use matched lengths of HD-SDI cables for links 1 and 2

444 3G RGB

There are two types of 444 3G signal.

- The single link version contains the same signal as the 444 1.5G signal, but according to SMPTE 425M over a single cable.
- The dual link version uses a proprietary image mapping for frame rates from 30 to 60 fps, and is only currently supported by certain recorders.

ARRIRAW 1.5G DL

ARRIRAW is the proprietary raw data generated by ARRI cameras. Raw data is the sensor image data before it is converted to RGB images. The ALEXA has a single sensor with a Bayer pattern color filter array, meaning that every pixel has only one channel of color information.

With normal HD images, the missing color channel information is calculated from the adjacent pixels in the camera.

With raw data, this calculation is delayed until after the recording to save bandwidth and creative options. Shooting ARRIRAW allows many decisions on how to convert the images to be made in post-production.

ALEXA ARRIRAW specs:

- Bayer pattern color coding
- 12 bit log luminance coding
- No white balance applied
- No exposure index applied
- Full sensor resolution (2880x1620)

ARRIRAW is transmitted to the recorder via ARRIRAW T-Link using standard HD-SDI dual link cables with proprietary encoding. The HD-SDI signal complies with the SMPTE 372M standard.

An ARRIRAW T-Link-certified recorder must be used for recording ARRIRAW. Certified recorders are available from Codex, Keisuko Giken and S.Two, among others.

For more information, visit http://www.arri.de/arriraw

ARRIRAW 3G SL

The ARRIRAW 3G SL signal format uses a single HD-SDI signal that complies with the SMPTE 425M standard. It is similar to ARRIRAW 1.5G DL, but uses only one cable.

ARRIRAW 3G DL

This output format is fully proprietary and does not follow SMPTE standards. It is used to transmit ARRIRAW with frame rates between 30 and 60 fps.

Note: Only use double-shielded HD-SDI cables on all HD-SDI outputs to ensure error-free data transmission!

Triggering record on an external recorder

When **SxS** recording is set to *Off,* the **REC** button triggers only the SDI record flag, signaling the recorder to start and stop recording.

The SDI record flag is an ancillary data packet in the blanking area of the HD-SDI signal that contains information about active recording. This packet is always embedded in the HD-SDI signal.

Note: With the SDI record flag, successful recording cannot be guaranteed, as there is no feedback from the recorder to the camera.

13.1.3 Parallel recording

Recording to both **SxS PRO** cards and external recorders simultaneously offers additional workflow options. For example, the **SxS PRO** recording can be used for dailies and proxy editing, while the external recorder captures the master data. In another scenario, the internal recording can be used for TV broadcast and the ARRIRAW captured on the external recorder can be used for theatrical distribution.

Remote controlling the external recorder

Whenever the camera switches between record and standby mode, it triggers the SDI record flag on the REC OUT connectors, signaling an attached recorder to start or stop recording. The SDI record flag is an ancillary data packet in the blanking area of the HD-SDI signal that contains information about active recording.

Note: There is no feedback channel providing information to the camera if the external recording is active. Check the external recorder directly to determine whether or not recording is active.

Timecode on external recorders

To keep timecode locked across the **SxS PRO** card and the external recorder when recording in parallel, configure the external recorder so that it uses the TC embedded in the HD-SDI stream from the camera.

13.1.4 High Speed recording

When a valid High Speed license key is installed, frame rates of 60 to 120 fps are enabled in High Speed mode. High Speed recording is only possible on **SxS PRO** cards with ProRes™ codecs up to ProRes 422 HQ in HD (1920x1080) resolution. ProRes 4444 is not available in High Speed mode.

For a detailed table of available frame rates and possible codec/card combinations, please refer to the Chapter *FPS* on page 59.

The REC OUT carries the same signal as the MON OUT during High Speed mode.

Note: Camera boot-time is increased by approximately 40 seconds when High Speed mode is active during a power-cycle.

13.2 Monitoring

The ALEXA's monitoring options are the electronic viewfinder EVF-1 and the MON OUT. Surround view is available on both. With surround view set to On, 10% additional pixels outside the recorded image area on the ALEXA's ALEV III sensor are displayed, allowing the operator to see outside the recorded image and keep unwanted objects, such as microphone booms, out of the shot. To view only the recorded image, set Surround view to off.

To aid in framing, both the EVF-1 and MON OUT can display frame lines overlaid on the image. Frame lines can be considered electronic versions of ground glasses in film cameras.

13.2.1 Frame Lines

Frame lines are stored as XML files. A standard set of frame lines is provided in each camera, including:

- 1.33:1
- 1.66:1
- 1.78:1
- 1.85:1
- 2.39:1
- 2.39:1 2.0x anamorphic

Note: When shooting ProRes 2K (2048x1152) for a DCI 2K release in a 1.85:1 aspect ratio, the preloaded frame line ARRI 1.85 2K DCI can be used to mark the corresponding 1998x1080 area for a DCI 2K 1.85 without requiring any scaling in post production. Do not use this frame line in ProRes HD (1920x1080).

The user can also create custom frame lines to match production specifications.

Description of the frame lines XML file

The different sections in the file are:

- camera: describes the ALEXA model that the frame lines file is made for.
- line: frame lines and the center cross in the active image area consist of single lines. The line orientation is defined by three attributes: left, right, bottom and top for horizontal lines, top, bottom, left and right for vertical lines. Two attributes define the start and end points, and the third attribute defines the distance from the image edge.
- Distances for start, end and position are relative to the width or the height of the image and have a precision of 5.
- To create a centered frame line with a center cross as in the example, a total of six lines is necessary.
- To calculate the position of a line for a given aspect ratio, use the following formulas:
  - horizontal lines for aspect ratios >1.78 (e.g. 1.85): [1-(1.78/Aspect)]/2=distance from bottom or top
  - vertical lines for aspect ratios <1.78 (e.g. 1.33): [1-(Aspect/1.78)]/2=distance from left or right

XML example

The following sample XML code illustrates the frame lines system . It describes frame lines for a 2.35 centered aspect ratio inside the camera's 1.78 recorded image.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- NOTES:
       All widths are in pixels.
       All colors can be one of: black, white, or user.
       If you select user, the color can be changed through
       the user interface.
       You can add as many lines as you like. Lines are
       defined by giving 3 distances from the border.
       So if you specify top, left and right it will
       be a horizontal line with the given distance
       from left, right and from the top.
       The values are in the range [0, 1], where:
               0 is at the edge
               1 is on the opposite edge
       So specifing 0.4 from left is the same as 0.6 from right.
-->
<framelines>
       <!-- The description of the camera, this will
            only be used for selecting the correct files.
            So the user can only select glasses for his
           camera/current setup. -->
       <camera>
               <type>Alexa EV</type>
               <sensor>3K</sensor>
               <aspect>1.78</aspect>
               <hres>2880</hres>
               <vres>1620</vres>
       </camera>

       <!--user color line at top and bottom of 2.35 aspect-->
       <line>
               <left>0</left>
               <top>0.12174</top>
               <right>0</right>
               <width>4</width>
               <color>user</color>
       </line>
       <line>
               <left>0</left>
               <bottom>0.12174</bottom>
               <right>0</right>
               <width>4</width>
               <color>user</color>
       </line>

       <!-- Center cross horizontal lines, user color -->
       <line>
               <left>0.46355</left>
               <top>0.5</top>
               <right>0.50868</right>
               <width>4</width>
               <color>user</color>
       </line>
       <line>
               <left>0.50868</left>
               <top>0.5</top>
               <right>0.46335</right>
               <width>4</width>
               <color>user</color>
       </line>
       <!-- Center cross vertical lines, user color -->
       <line>
               <left>0.5</left>
               <top>0.43519</top>
               <bottom>0.51543</bottom>
```

```
                <width>4</width>
                <color>user</color>
        </line>
        <line>
                <left>0.5</left>
                <top>0.51543</top>
                <bottom>0.43519</bottom>
                <width>4</width>
                <color>user</color>
        </line>
</framelines>
```

13.2.2 Status Info Overlays

The ALEXA can display camera status information on both the MON OUT and EVF-1.

At the top and bottom of the screen, the ALEXA displays textual status information. The top status bar consists of sensor FPS, shutter angle, exposure index and white balance. In the EVF-1, the status bar also works as a menu, allowing the user to change the values when the **CAM** button is pressed.

The bottom status bar displays information about the battery levels, recording/standby flag and remaining capacity of internal storage.

On the left and right of the screen, icons provide information about the current status of the camera. The icons are organized into groups.

The left icon group is labeled SYS and contains information about the general system state of the ALEXA. On the right side, there are three groups labeled MON, EVF and LOOK. They provide specific information about the MON OUT, EVF-1 and the application of ARRI Look Files.

The following table explains the icons in the SYS group:

Icon	Description
	Indicates that the current recording resolution is set to HD.
	Indicates that the current recording resolution is set to 2K.
	Indicates that there is a warning condition in the camera.
	Warns that the camera has detected an error.
	Indicates that the camera temperature is outside of its optimal range.

Warns that the camera temperature has reached a critical point where it can no longer be operated and must be powered down.

Indicates that the camera controls are locked.

Only shown in EVF-1

Indicates that a frame grab is currently in progress.

Indicates that the signal from the RET IN connector is currently displayed.

The following table explains the icons in the MON, EVF and LOOK group on the right:

Indicates that the gamma of the respective output is set to REC 709.

Indicates that the gamma of the respective output is set to LOG C.

Warns that peaking is active on the respective output.

As peaking may alter the image in subtle ways not easily noticed otherwise, this icon is colored orange.

Warns that smooth mode is active in the EVF-1.

As smooth mode alters the image reproduction in the EVF-1, this icon is colored orange.

Indicates that the current Look file is applied to the EVF-1.

Indicates that the current Look file is applied to the MON OUT output.

Indicates that the current Look file is applied to the SxS recording path.

Indicates that the current Look file is applied to the REC OUT output.

13.3 Using Timecode

Timecode ensures that every image of recorded media can be identified with a unique value and synced with corresponding media, such as sound or the second camera in a 3D application. When used with other metadata, such as reel names, all recorded media maintains its unique identity.

Following are two ways timecode can be used on a production:

External TC, Time of day

- *Use:* This format is often used on multi-camera productions with sync-sound. When all cameras are running at sync-sound speed, which is also the project frame rate, sound and image time code match and allow for easy syncing in post.
- *Setup:* The sound department acts as the timecode master, and generates timecode which uses the time of day as a value, and a time base matching the project frame rate. Twenty-four hours of time will translate into twenty-four hours of time code.
  Timecode is fed to the camera via the TC connector. The timecode source must be set in the camera to Ext LTC and the mode to Free Run. The project fps setting must match both the sensor frame rate and the time base of the external timecode signal. The camera can be set to use Jam sync generator, in which it samples the timecode value once and then continues counting based on its own high-precision crystal clock. The timecode source can be disconnected from the camera after jamming in Jam sync generator mode. This mode ensures stable timecode with an offset of less than one frame for each eight hours, after which the camera has to be re-jammed.
  Alternatively, the camera can be set to regenerate mode, or Regen on the TIMECODE OPTIONS screen. In Regen mode, the camera uses the timecode value of the external timecode source. This ensures correct timecode for an infinite duration, but the timecode source must remain connected to the camera.
- *Variations:* If shooting starts close to midnight, the timecode might be started with an offset time of day to prevent a rollover at midnight.
- *Restrictions:* External timecode is only possible if the camera is running at sync-sound speed. If the camera is over- or under-cranking, the timecode frame rate will no longer match the sensor framerate, and timecode values would either be duplicate or dropped. To prevent this, the ALEXA will automatically switch to Int TC source and Regen mode when the sensor frame rate is changed.

Internal TC, Rec Run

- *Use:* Record run timecode is often used on single camera productions that are either MOS or use a dumb slate to sync picture and sound. Record run timecode guarantees continuous timecode on all recorded data. Record runtime code also works with over- and under-cranking.
- *Setup:* The timecode source must be set to Int TC, the mode to Rec Run and the generator to Regen. Timecode counts up only during recording, by one frame for each image generated by the sensor. The timecode counts at the project frame rate set on the camera. Normally, the timecode hour value advances by one hour for each new reel, using only hours 01-20 for reel 1-20, and then restarting at hour 01 for reel 21.
- *Variations:* Record run timecode might be used for off-speed work on productions that use external timecode sources for all sync sound
- *Restrictions:* None.

13.4 Syncing the Sensors of Two Cameras

Two ALEXAs can be synced for 3D applications or any application requiring sensor sync using the EXT connectors and corresponding cable. When synced, images are captured from each camera's sensor at precisely the same time.

Note: Syncing two sensors is possible at frame rates between 1.000 and 60.000 fps.

To sync the sensors of two ALEXAS:

1. Connect an EXT cable KC 155-S to the EXT ports on each ALEXA.
2. In the System menu on the master camera, select External Sync.
3. On the EXT SYNC screen, set Sensor sync to EXT master.
4. In the System menu on the slave camera, select External Sync.
5. On the EXT SYNC screen, set Sensor sync to EXT slave. It takes approximately five seconds for the two ALEXAs to sync.

The master camera triggers the slave camera so that images are created at the same moment of time with an accuracy of 10 µs. Whenever an error occurs, the camera will issue a warning.

Image integration between master and slave camera has a locked offset of less than 10 µs. This means that in the worst case, exposure differs by 4.3% (@ 60 fps frame rate and 5.0° shutter angle). With a regular exposure time (24 fps, 172.8°), the maximum difference is 0.05%.

Synchronizing Image Output

The REC OUTs and MON OUTs of two ALEXAs can also be synchronized. To achieve this, the user must send a trigger from the master camera to the slave camera after sensor sync is established.

To sync the REC OUTs and MON OUTs of two ALEXAs:

1. Ensure that the sensors of the two ALEXAs are synced.
2. In the System menu on the master camera, select External Sync.
3. On the EXT SYNC screen, select Send HD sync trigger.
4. Press the jogwheel to send the trigger to the slave camera.
   The camera will display the message *HD sync trigger sent to slave camera!*. If the sensors are not synced, the camera will display the error message *Trigger not sent. Camera must be set to Ext sync: Master!*.

After the sync trigger has been sent, the slave camera will no longer display the warning *HD outs not synced. Trigger now!*.

If the two cameras' settings are synced over Ethernet, the trigger is automatically sent.

When the outputs are synced, jitter between the two cameras' HD outputs is less than 500 ns. The HD output of each camera can be advanced or delayed by up to 30 HD clocks (1 HD clock= 13.46 ns), allowing for a total shift of 60 HD clocks (808 ns total) between cameras.

Timecode

Timecode is also transmitted from the master to the slave over the EXT cable. When a camera has been set to slave, it automatically uses the timecode values transmitted over the EXT cable. The TC screen will display *EXT TC from master camera* as TC source, and all options are disabled.

Note: When the mirror shutter is switched on, an ALEXA Studio can only be synced to another ALEXA Studio.

13.5 Syncing the Settings of Two Cameras

Two ALEXAs can be operated with synchronized settings. ARRI recommends to sync the settings ALEXAs of the same model only, for example, two ALEXA Plus models.

Camera connection

The settings of two ALEXAs can be synchronized over ethernet using the ALEXA Ethernet/Ethernet Cable KC 156-S, or over an ethernet hub using the ALEXA Ethernet/RJ-45 Cable KC 153-S.

Camera setup

To sync the settings of two ALEXAs over Ethernet:

1. Connect an ALEXA Ethernet/Ethernet Cable KC 156-S to the EXT ports on both ALEXAs, or an ALEXA Ethernet/RJ-45 Cable KC 153-S to the ethernet hub and the EXT port of each ALEXA.
2. In the System menu on the master camera, select External Sync.
3. On the EXT SYNC screen, set Settings sync to ETH master.
4. In the System menu on the slave camera, select External Sync.
5. On the EXT SYNC screen, set Settings sync to ETH slave. The two ALEXAs will automatically negotiate IP addresses. It takes approximately five seconds to establish a connection.

The master camera will initially distribute its settings to the slave camera. Once this is done, settings can also be changed on the slave camera, and the change will take effect on both cameras. This is useful if the master camera's controls are not accessible.

If a camera is set to ETH master or ETH slave, but is not connected to another camera, a warning is displayed on the STATUS Info screen.

Synced settings

The following settings are synced when syncing two ALEXAs:

WB>White Balance + CC Tint

EI>Exposure Index

FPS>Sensor FPS

FPS>HIGH SPEED>High Speed mode[2]

SHUTTER>Shutter Angle

COLOR>Gamma>SxS

COLOR>Gamma>REC OUT

COLOR>Gamma>MON OUT

COLOR>Gamma>REC OUT

COLOR>Gamma>EVF

COLOR>Gamma>LOG C film matrix

MENU>Recording>SxS>SxS Recording

MENU>Recording>SxS>SxS Codec

MENU>Recording>SxS>High Speed codec[2]

MENU>Recording>SxS>Dual recording

MENU>Recording>REC OUT>Frame rate

MENU>Recording>REC OUT>HD-SDI format

MENU>Recording>REC OUT>Scan format

MENU>Recording>REC OUT>Output range

MENU>Recording>REC OUT>REC OUT fps sets sensor fps

MENU>Recording>REC OUT>SDI remote

MENU>Recording>REC OUT>Vari flag

MENU>Monitoring>EVF>Status info

MENU>Monitoring>EVF>Surround view

MENU>Monitoring>EVF>Surround mask

MENU>Monitoring>EVF>Framelines

MENU>Monitoring>EVF>Anamorphic desqueeze*

MENU>Monitoring>MON OUT>Frame rate

MENU>Monitoring>MON OUT>Scan format

MENU>Monitoring>MON OUT>Status info

MENU>Monitoring>MON OUT>Surround view

MENU>Monitoring>MON OUT>Surround mask

MENU>Monitoring>MON OUT>Framelines

MENU>Monitoring>MON OUT>Anamorphic desqueeze[1]

MENU>Project>Project fps

In addition, the slave camera takes over the Camera ID of the master camera, so file names are identical except for the Camera ID prefix. It is important to give the master and the slave camera different Camera ID prefixes to prevent duplicate file names.

[1]Valid license for anamorphic desqueeze must be installed on both cameras.

[2]Valid license for **SxS** High Speed recording must be installed on both cameras

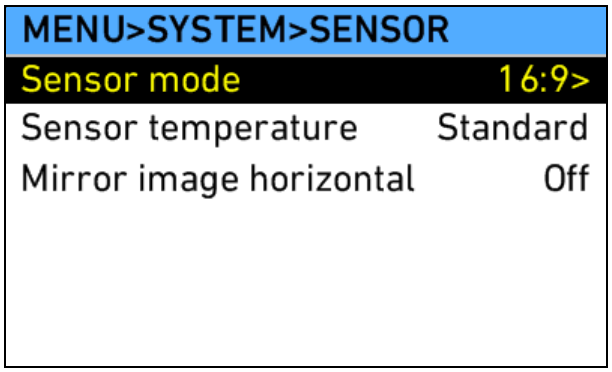
13.6 Sensor modes 16:9 and 4:3

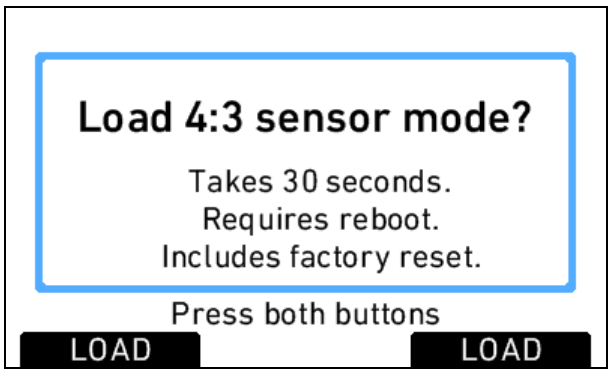
The ALEXA M, ALEXA Plus 4:3 and ALEXA Studio have ALEV III sensors and can be operated in 16:9 or 4:3 mode.

Note: ALEXA and ALEXA Plus can only be operated in 16:9 mode.

To change the sensor mode:

1. In the System menu, select Sensor.
2. Select Sensor mode. The current sensor mode is indicated on the top line on the SENSOR screen.
3. Press the jogwheel to select 16:9 or 4:3 sensor mode.
4. Press the **LOAD** buttons simultaneously to load the new sensor mode. Loading the new sensor mode takes approximately 30 seconds including a mandatory camera reboot. A progress bar indicates the sensor mode loading progress.





Note: Switching from 16:9 to 4:3 and vice versa always includes a factory reset.

When using 4:3 mode, there are some important restrictions:

- **SxS** recording is only possible with ProRes codecs in 2K (2048x1536) resolution.
- The REC OUT output can only be set to the ARRIRAW format.
- No High Speed mode is available in 4:3 sensor mode. When switching to High Speed mode, the sensor mode automatically switches to 16:9.

The current sensor mode can also be checked on the SYSTEM INFO screen by pressing the **INFO** button and **SYSTEM** button.

14 ALEXA Plus

14.1 General Description

The ALEXA Plus has a unique side cover that contains extended electronics and offers the following additional functions over the standard ALEXA:

- Built-in radio modem for wireless remote control of lens and camera
- A level sensor to determine the camera's tilt and roll in degrees
- Three CLM ports for driving CLM-2, CLM-3 or CLM-4 motors
- Two LCS bus interfaces for connecting WCU-3, WHA-3 and ZMU-3 hand units
- LDS Lens Data System for reading lens data from LDS lenses
- Depth of field calculation for LDS lenses and LDA (Lens Data Archive) lenses in combination with calibrated lens motors
- LDD (Lens Data Display) interface
- Lens Adapter PL Mount LA-PL-2 with LDS support
- Control of LDS, radio, and lens motors through the camera user interface
- A third RS socket
- A second MON OUT output
- An additional function button labeled **WRS** (Wireless Remote System). It gives access to the WRS screen, from where all camera settings related to the Plus camera features can be adjusted.

Any ALEXA can be upgraded to an ALEXA Plus by installing the Plus module.

Note: The Plus module must be installed by an authorized ARRI service center only.

Figure 63: CLM sockets

Figure 64: ALEXA Plus connectors

14.2 Optics

14.2.1 Lens Adapter PL-Mount LA-PL-2 (with LDS)

The ALEXA Plus lens mount supports the ARRI Lens Data System. An LDS lens must be mounted in the 12 o'clock or 3 o'clock position to enable the LDS functions. Take care not to damage the LDS contacts on the lens and the camera when mounting or unmounting a lens or lens port cover.

Apart from the LDS feature, the same procedures as with the LA-PL-1 apply.

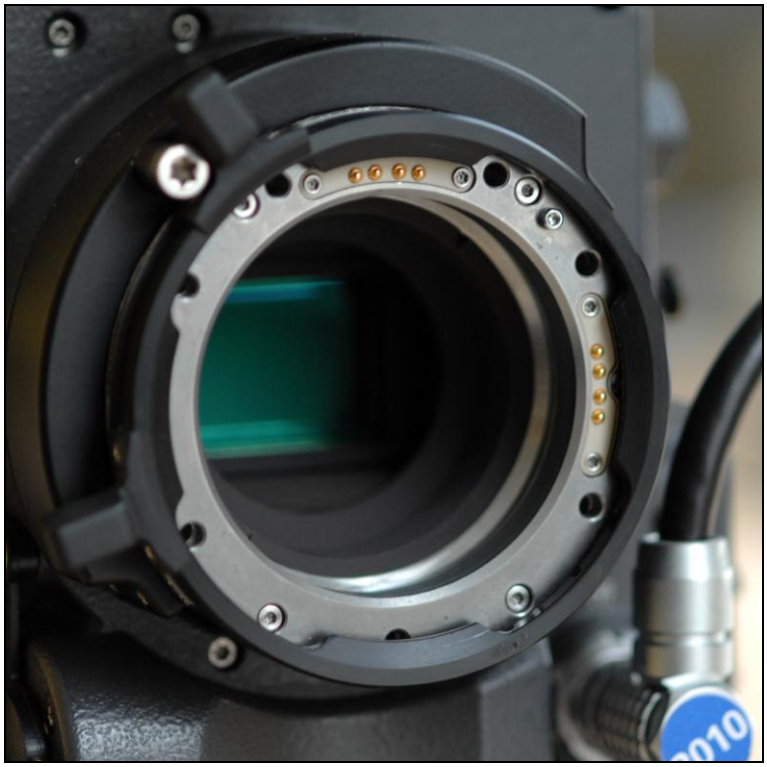


Figure 65: Lens adapter PL-Mount LA-PL-2 (with LDS)

14.3 Radio System

The ALEXA Plus module contains a radio unit that enables wireless lens control, lens data communication and remote control of basic camera functions. There are two radio systems available for the ALEXA: yellow radio and white radio.

14.3.1 Yellow Radio

The ALEXA Plus can be equipped with the yellow radio system, which has commonly been used on ARRI film cameras. It may be a cost-effective option for rental companies that already own equipment with yellow radio. ALEXAs equipped with yellow radio would communicate with their existing inventories of yellow radio wireless control units without hardware updates or modification. Yellow radio can be identified by a yellow ring at the base of the antenna mount.

Note: Only a limited supply of yellow radio units is still available. Yellow radio is no longer produced and will no longer be available once all existing units are sold.

Channel	Frequency
1,3,5,6	2.406 - 2.435 GHz (Low band)
0,2,4,6,8	2.444 - 2.472 GHz (High band)

Note: Only odd numbered channels are legally permitted in France.

14.3.2 White radio

The ALEXA Plus is equipped with the white radio system as standard . It has eight available channels. White radio can be identified by a white ring at the base of the antenna mount point.

Channel	Frequency
0	2.410 GHZ
1	2.415 GHZ
2	2.430 GHZ
3	2.435 GHZ
4	2.450 GHZ
5	2.455 GHZ
6	2.470 GHZ
7	2.475 GHZ

White radio and yellow radio cannot be mixed in the same radio network of camera and hand units. It is possible to use both systems in parallel within different radio networks.

Up to three hand units can be connected to one camera in parallel to form a radio network.

Note: When a camera is set to "Sensor sync: EXT slave", its radio module automatically switches itself off, and the camera receives CLM control commands from the Master camera via the EXT cable.

14.4 Wireless Remote System

14.4.1 Lens Motors

The ALEXA Plus supports ARRI CLM-2, CLM-3 and CLM-4 motors. CLM-1 motors are not supported. CLM-2, CLM-3 and CLM-4 motors can be used in a mixed setup.

Note: Use only one lens motor per lens axis.

Lens motors should be connected, according to their position on the lens, to the IRIS, FOCUS and ZOOM sockets on the camera-right side.

Motor calibration

After connecting a lens motor to the camera and the lens, it must be calibrated. The lens motor must be recalibrated under the following conditions:

- when the lens motor is detached from the lens
- after a camera reboot
- after changing lenses
- after a change in motor position while powered down

Note: Omitting motor calibration might lead to damage of the lens due to the high level of motor torque.

Motor direction

The direction of the motors can be set in the ALEXA's menus.

To set the direction of a motor:

1. Press the **WRS** button.
2. Select the lens by pressing the **IRIS CLM**, **ZOOM CLM** or **FOCUS CLM** button.
3. Press the **LEFT** or **RIGHT** button to set the direction of the lens motor.

Motor torque

For CLM-3 and CLM-4 motors, the motor torque can be set in the ALEXA's menus.

To set the torque on a CLM-3 or CLM-4 lens motor:

1. Press the **WRS** button.
2. Select the lens by pressing the **IRIS CLM**, **ZOOM CLM** or **FOCUS CLM** button.
3. Press the **+1** or **-1** buttons to increase or decrease the motor's torque. Available torque settings are 1 to 4, with 1 being the lowest torque level.

Note: Ensure that the motor torque level matches the lens to avoid lens damage.

3D lens sync

When two ALEXA Plus cameras are set to Sensor sync EXT master and EXT slave, the slave camera will switch off its radio module and receive motor control commands from the master camera over the EXT connection.

Note: Matching of the master and slave cameras' lenses in terms of focus, iris and zoom ring positions depends on the mechanical accuracy of the lenses. Make sure the lenses in use are matched as closely as possible.

14.4.2 Hand Units

For detailed information of the hand units, please refer to the device's own manuals.

Wireless Compact Unit WCU-3

The WCU-3 is a compact hand unit featuring a radio system to connect to the camera wirelessly. It has two LCS ports for connecting the device to the camera via cable and to attach a ZMU-3. A wheel and a slider can be used to control focus and iris axes. Zoom axis can be controlled by attaching a ZMU-3 at an LCS port.

The WCU-3 also has a display where it shows current fps, shutter angle, exposure index and white balance of the camera.

Wireless Main Unit WMU-3

The WMU-3 is a radio system for wireless connection to the camera. Both WFU-3 and WZU-3 can be attached to the WMU-3.

Wireless Focus Unit WFU-3

The WFU-3 has a knob and a slider that can be used to control focus and iris axes. It connects to the camera through a WMU-3 or a WHA-3.

Wireless Zoom Unit WZU-3

The WZU-3 controls the zoom axis. It connects to the camera through a WMU-3 or a WHA-3.

Wired Hand Adapter WHA-3

The WHA-3 allows both WFU-3 and WZU-3 to connect to the camera via cable.

Zoom Main Unit ZMU-3

The ZMU-3 controls the the zoom axis. It can be connected to the camera via cable to an LCS port, or via cable through an LCS port of an WCU-3, or wirelessly by using a WZE-3.

Wireless Zoom Extension WZE-3

The WZE-3 is a radio system that enables direct wireless connection of a ZMU-3 and a camera.

Hand Unit Priorization

Different priority levels are assigned to the hand unit devices to ensure only one device has control over a motor at a time.

A device's knob that is assigned to an axis has a higher priority than a device's slider assigned to the same axis. When steering items of the same type are assigned to the same axis, the one connected via WRS has highest priority, second highest priority has a device cable on the upper LCS port, the lower LCS port has the lowest priority. Of two radio devices with the same steering items assigned to the same axis, the one that connects to the camera first gains control.

Cabled devices can gain control of an axis at the time of connection. Wireless devices must be rebooted if an axis has become idle before they can gain control.

An exception to the rule are devices on the zoom axis. Here the cabled devices have the highest priority, with LCS port 1 having priority over LCS port 2.

14.5 Lens Data Display LDD-FP

The Lens Data Display for Focus Pullers LDD-FP can be used to display lens information. Connect it to the LDD port of the Plus module.

14.6 Plus Camera Controls

The ALEXA PLUS has an additional function button labeled WRS. It gives access to the WRS screen, from where all camera settings related to the Plus camera features can be handled.

The WRS screen gives an overview of radio status, camera level, LDS status, and CLM status. The screen buttons lead to screens containing more detailed info on these topics and where settings can be changed.

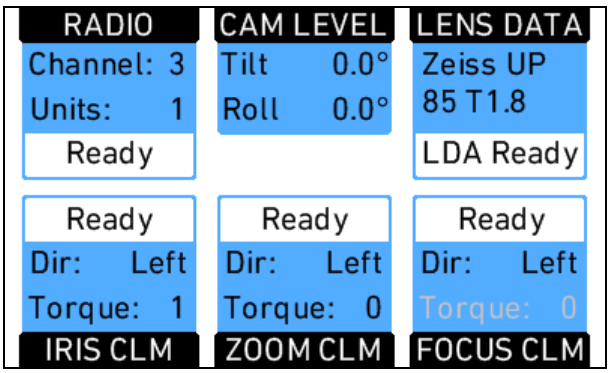


Figure 66: WRS screen

RADIO

Shows the currently set radio channel, the number of connected hand units and the staus of the radio system. Pressing the screen button opens a screen where radio can be set on or off and the channel number can be set. When radio is switched on, a small icon appears in the camera homescreen.

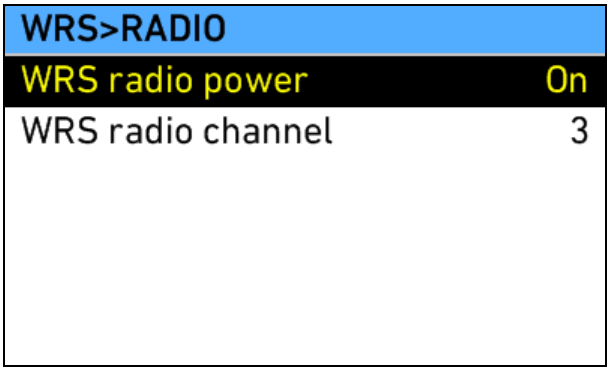


Figure 67: WRS radio screen

CAM LEVEL

Shows the tilt and roll of the camera in degrees as measured by the camera's position sensor. This sensor can be reset if it appears to have an offset. Press the CAM LEVEL screen button to access the reset screen. By pressing the two lower outer screen buttons simultaneously, the sensor is reset.

Note: The sensor can only be reset while both axis are within a threshold of +/-10

degrees around 0.

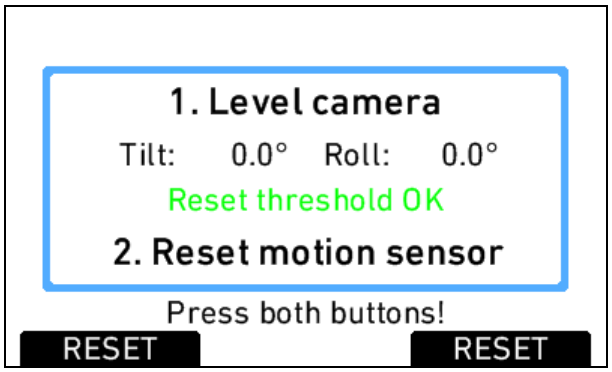


Figure 68: Motion sensor reset screen

LENS DATA

Shows the type of LDS lens connected and the LDS status. The LENS DATA screen button leads to the LDS screen, where lens info like lens type, current focal length, iris, focus distance and close and far point of depth of field are shown.

The OPTIONS screen button opens the LDS options screen, where the LDS unit can be switched between imperial and metric, and the circle of confusion for correct calculation of depth of field can be set.

Note: After connecting a new LDS lens, turn all lens rings slowly until all lens axes have transmitted their current positions.

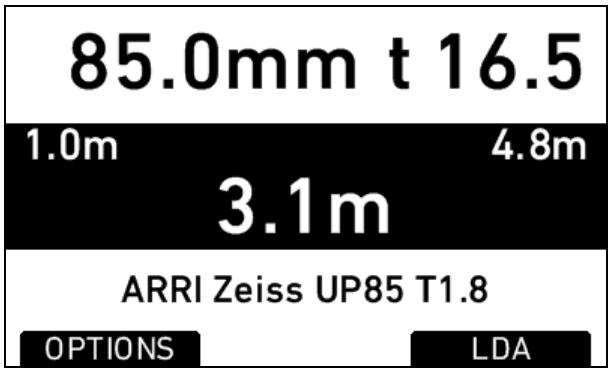


Figure 69: LDS info screen

LDA

When a non-LDS lens is connected, the user can achieve LDS functionality by using the Lens Data Archive. In the LDS screen, a button labelled LDA appears except when a LDS lens is connected.

The LDA consists of a user list and a main archive list. The user list should only contain the lenses currently used to achieve quick access to the desired lens tables. The main archive contains a set of lens tables for ARRI/Zeiss Highspeed, Master Primes and Ultra Primes and can be extended with additional lens tables for any PL-Mount lens.

Figure 70: User LDA

Note: Custom lens tables may have to be created manually beforehand.

Pressing the LDA button opens the User LDA. Select a lens table and press the wheel. After calibrating the lens motors, the LDS functionality can be used.

To add a lens table from the main archive, access the User LDA screen and press the ADD button. This opens the Main LDA list. From the main archive, first select a lens type, the a lens model and then a lens class. The lens class can be found on the lens barrell below the infinity symbol of the focus scale. Then select to add the lens table to the user list (Press ADD), use it without adding (USE), or both (ADD+USE).

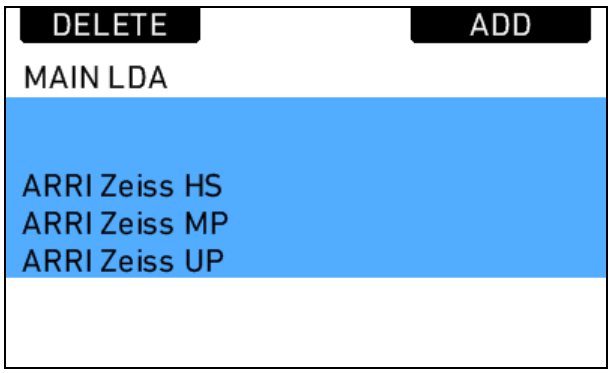


Figure 71: Main LDA screen

To delete a lens table from the user archive, access the user list and press the DELETE button. Select the lens table to delete and press the two buttons labelled DELETE simultaneously. Repeat this procedure to delete further lens tables.

Custom lens tables can be added to the main archive via the SD card. Place the lens table on the SD card in a folder named "LDA". Insert the SD card into the camera. Go to the main archive list and press ADD. Select the desired lens table and press the wheel. The lens table will be located in the main archive as lens type "Custom".

To delete a custom lens table from the camera, go to the main archive list and press DELETE. Select the lens table and press the two buttons labelled DELETE simultaneously. Repeat this procedure to delete further custom lens tables.

Lenses can also be equipped with the lens data mount LDM. The mount contains a chip with the lens table stored inside, so the lens transmits its data to the camera as soon as it is connected. For information on current ring positions, these lenses must be used in combination with controlled lens motors.

CLM screens

The screens for IRIS, FOCUS and ZOOM controlled lens motors all have the same layout. They show the motor type, motor direction and motor torque.

Note: For CLM-2 motors the torque value is greyed out as torque is only active for CLM-3 motors. It can nonetheless be changed in case a CLM-3 motor might be used but is currently not at hand.

In addition, a lens motor calibration can be triggered, either for all lens motors, or only for the one featured in the particular screen.

Note: When starting a motor calibration, make sure each motor's cog wheel is connected properly to the lens. Pay extra attention that no one is close to the motors or holding them. Catching a finger, cloth or anything else on the motor's cog wheel can cause sever body harm as well as damage to the system.

IRIS CLM

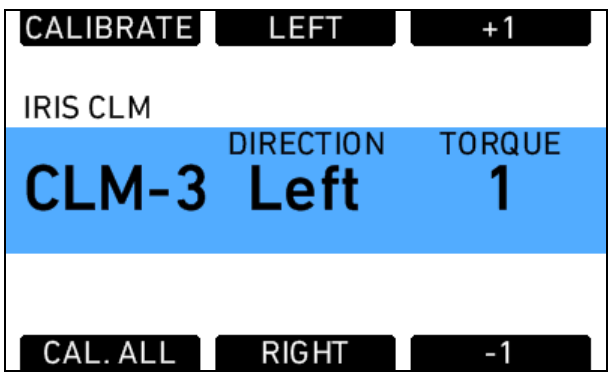


Figure 72: Iris CLM screen

Shows status, direction and torque of the CLM connected to the IRIS socket.

Press the IRIS CLM screen button to access the iris CLM screen. This screen shows the type of motor connected to the IRIS socket, its direction and torque. Direction and torque can be changed by the screen buttons below and above the value. The upper left screen button calibrates only the iris motor.

Pressing the lower left screen button starts calibration of all connected lens motors.

ZOOM CLM

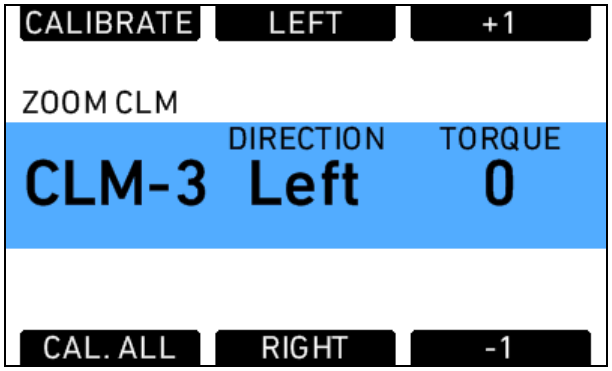


Figure 73: Zoom CLM screen

Shows status, direction and torque of the CLM connected to the ZOOM socket.

Press the ZOOM CLM screen button to access the zoom CLM screen. This screen shows the type of motor connected to the ZOOM socket, its direction and torque. Direction and torque can be changed by the screen buttons below and above the value. The upper left screen button calibrates only the zoom motor.

Pressing the lower left screen button starts calibration of all connected lens motors.

FOCUS CLM

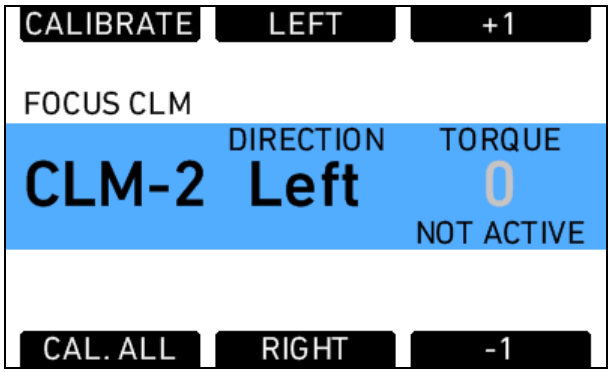


Figure 74: Focus CLM screen

Shows status, direction and torque of the CLM connected to the FOCUS socket.

Press the FOCUS CLM screen button to access the focus CLM screen. This screen shows the type of motor connected to the FOCUS socket, its direction and torque. Direction and torque can be changed by the screen buttons below and above the value. The upper left screen button calibrates only the focus motor.

Pressing the lower left screen button starts calibration of all connected lens motors.

3D Lens Sync

When two cameras are connected and their sensors are synced with via the EXT connectors, the slave camera will receive its motor commands from the master camera. Its radio module switches automatically off. Calibration of lens motors must happen individually for each camera.

15 ALEXA Plus 4:3

The ALEXA Plus 4:3 is identical to an ALEXA Plus except for its ALEV III sensor which has a 4:3 active area. This makes the camera the ideal companion camera to an ALEXA Studio.

Licenses

The ALEXA Plus 4:3 includes a bundle license, which enables DNxHD, High Speed recording and anamorphic desqueeze. The license is pre-installed on the camera and cannot be deleted.

Note: Do not downgrade the camera to a software version before SUP 6.1.

4:3 mode

The ALEXA Studio, ALEXA M and ALEXA Plus 4:3 cameras can be operated in 4:3 mode.

In 4:3 mode, the camera captures images from a vertically extended sensor area. The used area is 23.76 x 17.82mm in size, which translates to 2880 x 2160 sensor pixels.

Note: The sensors of regular ALEXA and ALEXA Plus cameras are not capable of creating a 4:3 image!

Loading 4:3 mode

Go to MENU>System>Sensor mode. The currently loaded mode is shown in the first line.

Press the wheel. To load the new mode, press the two lower screen buttons.

Note: Loading 4:3 or 16:9 mode results in all settings being set to factory reset values!

Frame rate

The maximum sensor frame rate in 4:3 mode is 48 fps.

Recording

SxS recording is only possible with ProRes codecs in 2K (2048x1536) resolution.

External recording is only possible in ARRIRAW with recorders that support ARRIRAW 4:3.

Monitoring

For monitoring, the 4:3 image is downscaled to 958 x 720 pixels for the EVF and 1440 x 1080 for the MON OUT. Only horizontal surround view is available in 4:3 mode. The image is not rescaled for surround view, but horizontally extended. The non-active area of the EVF and MON OUT is filled with black ("pillarboxed").

Anamorphic desqueeze

Both 1.3x and 2x anamorphic desqueeze is available in 4:3 mode. 1.3x anamorphic desqueeze results in an image size of 1280 x 720 for the EVF and 1920 x 1080 for the MON OUT, while 2x desqueeze results in an image size of 1280 x 480 for the EVF and 1920 x 720 for the MON OUT.

4:3 and Highspeed Mode

It is possible to switch from 4:3 to High Speed mode and vice versa. In High Speed mode, only the 16:9 center area of the image sensor is read out.

16 ALEXA Studio

16.1 General Description

The ALEXA Studio extends the features of an ALEXA Plus 4:3 by:

- Optical viewfinder

  Brand-new construction from ARRI, featuring optical anamorphic desqueeze, diopter correction, image flip, camera left/right positioning and horizontal distance adjustment

- Electronic mirror shutter

  The electronic mirror shutter can be adjusted in a range of 11.2° to 180.0° degrees. When in use, it completely removes rolling shutter effects of the sensor.

- Built-in motorized ND filter

  The ND filter has a density of 1.3 and can be moved in and out of the optical path with the push of a button. It is located between the mirror shutter and the image sensor, so the optical viewfinder image is not affected by the filter and stays bright.

16.2 ALEXA Studio Images

Figure 75: ALEXA Studio right

Figure 76: ALEXA Studio left

Figure 77: ALEXA Studio top

Figure 78: ALEXA Studio bottom

Figure 79: ALEXA Studio front

Figure 80: ALEXA Studio back

16.3 Optics

16.3.1 Electronic Mirror Shutter

The electronic mirror shutter is located between the PL-mount and the image sensor at an angle of about 45°. It is part of the optical reflex viewfinder system in that it reflects the lens image into the optical viewfinder.

It is synchronized with the electronic shutter of the camera sensor so that the sensor is only read out in the dark phase. This completely removes rolling shutter effects of the sensor readout.

Its 180° mirrored surface reflects the lens image into the optical viewfinder. The open sector of the mirror shutter can be reduced through an electronically controlled sector gate. The mirror shutter rotates 360° for every capured frame, controlling the exposure of the sensor through its open sector. The readout of the sensor happens while the mirror reflects the light of the optical path into the optical viewfinder.

The angle of the open sector is electronically controlled via the regular camera controls.

16.3.2 Lens Adapter PL Mount LA-PL-2 (with LDS)

The lens mount of the ALEXA Studio supports the ARRI Lens Data System. The LDS lens must be mounted in the 12 o'clock or 3 o'clock position to enable the LDS functions. Take great care not to harm any elements of the LDS contacts on either lens or camera when attaching or deattaching a lens or lens port cover.

Besides the LDS feature, the same rules as with the LA-PL-1 apply.

Figure 81: ALEXA Studio PL-Mount

Note: Due to the optical mirror shutter, the use of Angenieux Optimo Rouge lenses, any Super16 lenses, or lenses with dimensions not matching the dimensions in the figure "Allowed lens dimensions with mirror shutter" drawing cannot be used with the ALEXA Studio, as they would destroy the rotating mirror shutter!

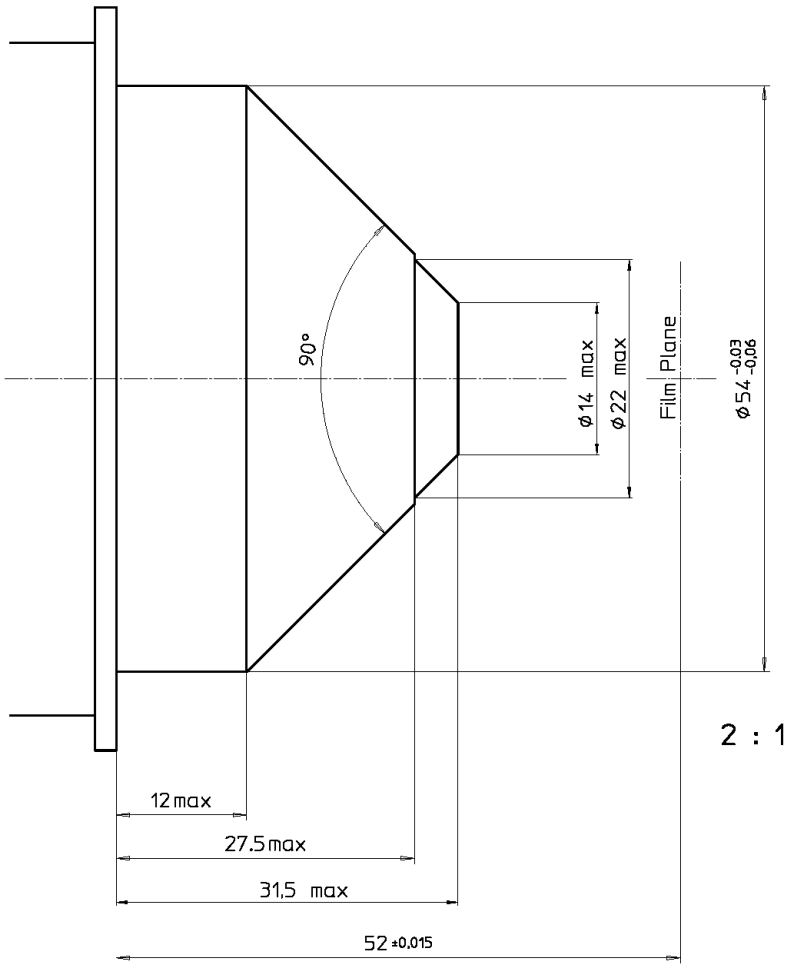


Figure 82: Allowed lens dimensions with mirror shutter

16.3.3 Optical Viewfinder

The ALEXA Studio has an optical reflex viewfinder system with interchangeable ground glasses.

It offers an exceptional viewing quality favoured by a large optical design. Special care has been taken to avoid the unpleasant vignette effect that could occur by moving the eye.

Note: To use the optical viewfinder, the mirror shutter must be set to On.

The viewfinder is adjustable in two axes, laterally extendable for left eye operation and shows illuminated frame lines (ARRIGLOW).

The viewfinder image stays upright and correct left-to-right when the viewfinder is swivelled within the main axis.

Figure 83: OVF top view, with mounting points marked

Extending the viewfinder arm

- Loosen the straight-structured ring next to the FIX engraving counter-clockwise (contrary to the arrow).
- Adjust the horizontal position.
- Tighten the ring clockwise (with the arrow direction).

Adjust Barrel Friction

- Move the dot-structured ring according to the engravings LOOSE and FRICTION to loosen or tighten the friction of the OVF barrel.

Contrast Filter

To achieve a temporary subjective reduction of viewfinder contrast range, a contrast filter (density 0.6) can be pivoted into the optical beam path.

- Use the lever next to the level bubble to pivot the contrast filter into the optical path.
- Releasing the lever pivots the contrast filter back out of the optical path.

Ground glasses

The ground glass is the equivalent to the image sensor for the optical viewfinder. The image created by the lens is projected to the ground glass, from where it is picked up by the optical viewfinder.

Ground glasses contain frame and format markings to show the recorded image area and the area of interest. The sensor aperture of the ALEXA Studio is different from the camera aperture of ANSI and DIN Super35 formats. Therefore, Super35 ground glasses of the ARRICAM system do not provide exact frame markings in the ALEXA Studio viewfinder image. For exact framing, use only ground glasses made specifically for the ALEXA Studio.

To exchange a ground glass:

- Press the VIEW button so that the sensor is protected by the mirror shutter.
- Turn off the camera and disconnect it from power supply.
- Remove the lens or protective cap.
- Screw the ARRI Ground Glass Puller into the ground glass.
- Carefully pull out the ground glass.
- Check that the new ground glass and the ground glass holder are clean.
- Screw the ARRI Ground Glass Puller into the new ground glass and push it into the holder.
- Make sure the ground glass is inserted completely and correctly locked in place.
- Attach a lens or a protective cap to the lens mount.

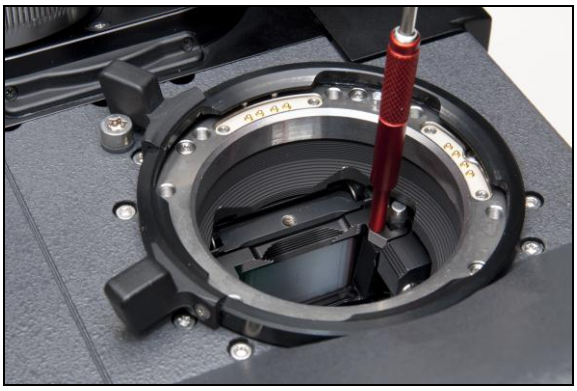


Figure 84: Ground glass in camera with Ground Glass Puller attached

Figure 85: Ground glass with attached Ground Glass Puller

To remove the field lens, which is located above the ground glass:

- Remove the ground glass first
- Screw the ARRI Ground Glass Puller into the field lens
- Carefully pull out the field lens

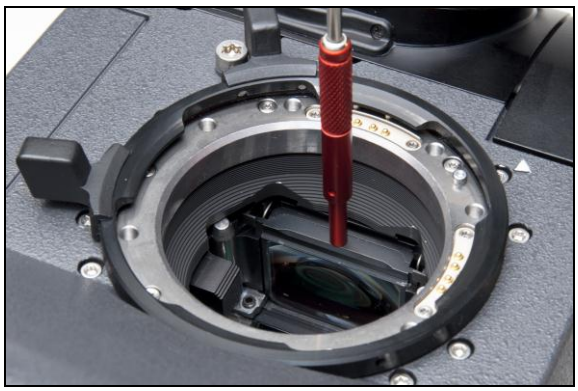


Figure 86: Field lens in camera with attached Ground Glass Puller

Figure 87: Field lens with attached Ground Glass Puller

Note: Due to the risk of displacement caused by shock force, we recommend to remove both ground glass and field lens before transportation and shipping of the camera. Whenever removing the camera from its case, check that both ground glass and field lens are properly seated before switching on the camera to prevent any damage to the mirror shutter.

ARRIGLOW

The ARRIGLOW module is integrated in the optical viewfinder system of the ALEXA Studio. It allows illuminated format markings to be superimposed onto the viewfinder image with adjustable brightness.

- Press the buttons on the left side of the OVF below the DIMMER engravement to adjust the brightness of the ARRIGLOW. At its lowest brightness setting, the ARRIGLOW is switched off.
- The ARRIGLOW color is set in the camera menu under MENU>Monitoring>Frame lines> Frame lines color

Figure 88: ARRIGLOW buttons

Changing the ARRIGLOW mask

The ground glass used for the optical viewfinder should be combined with a matching glow mask. To change the glow mask:

- Loosen the 3mm allen screw next to the level bubble.
- Remove the level bubble element.
- Grab the glow mask with a Hirschmann clamp at the forceps hole and pull it out of the glow mask frame.
- Check that both the new glow mask and the glow mask frame are clean.
- Carefully push the new glow mask into the glow mask frame.
- Make sure the glow mask is inserted completely.

- Place the bubble element on top of the ARRIGLOW module and tighten the 3mm allen screw.
- Turn on the ARRIGLOW and check that ground glass and glow mask are correctly aligned.

Figure 89: Glow mask slot

Anamorphic Desqueeze

- Turn the wheel on top of the OVF ball element to swing the anamorphic desqueeze element into the optical path.
- *Note: By default, the anamorphic element is for 2x anamorphic lenses. It can be changed to an element for 1.3x anamorphic lenses.*

Image Flip

- Press the button next to the image flip symbol.
- Turn the knob next to the image flip symbol until the image is fully flipped.
- To undo the flip, rotate the knob until the button jumps out and the knob is locked again.

Diopter Adjustment

- *Note: Depends on the eyepiece in use. Description for default eye piece of ALEXA Studio.*
- Turn the eyepiece barrel until the ground glass is in focus.
- A neutral, unstructured, bright out-of-focus image content helps with this.

Attaching the optical viewfinder

Upon delivery, the OVF is not connected to the camera and must be installed by the user.

- Remove the protective cover from the OVF by loosening its 2x 3mm allen screws.
- Remove the blinding plate from the camera by loosening its 2x 3mm allen screws.
- Place the OVF on the camera.
- Take special care that the electronic connectors of camera and viewfinder are connected before pushing the OVF in place.
- Tighten the 3x 3mm allen screws of the OVF (See OVF top view image for locations of screws).

Note: The torx screws on the camera that are painted red may not be tightened or loosened, as this would corrupt the alignment of the OVF.

Figure 90: OVF with cover plate

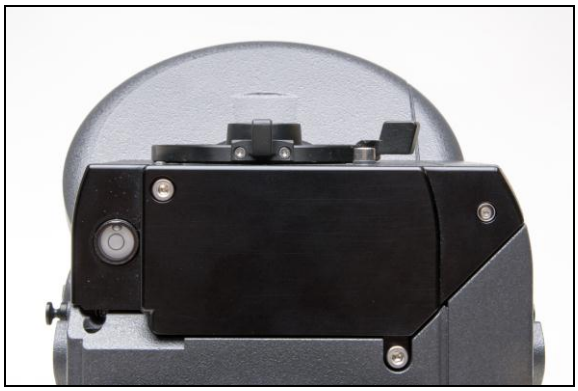


Figure 91: Alexa Studio with cover plate

Swapping the optical viewfinder for an electronic viewfinder EVF-1

- Make sure the camera is powered down.
- Loosen the 3x 3mm hex screws of the OVF completely (See OVF top view image for locations of screws).
- Remove the optical viewfinder.
- Place the EVA-1 electronic viewfinder adapter plate where the optical viewfinder was.
- Tighten the 2x 3mm hex screws.
- Attach the EVF mounting bracket with the EVF-1 to the camera housing with its 2x 3mm allen screws.
- Connect the EVF cable to the camera.
- Power the camera.

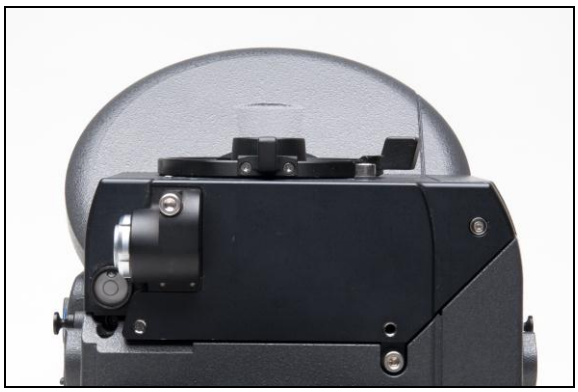


Figure 92: Electronic viewfinder adapter EVA-1

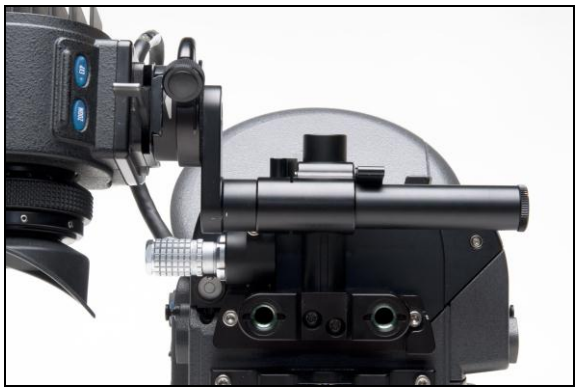


Figure 93: ALEXA Studio with mounted EVF-1

16.3.4 ND Filter

The ALEXA Studio has a ND filter in front of the sensor, which can be moved in and out of the optical path. The motorized filter slider contains a ND filter with a density of 1.3, and a cover glass without additional density. The filter slider is sealed, so that no dirt or dust can enter the area between the slider and the sensor.

Note: Perform regular dust checks on the outside of the ND filter slider, as dust that might collect on top of it. As the slider is very close to the sensor, dust or dirt collecting on it might be visible as artifacts in images.

When performing a dust check, make sure the camera is switched off and disconnected from any power source to prevent the mirror shutter from activation during the cleaning process.

The ND filter can be activated in the EI screen by pushing the lower right screen button.

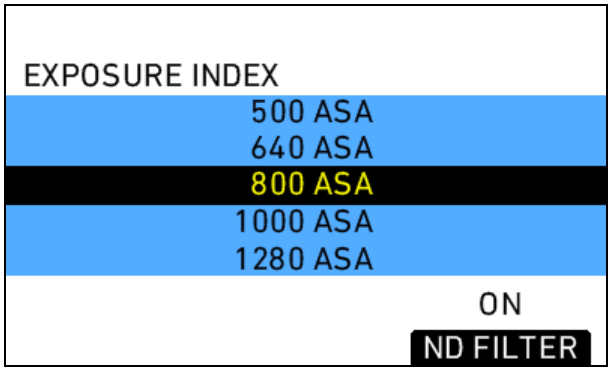
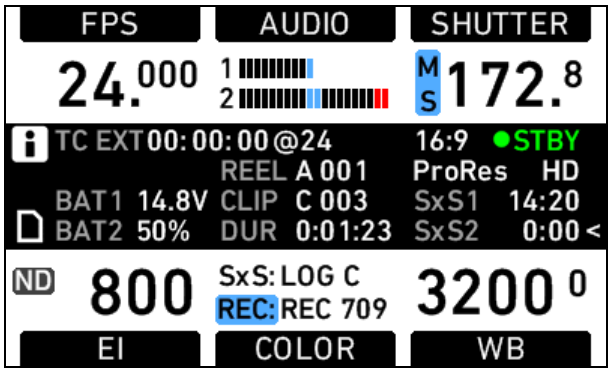


Figure 94: EI screen

If activated, the ASA rating in the Homescreen will have an ND index next to it.

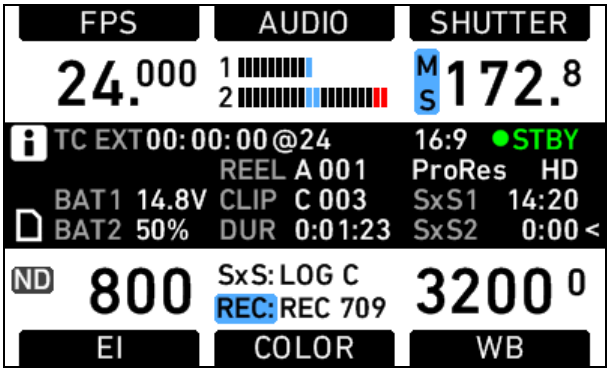


Note: The use of the internal ND filter has no influence on the EI rating of the camera. When measuring exposure with a light meter, take into account the light loss of 4 1/3 stops generated by the ND filter.

16.4 Studio Camera Controls

Only a few additional controls are available on the ALEXA Studio. These are used to control the mirror shutter and the ND filter.

The Homescreen has icons for the active ND filter and the mirror shutter position and state.



Icon	Meaning
ND	ND filter is active
G	Mirror is on & parked in gate position (Grey icon if mirror shutter is switched off)
V	Mirror is on & parked in view position (Grey icon if mirror shutter is switched off)
MS	Mirror shutter is running

ND filter activation

- In the Homescreen, press EI.

- In the EI screen, press the lower right screen button labeled ND FILTER to move the ND filter in and out of the optical path.

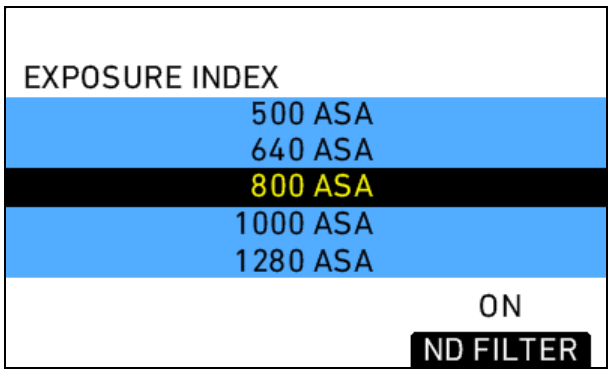
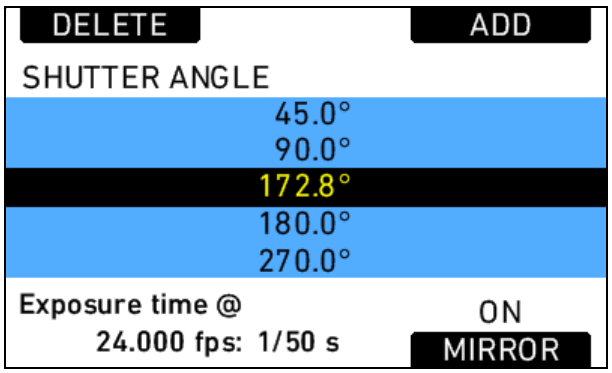


Figure 95: EI screen

Mirror shutter activation

- In the Homescreen, press SHUTTER.
- In the Shutter screen, press the lower right screen button labeled MIRROR to activate or deactivate the mirror shutter.



Note: When mirror shutter is active, the shutter angle is limited to 180.0 degrees. Frame rates higher than 37 fps for 4:3 and higher than 46 fps for 16:9 reduce the shutter angle range further!

Note: For frame rates higher than 30 fps, it is recommended to use a power source with a voltage level of 18-35 V to ensure the mirror shutter is powered sufficiently!

MIRROR PARK buttons VIEW and GATE

The camera left side Operator Controls have two additional function buttons labelled VIEW and GATE. These buttons control the parking position of the mirror shutter.

A spinning mirror shutter can be stopped by pressing either of the two buttons. Pressing the VIEW button will park the mirror in the optical path, enabling a live preview in the optical viewfinder.

Pressing the GATE button will stop the mirror shutter out of the optical path, enabling a live preview on the MON OUT and the REC OUT, and the EVF in case it is mounted to the camera. Each button is accompanied by a blue LED that lights when the mirror is parked in the respective position. When the mirror shutter is running, both of the LEDs will be active.

Pressing the GATE button while the mirror is parked in the VIEW position will move the mirror shutter by 180.0° degrees into the GATE position.

Pressing the VIEW button while the mirror is parked in the GATE position will move the mirror shutter by 180.0° degrees into the VIEW position.

To restart the mirror shutter, press both VIEW and GATE simultaneously.

Note: After booting the camera, the mirror shutter is parked in the GATE position for safety reasons.

When stopping, the mirror shutter always opens up the electronic sector gate to 180.0°, and closes down when it is restarted.

A live image on EVF, MON OUT and REC OUT is available when the mirror shutter is spinning or parked in the GATE position. A parked mirror shutter will automatically start spinning when recording is started.

When the mirror shutter is switched off, it is parked in the GATE position.

Note: For safety reasons, it is required to power down the camera before performing a "gate check". Do not check or clean the sensor cover glass while the camera is powerded up and the mirror is parked in the GATE position!

Frame rate and shutter angle with mirror shutter on

When the mirror shutter is switched on, the sensor frame rate is limited to 60 fps in 16:9 and 48 fps in 4:3.

Frame rates higher than 37 fps in 4:3 or 46 fps in 16:9 reduce the maximum possible mirror shutter angle. When the frame rate change reduces the allowed mirror shutter angle below the currently active shutter angle, the camera automatically sets the shutter angle to 135.0°. The technically possible maximum shutter angle depends on the frame rate. To achieve the maximum possible shutter angle:

- Press the SHUTTER button in the Homescreen to get to the Shutter list screen.

- Press the ADD button in the Shutter list screen to get to the Shutter angle screen.
- Press the MAX button in the Shutter Angle screen and confirm by pressing the jogwheel twice.
- The maximum possible shutter angle is now a part of the shutter list and can be set by pressing the jogwheel.

When the mirror shutter is on, the camera redirects the user to the Shutter list screen after setting the sensor frame rate, where the shutter angle can be adjusted as desired. To cancel this action, press the HOME button.

16.5 4:3 Mode

The ALEXA Studio, ALEXA M and ALEXA Plus 4:3 cameras can be operated in 4:3 mode.

In 4:3 mode, the camera captures images from a vertically extended sensor area. The used area is 23.76 x 17.82mm in size, which translates to 2880 x 2160 sensor pixels.

Note: The sensors of regular ALEXA and ALEXA Plus cameras are not capable of creating a 4:3 image!

Loading 4:3 mode

Go to MENU>System>Sensor mode. The currently loaded mode is shown in the first line.

Press the wheel. To load the new mode, press the two lower screen buttons.

Note: Loading 4:3 or 16:9 mode results in all settings being set to factory reset values!

Frame rate

The maximum sensor frame rate in 4:3 is 48 fps.

Recording

SxS recording is only possible with ProRes codecs in 2K (2048x1536) resolution.

External recording is only possible in ARRIRAW with recorders that support ARRIRAW 4:3.

Monitoring

For monitoring, the 4:3 image is downscaled to 960 x 720 pixels for the EVF and 1440 x 1080 for the MON OUT. Only horizontal surround view is available in 4:3 mode. The image is not rescaled for surround view, but horizontally extended. The non-active area of the EVF and MON OUT is filled with black ("pillarboxed").

Anamorphic desqueeze

Both 1.3x and 2x anamorphic desqueeze is available in 4:3 mode. 1.3x anamorphic desqueeze results in an image size of 1280 x 720 for the EVF and 1920 x 1080 for the MON OUT, while 2x desqueeze results in an image size of 1280 x 480 for the EVF and 1920 x 720 for the MON OUT.

For the optical viewfinder, anamorphic desqueeze can be achieved by flipping an anamorphic element into the optical path. By default, the OVF has an optical element for 2x desqueeze. Elements for 1.3x desqueeze are also available.

4:3 and Highspeed Mode

It is possible to switch from 4:3 to High Speed mode and vice versa. In High Speed mode, only the 16:9 center area of the image sensor is read out.

16.6 Licensed Features

Licensed features DNxHD, High Speed mode and Anamorphic Desqueeze are automatically enabled in the ALEXA Studio.

17 ALEXA M

17.1 General Description

The ALEXA M is a specialty camera where the camera body is split into two parts. The camera head contains the image sensor, while the backend contains the image processing modules. Both parts are connected via a fibre interface.

The advantages of this system are:

- Better access to small spaces where a regular ALEXA would not fit into
- Lighter handheld operation.
- Lighter and smaller setups on 3D rigs
- Easy camera operability when the camera head cannot be accessed, e.g. a camera crane or a helicopter rig.

17.2 ALEXA M Images

OPTICAL LINK
REC
LINK

Figure 96: ALEXA M Backend left side

Figure 97: ALEXA M Backend right side

OPTICAL
LINK
ETH
RS
RS
AUDIO IN
TC
12 V
AUDIO OUT
SXS

17.3 ALEXA M Camera Head

The ALEXA M camera head contains the image sensor and parts of the image processing. Images are transmitted to the Backend via fibre cable. The fibre connection is bi-directional and returns the EVF image to the camera head from the Backend.

Due to the fibre connection, the ALEXA M has an increased power draw of approximately 120W, with the head drawing 40W. The head can be powered from the backend with hybrid fibre cables of up to 30m length.

Note: When powering the head from the backend, power supplies with at least 24V output must be used, due to the voltage drop over the hybrid cable.

The head can also be powered directly through its BAT connector, if the battery delivers at least 40W of power.

17.3.1 CCH-2

The Camera Center Handle 2 CCH-2 is the handle for the ALEXA M camera head. It is mounted with 4x 3mm allen screws and can be attached either to the top or the bottom of the camera head.

Figure 98: CCH-2 mounted on ALEXA M camera head

Note: The CCH-2 only fits the ALEXA M camera head and not the ALEXA M backend or any other ALEXA camera.

17.4 ALEXA M Camera Backend

The ALEXA M camera backend contains the main controls, image processing, output and recording. It behaves like any regular ALEXA, only that it lacks the operator controls and is slightly longer.

17.5 Fibre Connection

Figure 99: SMPTE 311optical fibre connectors

The ALEXA M utilizes SMPTE 311 fibre connectors and cables. The camera head can be powered with hybrid fibre/power cables with a length of up to 30m, if the backend power supply can deliver 120 W in total.

Note: When powering the camera head from the backend, the power supply must have an output of at least 24V due to a voltage drop over the hybrid cable.

If this is not the case, the head should be powered separately through its BAT connector with a power supply that delivers at least 40W of power.

For regular fibre cable, a signal loss of up to 10 dB is acceptable. 1 km of fibre cable has a signal loss of 0.5 dB, while a fibre connector pair introduces a signal loss of 0.5-2 dB, depending on the amount of dirt on the optical contacts. Typically, a cable length of up to 1 km with 4 connection joints is still acceptable.

To connect the cable to the camera, make sure the cable direction is correct. Line up the red guides and push the cable connector onto the camera connector piece. A clicking sound indicates the connector has locked. Plug the rubber caps of the connectors into each other to protect their inside from dirt.

To disconnect the cable from the camera head, pull on the rubber end of the connector in the direction of the cable. To disconnect the cable from the backend, push the metal ring of the camera connector piece and pull on the cable connector in the opposite direction.

Connect the camera head to the backend via the optical link before powering the camera. Disconnecting the head from the backend during operation requires both parts to be powered down and reconnected before powering up the system again.

Figure 100: Correctly aligned fibre connectors

Cleaning of fibre connectors

Cleaning of the fibre connectors is an important task. Only use cleaning devices certified for SMPTE 311 connectors, like the “IBC M20” which is delivered with the camera package. Never use compressed air or any other uncertified cleaning method, as this could permanently damage or destroy the fibre connectors.

Both dry and wet cleaning tools are available, with the dry cleaners having proved to be more efficient for regular cleaning, while the wet cleaners are better with strong and sticky contaminations.

Regular cleaning of at least one time per day is recommended, as well as any time the signal quality deteriorates.

Fibre connection status

Next to the fibre connectors of the ALEXA M is a fibre status LED that reflects the signal strength.

A green LED reflects a good signal strength.

If the LED is alternately flashing between green and amber, the signal is weak, which can be caused by dirty connectors, faulty cables, or a bad connection. Power down the camera, clean the connectors, reconnect the cable to the camera and repower the camera in this particular order. If the problem does not go away, swap the cable.

An amber LED indicates a link error. The camera must be rebooted. If the link error reoccurs, follow the steps described for the green/amber flashing LED.

17.6 4:3 Mode

The ALEXA Studio, ALEXA M and ALEXA Plus 4:3 cameras can be operated in 4:3 mode.

In 4:3 mode, the camera captures images from a vertically extended sensor area. The used area is 23.76 x 17.82mm in size, which translates to 2880 x 2160 sensor pixels.

Note: The sensors of regular ALEXA and ALEXA Plus cameras are not capable of creating a 4:3 image!

Loading 4:3 mode

Go to MENU>System>Sensor mode. The currently loaded mode is shown in the first line.

Press the wheel. To load the new mode, press the two lower screen buttons.

Note: Loading 4:3 or 16:9 mode results in all settings being set to factory reset values!

Frame rate

The maximum sensor frame rate in 4:3 is 48 fps.

Recording

SxS recording is only possible with ProRes codecs in 2K (2048x1536) resolution.

External recording is only possible in ARRIRAW with recorders that support ARRIRAW 4:3.

Monitoring

For monitoring, the 4:3 image is downscaled to 960 x 720 pixels for the EVF and 1440 x 1080 for the MON OUT. Only horizontal surround view is available in 4:3 mode. The image is not rescaled for surround view, but horizontally extended. The non-active area of the EVF and MON OUT is filled with black ("pillarboxed").

Anamorphic desqueeze

Both 1.3x and 2x anamorphic desqueeze is available in 4:3 mode. 1.3x anamorphic desqueeze results in an image size of 1280 x 720 for the EVF and 1920 x 1080 for the MON OUT, while 2x desqueeze results in an image size of 1280 x 480 for the EVF and 1920 x 720 for the MON OUT.

4:3 and Highspeed Mode

It is possible to switch from 4:3 to High Speed mode and vice versa. In High Speed mode, only the 16:9 center area of the image sensor is read out.

17.7 Licensed Features

Licensed features SxS High Speed Recording and Anamorphic desqueeze are automatically enabled in the ALEXA M.

17.8 Lens Data System

The ALEXA M is equipped with a LA-PL-2 lens mount with LDS contacts. When using a LDS lens, such as Master Primes or LDS UltraPrimes, the camera reads, displays and records lens metadata.

The LDS screen can be accessed through the menu, which contains an additional item "LDS". This menu item is only available on the ALEXA M.

Note: Lens motors and the lens data archive LDA are not supported by the ALEXA M.

18 RCU-4

Figure 101: RCU-4 remote control unit

The camera can be remote controlled with an RCU-4. This device mirrors the controls on the camera's right side. It is connected to the camera's Ethernet port. Power is supplied via the Ethernet cable.

Note: The ALEXA M features two ports labeled "ETH" in addition to the Ethernet port. However, these cannot be used for connecting the RCU-4.

To power the RCU-4, press the power button after connecting the device to a camera.

During boot-up, the RCU-4 compares its firmware version with the camera firmware version. If it detects a difference, it will update itself to match the camera's firmware version. When the update is completed, the RCU-4 will shut down automatically.

The power button of the RCU-4 only affects the RCU-4. It is not possible to power or to shut down the camera with the RCU-4. When the camera is powered down, the RCU-4 shuts down automatically as it loses its power supply.

The LOCK button of the RCU-4 locks only the RCU-4. It does not affect the camera lock.

For more info, please refer to the RCU-4 user manual.

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A.1 Appendix

Image Sensor	
Type	ALEV III CMOS sensor
Sensor frame rates	0.750 - 60.000 fps 60.000 - 120.000 fps in High Speed mode
Shutter angle	5.0° - 358.0° 5.0° - 356.0° in High Speed mode
Total active pixels (incl. surround view)	3112 x 1782
Pixels of recorded image	2880 x 1620
Aperture of recorded image	23.76 x 13.365 mm
Image aperture (incl. surround view)	25.674 x 14.701 mm
Pixel pitch	8.25 µm
Aspect ratio	1.78:1 (16:9)
Filters	optical low pass, UV, IR
Color filters	RGB primary colors
Lens	
Lens mount	Exchangeable lens mount, with PL mount LA-PL-1 installed
Flange focal depth	52.00 mm nominal
Image processing	
White balance	2000 - 11000 Kelvin
CC Shift	-8 to +8 (translates to full magenta/ full green gel correction)
EI rating	160 - 3200 ASA
Recorded image resolution	1920 x 1080 pixels (downscaled from 2880 x 1620)
Viewfinder	
Type	ARRI EVF-1
Technology	LCOS imaging device
Resolution	1280 x 784 pixels
Power	
Power supply	DC 11 - 34V
Power management	Active ORing between BAT connector and onboard battery adapters
Power consumption	ca. 85W w/o accessories
Power outputs	2 x RS (24V), 1x 12V
Recording	

Recording media	Sony **SxS PRO** cards
Recording compression codec	Apple ProRes 422/4444 codec family Avid DNxHD (requires license key)
Frame rates	0.75 - 60 fps 60 - 120 fps in High Speed mode (no ProRes 4444)

Image Outputs

Recording output	2x REC OUT configurable as: 2x 422 1.5G SL YCbCr @ frame rates: 23.976, 24, 25, 29.97 and 30 fps or 1x 422 1.5G DL YCbCr @ frame rates: 48, 50, 59.94 and 60 fps or 2x 422 3G SL YCbCr @ frame rates: 48, 50, 59.94 and 60 fps or 1x 444 1.5G DL RGB @ frame rates: 23.976, 24, 25, 29.97 and 30 fps or 2x 444 3G DL RGB @ frame rates: 23.976, 24, 25, 29.97 and 30 fps or 1x 444 3G DL YCbCr @ frame rates: 48, 50, 59.94 and 60 fps or 1x ARRIRAW 1.5G DL @ frame rates: 23.976, 24, 25, 29.97 and 30 fps or 2x ARRIRAW 3G SL @ frame rates: 23.976, 24, 25, 29.97 and 30 fps or 1x ARRIRAW 3G DL @ frame rates: 48, 50, 59.94 and 60 fps
Monitoring outputs	EVF out: proprietary signal for EVF-1 with delay <1 frame 1x MON OUT: 1x 422 1.5G @ frame rates: 23.976, 24, 25, 29.97 and 30 fps

Timecode

Type	TC clock generator with crystal oscillator
TC input	LTC in
TC outputs	LTC out HD-SDI LTC/VITC out

Dimensions and weight

Length x Width x Height (body)	332 x 153 x 158 mm 12.95" x 6.02" x 6.22"
Camera body weight	6.26 kg / 13.79 lb
Camera setup weight (incl. EVF-1, VMB-1, CCH-1)	7.65 kg / 16.85 lb
Others	
SD card	most SD cards with FAT/FAT32 up to 4 GB
Sound level	under 20 dB(A) @ 24 fps and ambient temperature < 25° C / 77° F
Environmental	-20° C to +45° C @ 95% relative humidity max, non condensing
ALEXA Plus	
Length x Width x Height (body)	332 x 175 x 158 mm 12.95" x 6.89" x 6.22"
Camera body weight	8.0 kg / 17.6 lb
Camera setup weight (incl. EVF-1, VMB-1, CCH-1)	8.4 kg / 18.5 lb
Lens mount	Exchangeable lens mount, with PL mount LA-PL-2 installed
ALEXA Studio	
Length x Width x Height (body)	363 x 177 x 163 mm 14.29" x 6.97" x 6.41"
Camera body weight	7.0 kg / 15.4 lb
Camera setup weight (incl. **SxS** module, OVF, CCH-1)	10.2 kg / 22.5 lb
Lens mount	Exchangeable lens mount, with PL mount LA-PL-2 installed
Sensor frame rates	0.750 - 60.000 fps 60.000 - 120.000 fps in High Speed mode 0.75 - 48.000 fps in 4:3 mode
Viewfinder	Optical viewfinder
Mirror shutter	Electronic mirror shutter
Shutter angle	5.0° - 358.0° 5.0° - 356.0° in High Speed mode 11.2° - 180.0° (Mirror shutter on)
Aspect ratio	1.78:1 (16:9) 1.33:3 in 4:3 mode
Total active pixels (incl. surround view)	3112 x 1782 3112 x 2160 in 4:3 mode

Pixels of recorded image	2880 x 1620 2880 x 2160 in 4:3 mode
Aperture of recorded image	23.76 x 13.365 mm 23.76 x 17.82 mm in 4:3 mode
Image aperture (incl. surround view)	25.674 x 14.701 mm 25.674 x 17.82 mm in 4:3 mode

ALEXA M

Length x Width x Height (M head)	212 x 129 x 149 mm 8.35" x 5.08" x 5.87"
M head weight	2.9 kg / 6.39 lb
Length x Width x Height (M backend)	323 x 153 x 158 mm 12.72" x 6.02" x 6.22"
M backend weight	5.5 kg / 12 lb
Lens mount	Exchangeable lens mount, with PL mount LA-PL-2 installed
Sensor frame rates	0.750 - 60.000 fps 60.000 - 120.000 fps in High Speed mode 0.75 - 48.000 fps in 4:3 mode
Viewfinder	Electronic Viewfinder EVF-1
Shutter angle	5.0° - 358.0° 5.0° - 356.0° in High Speed mode
Aspect ratio	1.78:1 (16:9) 1.33:3 in 4:3 mode
Total active pixels (incl. surround view)	3112 x 1782 3112 x 2160 in 4:3 mode
Pixels of recorded image	2880 x 1620 2880 x 2160 in 4:3 mode
Aperture of recorded image	23.76 x 13.365 mm 23.76 x 17.82 mm in 4:3 mode
Image aperture (incl. surround view)	25.674 x 14.701 mm 25.674 x 17.82 mm in 4:3 mode

ALEXA Plus 4:3

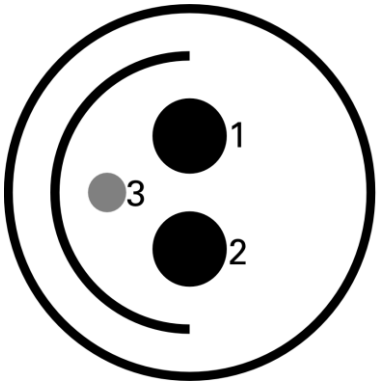
Length x Width x Height (body)	332 x 175 x 158 mm 12.95" x 6.89" x 6.22"
Camera body weight	8.0 kg / 17.6 lb
Camera setup weight (incl. EVF-1, VMB-1, CCH-1)	8.4 kg / 18.5 lb
Lens mount	Exchangeable lens mount, with PL mount LA-PL-2 installed

Aspect ratio	1.78:1 (16:9) 1.33:3 in 4:3 mode
Total active pixels (incl. surround view)	3112 x 1782 3112 x 2160 in 4:3 mode
Pixels of recorded image	2880 x 1620 2880 x 2160 in 4:3 mode
Aperture of recorded image	23.76 x 13.365 mm 23.76 x 17.82 mm in 4:3 mode
Image aperture (incl. surround view)	25.674 x 14.701 mm 25.674 x 17.82 mm in 4:3 mode

A.2 Connector Pin Outs

Note: The drawings of the connectors are not to scale.

BAT

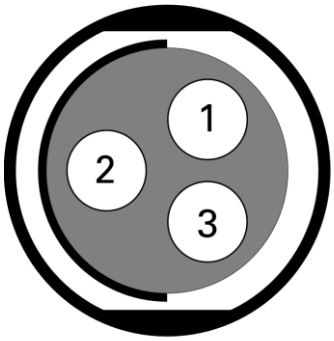


1 GND

2 +24V

3 BAT-COM

RS

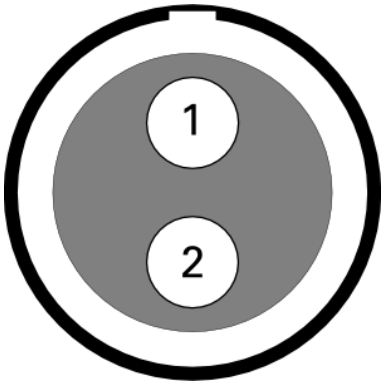


1 GND

2 24V-AUX

3 R/S

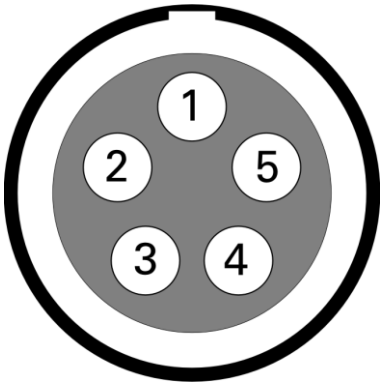
12V



1 GND

2 12V-AUX

TC



1 GND

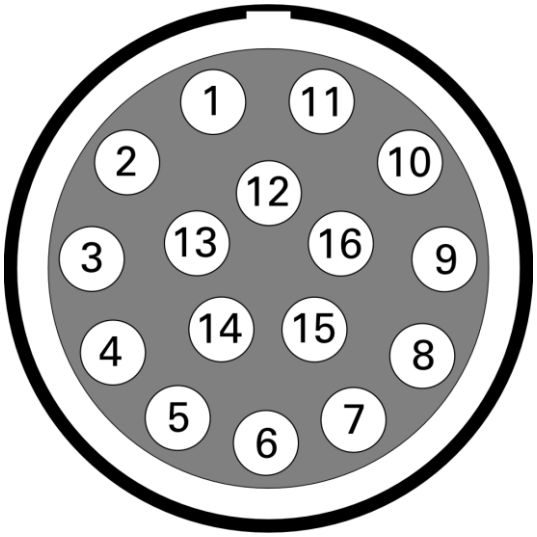
2 LTC IN

3 ASCII

4 TUNE OUT

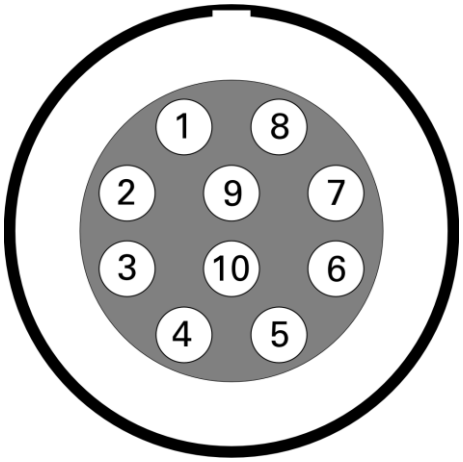
5 LTC OUT

EXT



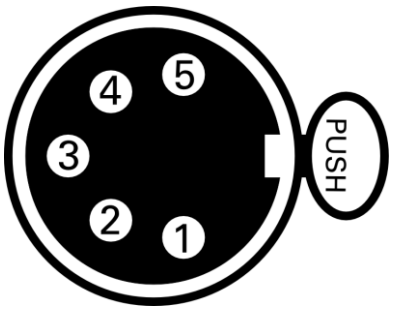
1	RS422-TXD(+)
2	RS232-TXD
3	CAN1-L
4	CAN1-H
5	CAN2-L
6	CAN2-H
7	24V-AUX
8	RS232-RXD
9	RS422-RXD(-)
10	RS422-RXD(+)
11	RS422-TXD(-)
12	GND
13	TTL-IN1
14	TTL-IN2
15	24V-AUX
16	GND

ETHERNET



1	MX-1P
2	MX-1N
3	MX-2P
4	MX-2N
5	MX-3P
6	MX-3N
7	MX-4P
8	MX-4N
9	GND
10	24V-ETH

AUDIO IN



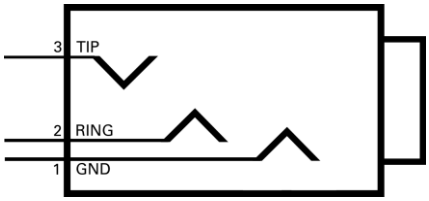
1	AGND
2	L-IN(+)

3 L-IN(-)

4 R-IN(+)

5 R-IN(-)

AUDIO OUT



1 GND

2 R-OUT

3 L-OUT

A.3 False Color Display

The false color display is a tool to check correct exposure. It can be activated in the EVF and the MON OUT image. When active, the image is turned into a greyscale image with important luminance ranges shown in signal colors.

Color Encoding

Six different colors are used to show the important luminance ranges.

What	Signal Level	Color
White clipping	100% - 99%	red
Just below white clipping	99% - 97%	Yellow
One stop over medium gray (Caucasian skin)	56% - 52%	pink
18% medium gray	42% - 38%	green
Just above black clipping	4.0% - 2.5%	blue
Black clipping	2.5% - 0.0%	purple

Figure 102: False Color Encoding

The following example illustrates the behavior of the false color display.

Figure 103: Night scene captured with ALEXA

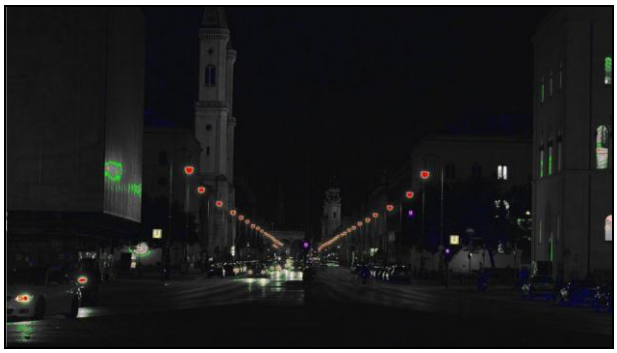


Figure 104: Night scene with false color active

A.4 Info Messages and Warnings

If anything unwanted occurs in the camera, it will give a message to the user.

These states, that require attention from the user, are indicated by icons in the main display, the viewfinder and the MON OUT.

Warnings are message that inform the user that a state has changed or that an error might occur soon. Anyway, recording is still possible.

If the camera goes into error state, recording is no longer possible, as it cannot be guaranteed that images are acquired as the user intended, or recording is simply not possible.

The messages give a compact info what has happened. If more information is required, please refer to the following tables.

Special warnings and errors: Sensor temperature

ALEXA has a Peltier element that keeps the image sensor at a stable temperature. This is important to achieve constant image quality. Under some occasions, the camera might not be able to keep this temperature, or it might take some time to reach the correct level. This can be the case right after booting, or with very hot or cold ambient temperatures.

A red temperature icon indicates that the sensor temperature is too far off to guarantee a high image quality, while a white temperature icon indicates that image quality is still in the (very high set) quality limits required by ARRI.

The related messages in the INFO screen are shown in the following tables.

ALEXA status message

System state: Good	Camera works properly.

ALEXA warning messages and meanings

Warning message	Meaning
Main Bat: Power warning	The battery attached to the BAT connector has reached its warning level. Battery power is about to end, and a replacement battery should be prepared.
Onboard Bat: Power warning	The battery attached to the onboard battery adapter has reached its warning level. Battery power is about to end, and a replacement battery should be prepared.
Card 1: Low capacity	The **SxS PRO** card in slot 1 has less than 3 minutes recording time left. Prepare a new card for recording.
Card 2: Low capacity	The **SxS PRO** card in slot 2 has less than 3 minutes recording time left. Prepare a new card for recording.

Card 1: Rec protected	The **SxS PRO** card in slot 1 is Rec protected. Remove the card from the camera, slide the switch located on the camera back end to the Rec enable position and re-insert the card.
Card 2: Rec protected	The **SxS PRO** card in slot 2 is Rec protected. Remove the card from the camera, slide the switch located on the camera back end to the Rec enable position and re-insert the card.
Card 1: Full	**SxS PRO** card in slot 1 is selected, but the **SxS PRO** card is full. Use a new card. Card in other slot can still record.
Card 2: Full	**SxS PRO** card in slot 2 is selected, but the **SxS PRO** card is full. Use a new card. Card in other slot can still record.
Card 1: Wrong file system	The **SxS PRO** card in slot 1 is not formatted in the file system required by the camera. Format the card.
Card 2: Wrong file system	The **SxS PRO** card in slot 2 is not formatted in the file system required by the camera. Format the card.
Card 1: Card is too slow	The write speed of **SxS PRO** card in slot 1 is insufficient for the sensor fps set on the camera. Use a card with a higher write speed.
Card 2: Card is too slow	The write speed of **SxS PRO** card in slot 2 is insufficient for the sensor fps set on the camera. Use a card with a higher write speed.
Card 1: files damaged!	One or more files on **SxS PRO** card in slot 1. Continue with a fresh card.
Card 2: files damaged!	One or more files on in slot 2 are defect. Continue with a fresh card.
Card 1: invalid cardtype	The card in slot 1 is not an **SxS PRO** card.
Card 2: invalid cardtype	The card in slot 2 is not an **SxS PRO** card.
Card 1: write problem!	The camera has problems writing to the **SxS PRO** card in slot 1. Continue with a fresh card.
Card 2: write problem!	The camera has problems writing to the **SxS PRO** card in slot 2. Continue with a fresh card.
Camera overheating	The camera system's temperature is reaching a critical level. this can either be due to a blocked camera fan or ambient temperature exceeding the system's limits. Apply additional cooling or switch of the camera to prevent hardware damage.
Low sensor temperature	The sensor temperature is lower than it should be. High image quality is still guaranteed.
High sensor temperature	The sensor temperature is higher than it should be. High image quality is still guaranteed.

Ext TC: Different frame rate	The external TC signal's time base differs from the project fps of the camera. Syncing is still possible.
Re-jam Timecode soon	Accuracy of jammed Timecode can soon expire. Re-jam camera with external Timecode soon.
Re-jam Timecode now	Accuracy of jammed Timecode has expired. Re-jam camera with external Timecode.
TC source forced to internal	Sensor fps does not match Project fps. External Free Run TC cannot be used, camera has switched to Int Rec Run TC.
TC mode forced to Rec Run	Sensor fps does not match Project fps. External Free Run TC cannot be used, camera has switched to Int Rec Run TC.
Interface bit error	Reboot camera. If error continues to occur, contact ARRI service.
Internal processing problem	Reboot camera. If error continues to occur, contact ARRI service.
Internal battery error	The internal battery which powers the real-time clock must be replaced. Contact an ARRI service center near you.
System problem	Reboot the camera. If error continues to occur, contact ARRI service.
System problem (I2C bus error)	Problem on camera data bus. Reboot the camera. If error continues to occur, contact ARRI service.
External TC: Incompatible frame rate	The external TC signal's time base is not accepted by the camera.
HD outs not synced. Trigger now!	Appears on slave cam with Ext sync activated, but not using settings sync. Send trigger from Ext sync master camera to ensure the REC OUTs of both cameras are in sync.
Connect with Ethernet slave!	Camera is set to Settings sync: Enet master, but is not connected with slave camera via Ethernet
Connect with Ethernet master!	Camera is set to Settings sync: Enet slave, but is not connected with master camera via Ethernet
External TC: Jamming. Please wait!	Camera jams to external TC signal. Do not disconnect TC source from camera until warning disappears.
External TC: Signal missing!	Camera is set to Ext LTC regen, but external TC signal is missing.
External TC: Incompatible frame rate!	The external TC signal has a time base that does not match the project fps of the camera.
Framegrab: Grabbing image failed	A problem occured in the camera. The frame grab failed.

Framegrab: Storing image failed	A problem occured with the SD card. The frame grab failed.
Playback failed	The camera could not play back the internally recorded clips.
EVF smooth mode not possible	Smooth mode is set to "On", but either sensor fps is higher then 30.000, or shutter angle is higher than 180.0
Ext LTC: Forced to JAM sync!	Ext LTC had to be switched to Jam sync by camera system.
Playback failed!	A problem with playback occured. Camera had to abort playback.
Card removed! Playback failed!	Camera had to abort playback, as **SxS** card was removed.
Calibrate lens motors!	New lens motors are attached to the camera. Prior to use they must be calibrated.
Temperature at limit. Fan RPM raised.	With camera fan is in "Rec low" mode, fan noise might exceed silent level because camera is becoming too hot.
Master/slave: Focus unit mismatch	With ALEXA Plus and 3D lens sync, both cameras must have same focus unit activated, which is not the case here.
Slave: No lens table active.	With ALEXA Plus and 3D lens sync, select lens table on slave when using LDA.
REC OUT: Switch on Vari flag!	When **SxS** recording is off and sensor fps does not match REC OUT fps, switch on Vari flag to prohibit duplicate frames.
Tropical mode active	Reminder for active tropical mode
REC OUT: Switch on Vari flag!	Issued when **SxS** is switched on and sensor fps is bigger than project fps.
ND filter stuck.	ALEXA Studio only. ND filter slider has mechanical problems.
Mirror sector problem.	ALEXA Studio only. Mirror sector has mechanical problems.
Mirror cannot reach sync speed.	ALEXA Studio only. Mirror cannot reach speed due to technical problems.
Voltage too low for mirror!	ALEXA Studio only. Power supply voltage level insufficient to drive mirror shutter.
Mirror out of phase	ALEXA Studio only. Mirror shutter and sensor are out of phase, may result in exposure artifacts.

Some buttons are defect.	Camera button signals are failing. Reboot camera. If reappearing after reboot, contact service for button replacement. Mostly hardware problem.
SxS: Check last clip. Low data rate!	Data rate of last recorded clip is very low. Check for artifacts in replay. Can also occure when forgetting to remove lens cap during recording.
Loading highspeed mode	While High Speed Mode is loading, the camera functionality is limited. Wait until High Speed mode loading has finished.
LDS failure, restart camera.	The lens data system has failed. Restart the camera if LDS is used.
M head: Clean fibre connection	The fibre signal quality of the ALEXA M camera is insufficient and requires cleaning of the connections.
M head: Power warning	The power level on the ALEXA M camera head is insufficient. Use a power source with a power supply of at least 40 W.
M head: High temperature	The temperature of the camera head is too high. Apply additional cooling to prevent automatic shutdown.
M head: Low fan speed	The fan of the ALEXA M camera head cannot reach a sufficient cooling speed. Fan might have to be cleaned or replaced.

ALEXA error messages and meanings

Main Bat: Low power	The battery attached to the BAT connector has reached its low level (10% below warning level). Battery must be replaced.
Onboard Bat: Low power	The onboard battery has reached its low level (10% below warning level). Battery must be replaced.
All Bats: Low power	Batteries on both BAT connector and onboard battery(s) have to be replaced.
Card 1: End of lifetime	The **SxS PRO** card in slot 1 has reached the end of its life cycle and has become read-only. Use a new card.
Card 2: End of lifetime	The **SxS PRO** card in slot 2 has reached the end of its life cycle and has become read-only. Use a new card.

Card 1: Write speed error	The current write speed could not be handled by the **SxS PRO** card in slot 1
Card 2: Write speed error	The current write speed could not be handled by the **SxS PRO** card in slot 2
Cards 1&2: Full	Both **SxS PRO** cards are full. Use fresh cards.
Cards 1&2: End of lifetime	Both **SxS PRO** cards have reached the end of their life cycle and has become read-only. Use fresh cards.
Cards 1&2: Wrong file system	Both **SxS PRO** cards are not formatted in the file system required by the camera. Format the cards.
Cards 1&2: Rec protected	Both **SxS PRO** cards are rec-protected. Eject the cards, switch off the protection and re-insert the cards.
Camera overheating	The camera is getting too warm. Apply additional cooling or shut down to prevent hardware damage.
Low sensor temperature	Sensor temperature is out of range. Wait until error message disappears before continuing to shoot.
High sensor temperature	Sensor temperature is out of range. Wait until error message disappears before continuing to shoot.
System error	Reboot the camera.
Codec error - Reboot!	An error in the compression module has occured, and recording was aborted. Reboot the camera before you continue to record!
Sensor error. Reboot!	The image sensor has a problem. reboot the camera.
Sensor boot error!	The sensor has not booted. Reboot the camera.
Interface error. reboot.	An internal data interface has a problem. If rebooting does not solve the problem, contact the ARRI service.
Fan error. Contact service!	The fan module is not working properly. Either install an SFM-1, or contact the ARRI service.

Fatal system error! Reboot camera now!	Camera has to be rebooted. If this error continues to occur, a hardware problem might be the reason. Contact the ARRI service.
Sync clock out of range.	The sync signal clock does not match the camera setting. Make sure the settings match!
Syncing sensor. Please wait!	Slave camera syncs to master camera. Wait until message disappears before starting to record!
A slave is not ready	One of the slave cameras is not ready for recording.
Software error - reboot camera!	A part of the camera software has stopped functioning properly and requires a camera reboot.
SxS: Audio recording failed	Audio recording on **SxS** card failed.
REC OUT: Frame drops. Set frame rate!	Frame rate of REC OUT is smaller than sensor fps. Make sure REC OUT frame rate matches sensor fps.
SxS cards differ. Recording prohibited!	With dual recording active, the two **SxS PRO** cards must have identical file structure. Use two fresh **SxS PRO** cards and analyze the not matching ones.
REC OUT: Frame drops. Set FPS.	**SxS** is switched off, and sensor fps is higher than REC OUT fps. Increase REC OUT fps to at least the sensor fps value.
REC error. please reboot!	Error in the recording module. Reboot camera.
Mirror shutter not calibrated!	ALEXA Studio only. Mirror shutter must be calibrated by ARRI service.
Mirror shutter phase error!	ALEXA Studio only. Mirror shutter continuosly not in phase with sensor. If rebooting does not solve the problem, contact ARRI service.
Mirror shutter: Cannot reach sync speed	ALEXA Studio only. Mirror shutter continuosly not reaching sync speed. If rebooting does not solve the problem, contact ARRI service.
No M head detected - reboot camera!	ALEXA M was booted without head connected. Connect head and reboot camera.

Fibre Connection Error!	Fibre connection between ALEXA M head and backend could not be established or has terminated. Check and clean connection, then reboot.
M head: Low power!	The power level of the ALEXA M head is critical. Make sure power supply can deliver at least 40 W of power. Check if power warning levels are set correctly.
M head: Temperature high	The temperature of the ALEXA M head is too high. Apply additional cooling to prevent automatic shutdown.
M head: Fan error. Contact service!	The fan of the ALEXA M camera head is defect. If replacing the fan does not solve the problem, contact the camera service.

If any error that requires rebooting continues to occur regularly, contact the ARRI service.

A.5 Dimensions, Weights and Menu Structure Trees

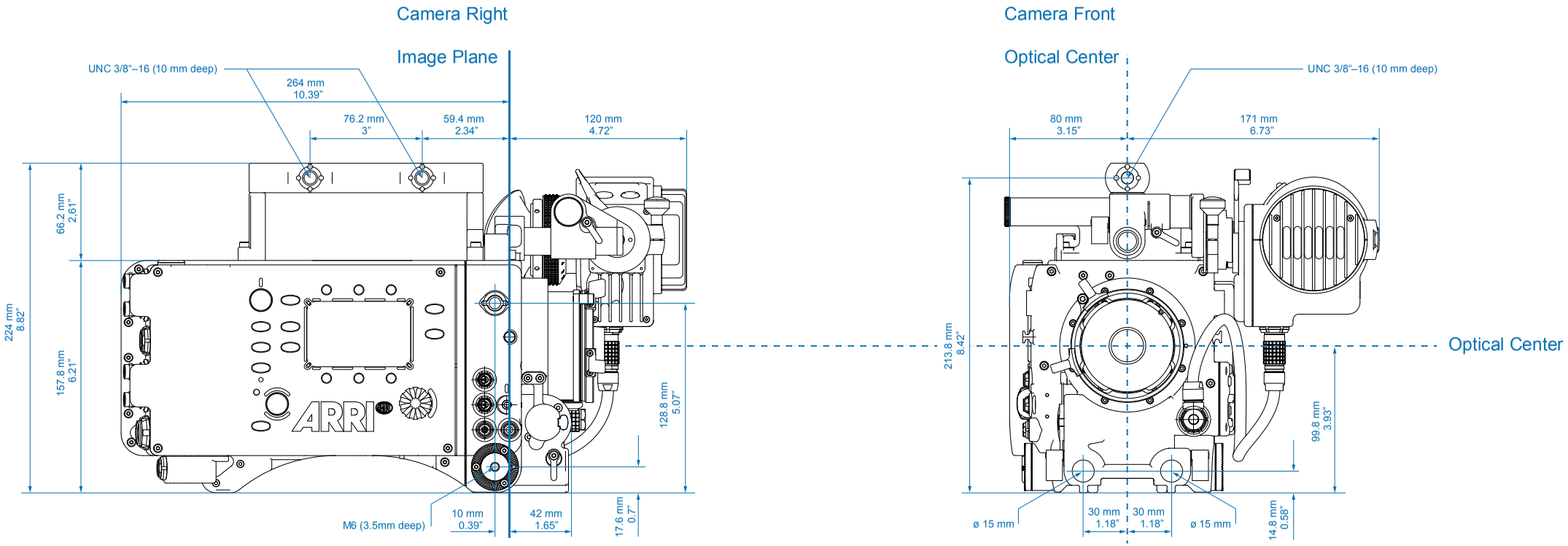
Dimensional drawings including weights information are attached to the end of this document. A version with higher resolution can be downloaded from the ARRI website: *http://www.arri.com/camera/digital_cameras/downloads*.

A Menu Structure Tree can also be found at the end of this document.

ALEXA

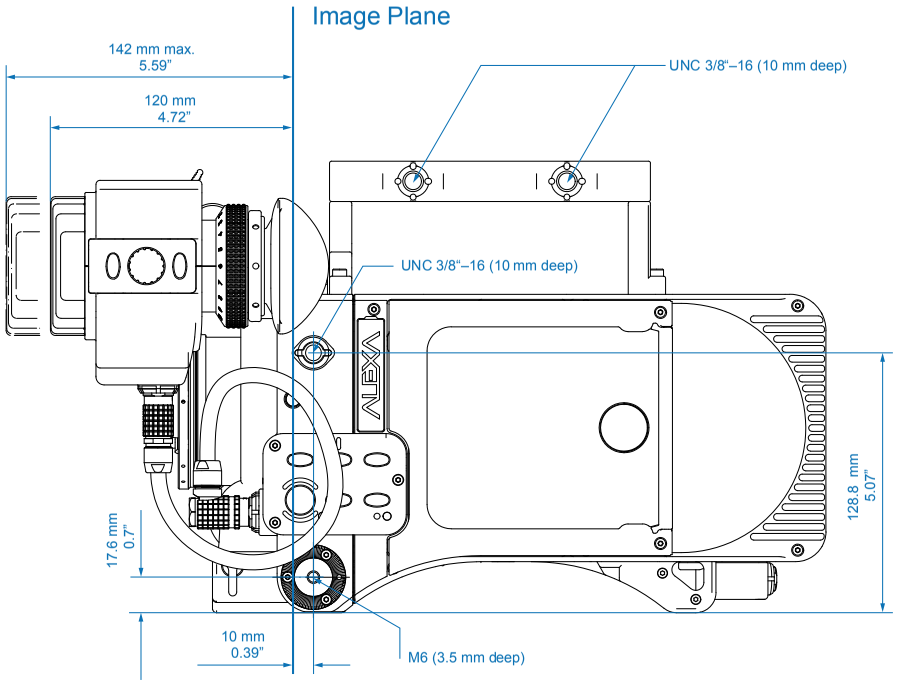
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

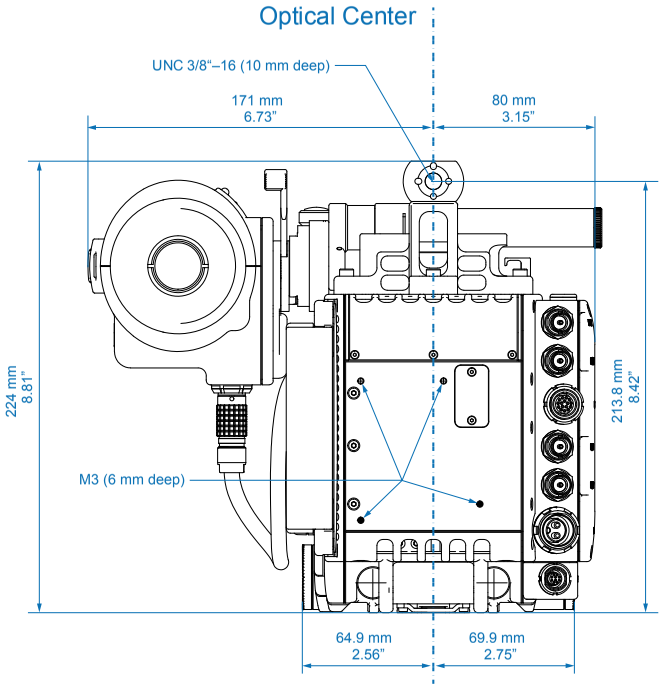


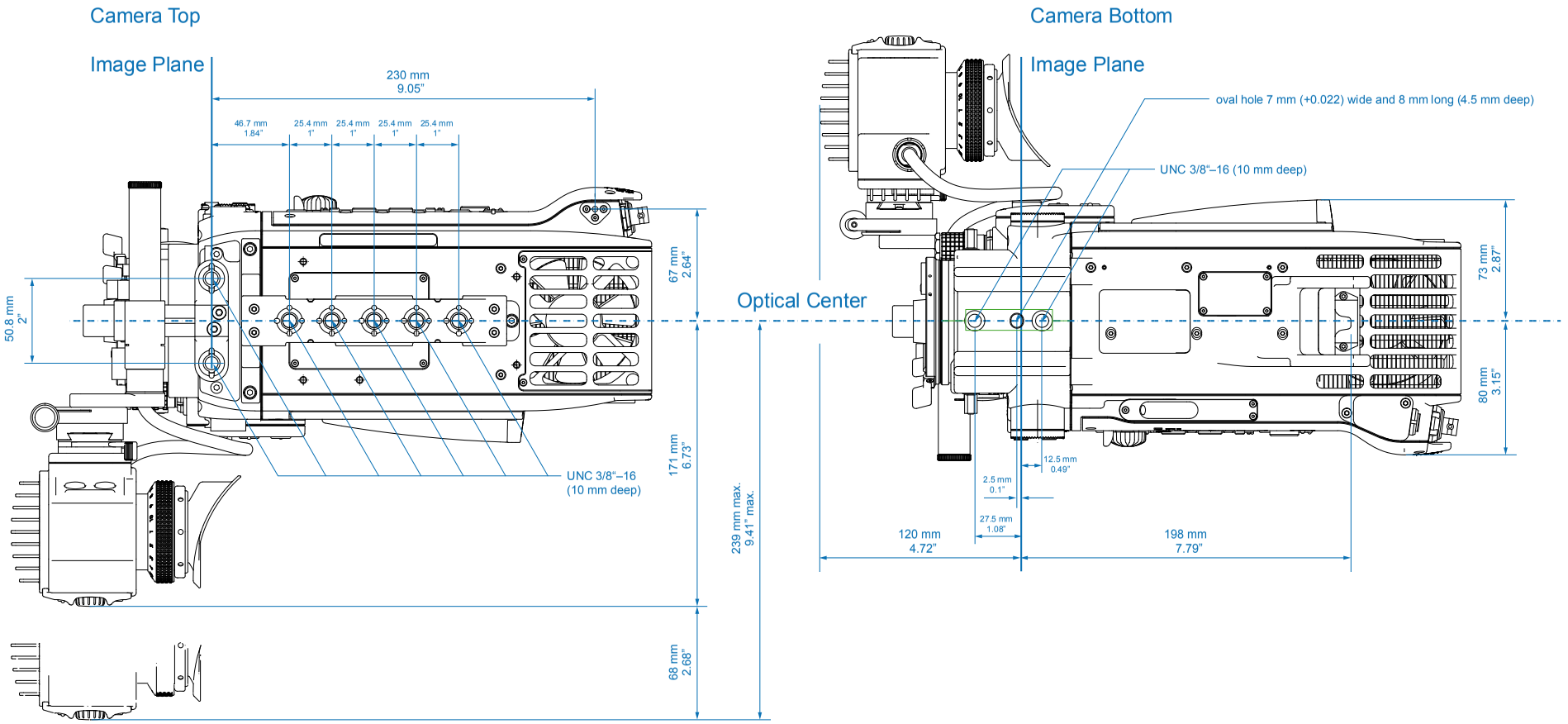
ALEXA	Length	Width	Height	Weight
Body, Camera Center Handle (CCH-1)	321 mm - 12.64"	153 mm - 6.02"	224 mm - 8.82"	6.5 kg - 14.33 lbs
Body, Camera Center Handle (CCH-1), Electronic Viewfinder EVF-1, Viewfinder Mounting Bracket (VMB-1)	384 mm - 15.12"	251 mm - 9.88"	" - "	7.5 kg - 16.53 lbs
Body, Camera Center Handle (CCH-1), Electronic Viewfinder EVF-1 extended, Viewfinder Mounting Bracket (VMB-1)	406 mm - 15.98"	319 mm - 12.56"	" - "	7.5 kg - 16.53 lbs

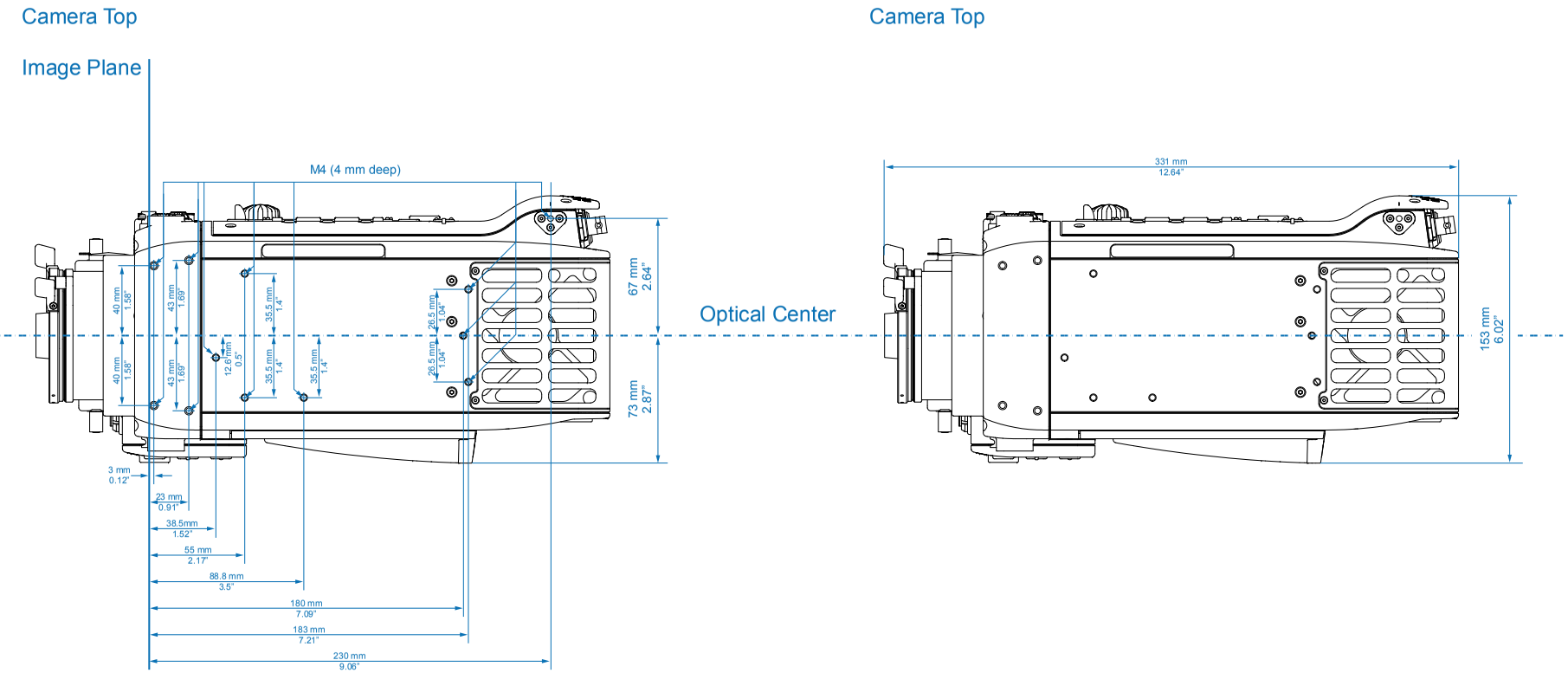
Camera Left



Camera Back



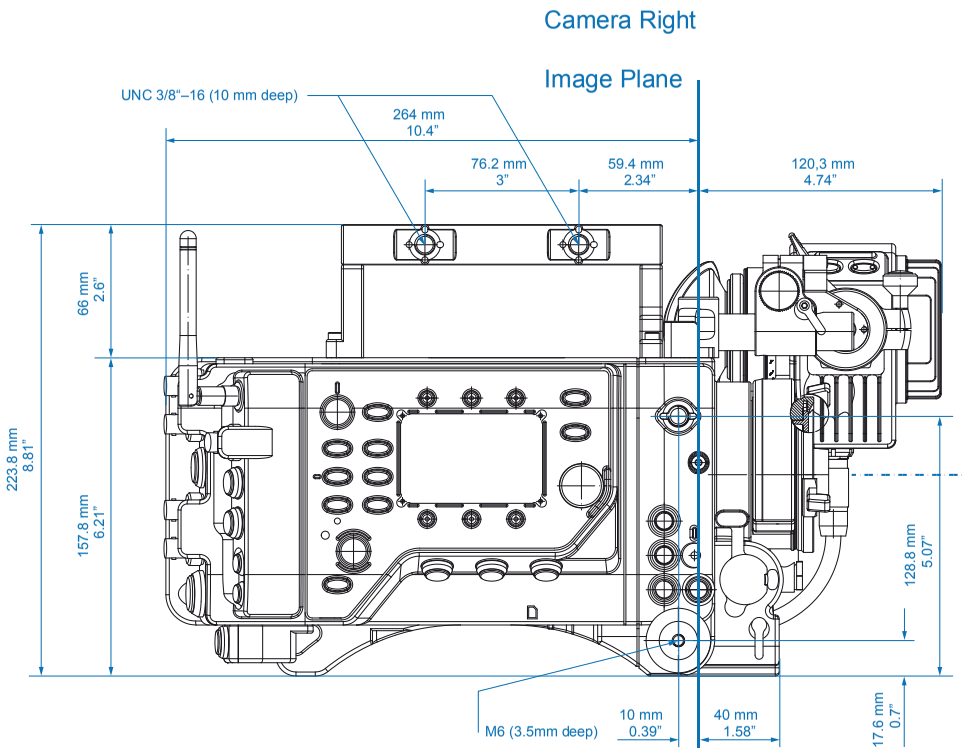

Camera Top
Image Plane
230 mm
9.05"
46.7 mm
1.84"
25.4 mm
1"
25.4 mm
1"
25.4 mm
1"
25.4 mm
1"
50.8 mm
2"
67 mm
2.64"
171 mm
6.73"
68 mm
2.68"
239 mm max.
9.41" max.
UNC 3/8"–16
(10 mm deep)
Optical Center
Camera Bottom
Image Plane
oval hole 7 mm (+0.022) wide and 8 mm long (4.5 mm deep)
UNC 3/8"–16 (10 mm deep)
73 mm
2.87"
80 mm
3.15"
12.5 mm
0.49"
2.5 mm
0.1"
27.5 mm
1.08"
120 mm
4.72"
198 mm
7.79"

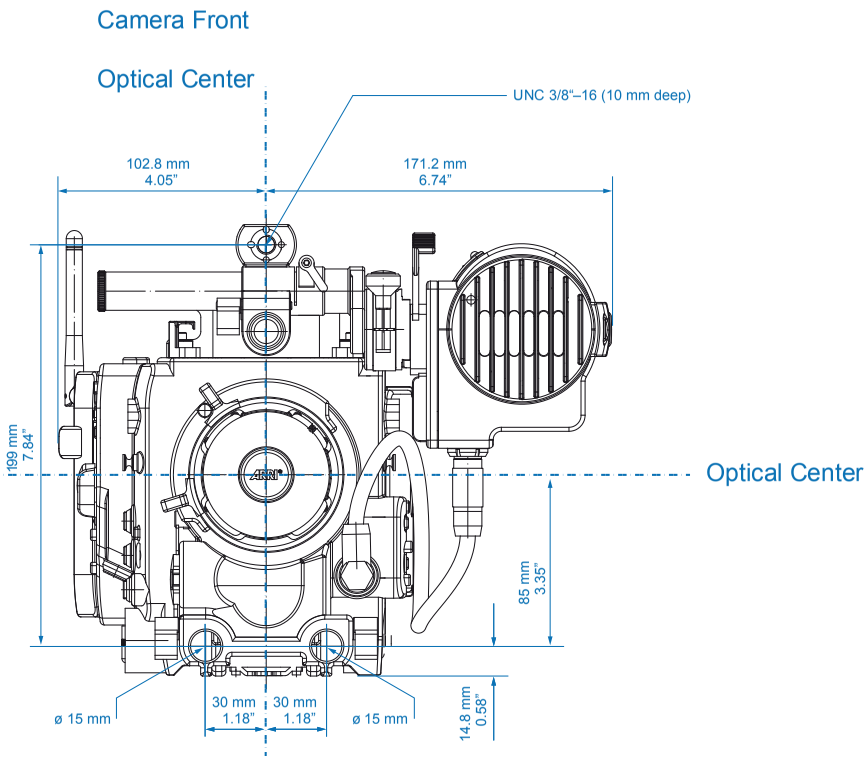

Camera Top
Image Plane
M4 (4 mm deep)
40 mm
1.58"
43 mm
1.69"
35.5 mm
1.4"
12.0 mm
0.5"
26.5 mm
1.04"
67 mm
2.64"
73 mm
2.87"
3 mm
0.12"
23 mm
0.91"
38.5mm
1.52"
55 mm
2.17"
88.8 mm
3.5"
180 mm
7.09"
183 mm
7.21"
230 mm
9.06"
Optical Center
Camera Top
331 mm
12.64"
153 mm
6.02"

ALEXA Plus

CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.





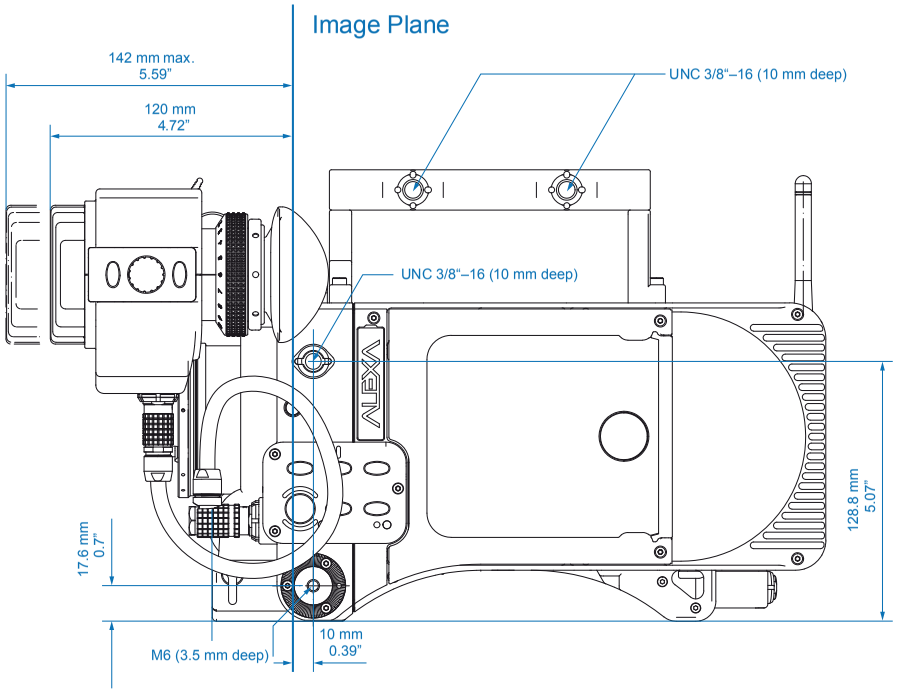
ALEXA Plus	Length	Width	Height	Weight
Body, SxS Module	332 mm - 12.95"	175 mm - 6.89"	158 mm - 6.22"	7.0 kg - 15.4 lb
Body, SxS Module, Camera Center Handle (CCH-1), Electronic Viewfinder EVF-1	384 mm - 15.12"	274 mm - 10.8"	224 mm - 8.82"	8.4 kg - 18.5 lb

ALEXA Plus

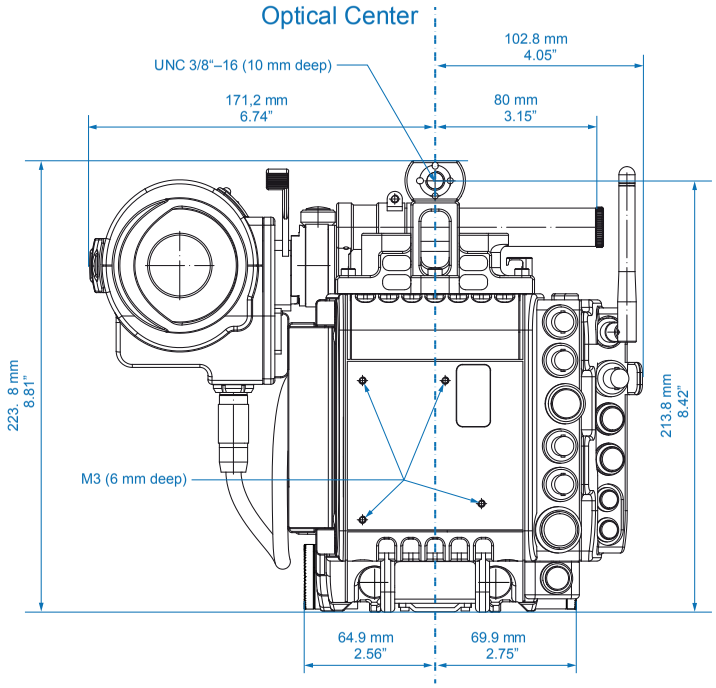
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Camera Left



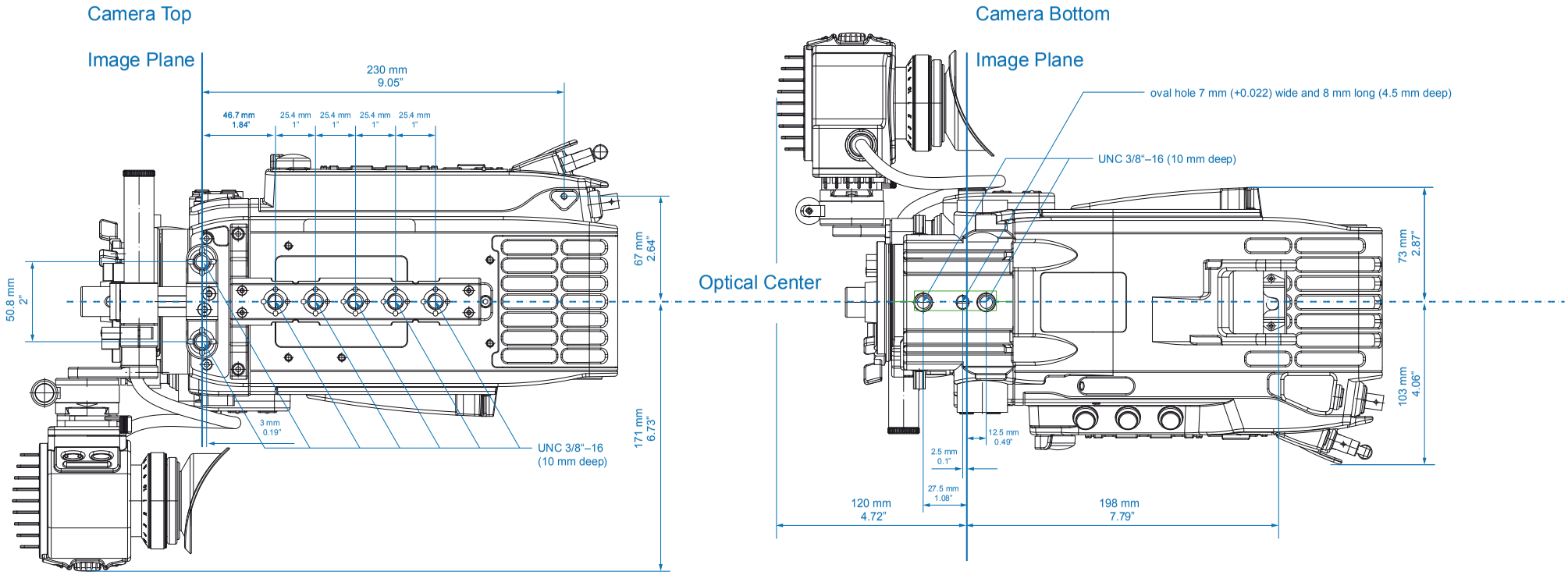
Camera Back



ALEXA Plus

CAMERA DIMENSIONS – **Version 2012-03**

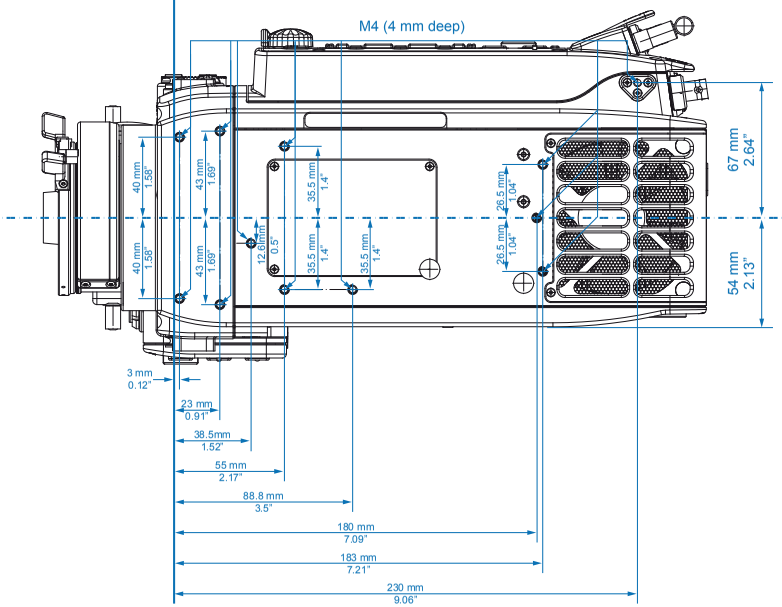
Technical Data are subject to change without notice.



ALEXA Plus

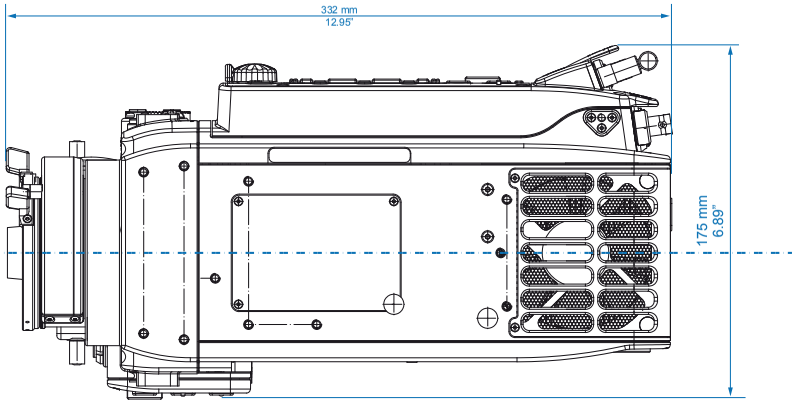
Camera Top

Image Plane



Optical Center

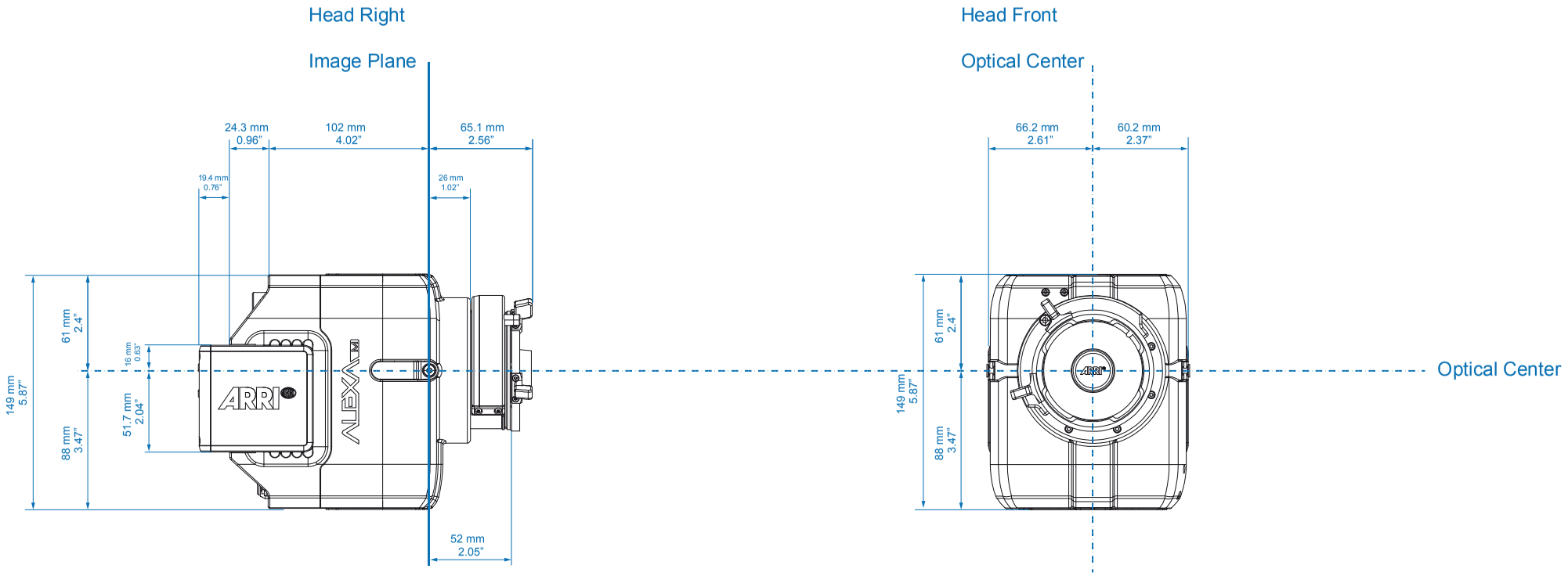
Camera Top



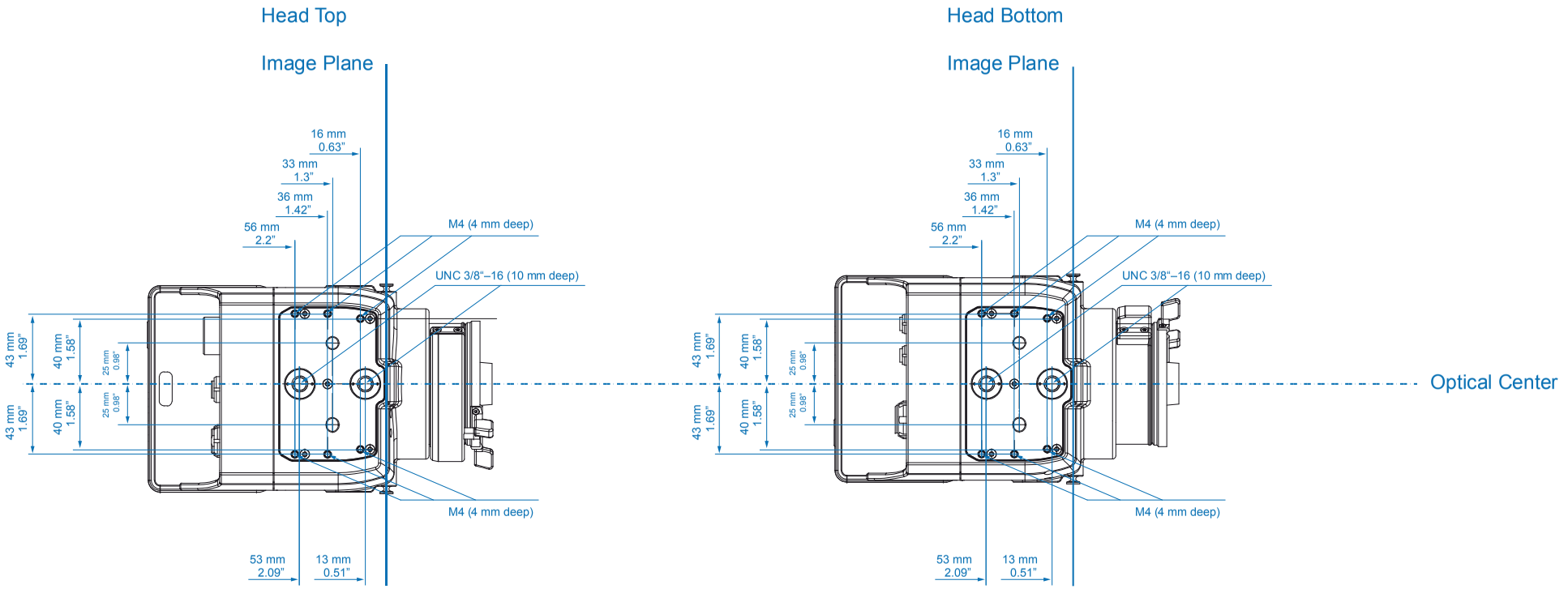
ALEXA M

CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.



ALEXA M	Length	Width	Height	Weight
ALEXA M Head	212 mm - 8.35″	129 mm - 5.08″	149 mm - 5.87″	2.9 kg - 6.39 lb
ALEXA M Backend	323 mm - 12.72″	153 mm - 6.02″	158 mm - 6.22″	5.5 kg - 12 lb

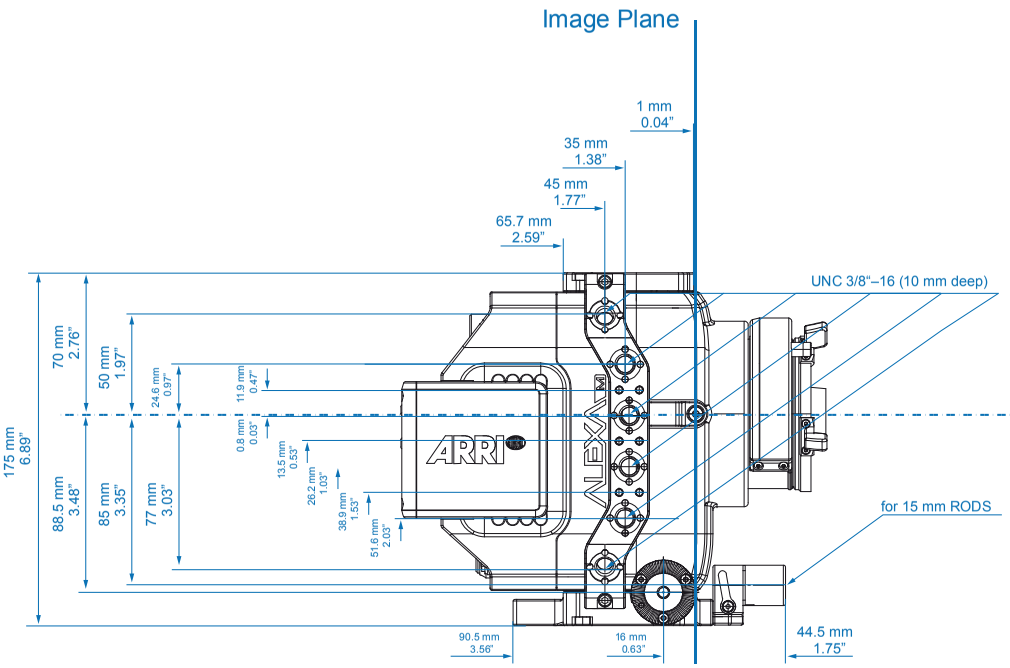

Head Top
Image Plane
16 mm
0.63"
33 mm
1.3"
36 mm
1.42"
56 mm
2.2"
M4 (4 mm deep)
UNC 3/8"–16 (10 mm deep)
43 mm
1.69"
40 mm
1.58"
25 mm
0.98"
M4 (4 mm deep)
53 mm
2.09"
13 mm
0.51"
Head Bottom
Image Plane
Optical Center

ALEXA M

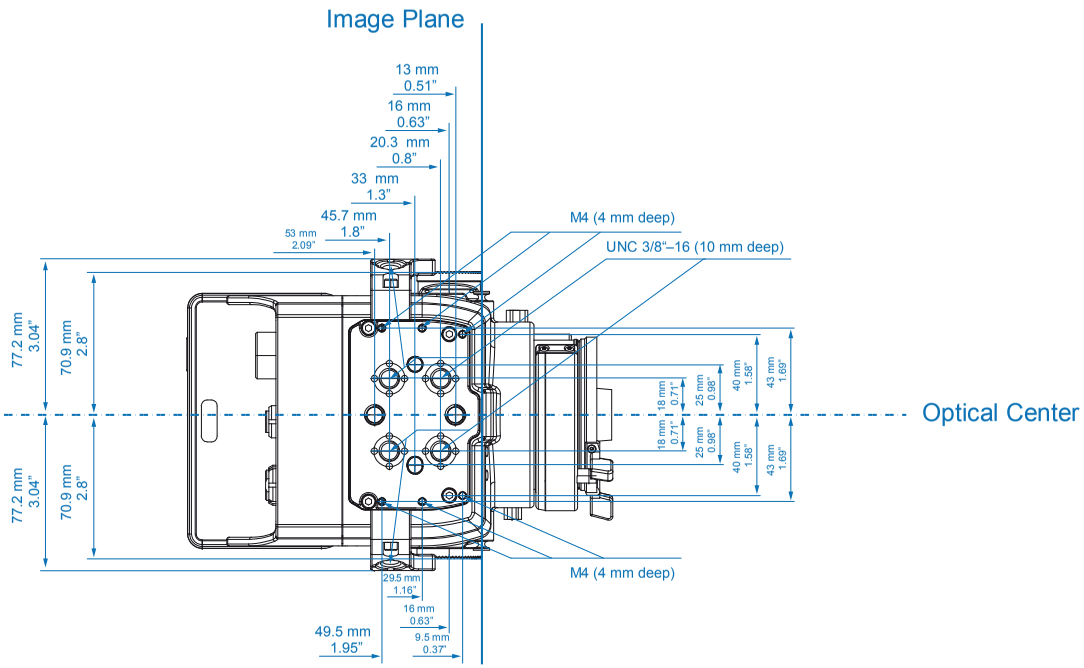
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Head with Cage Right



Head with Cage Top

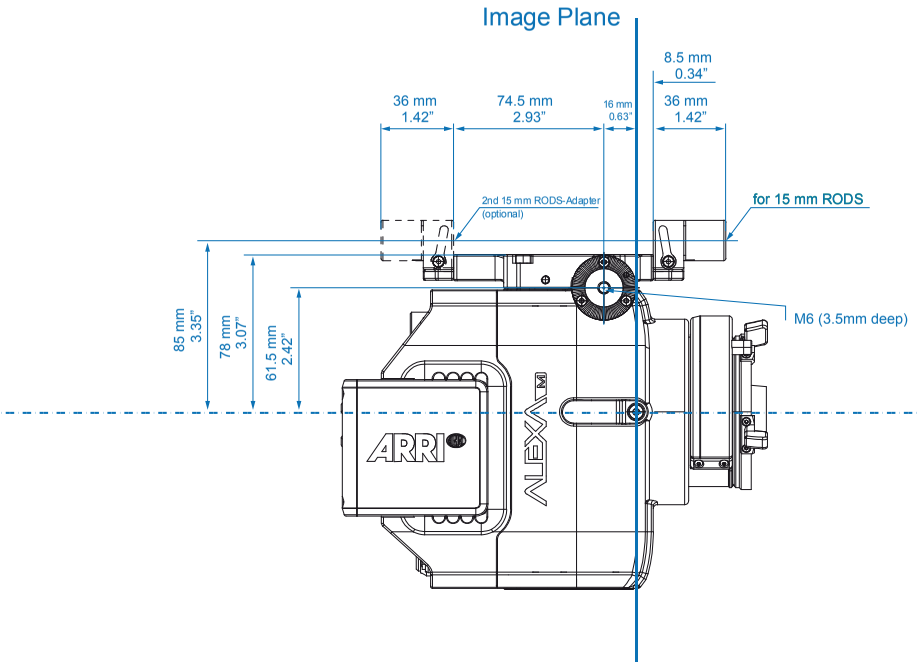


ALEXA M

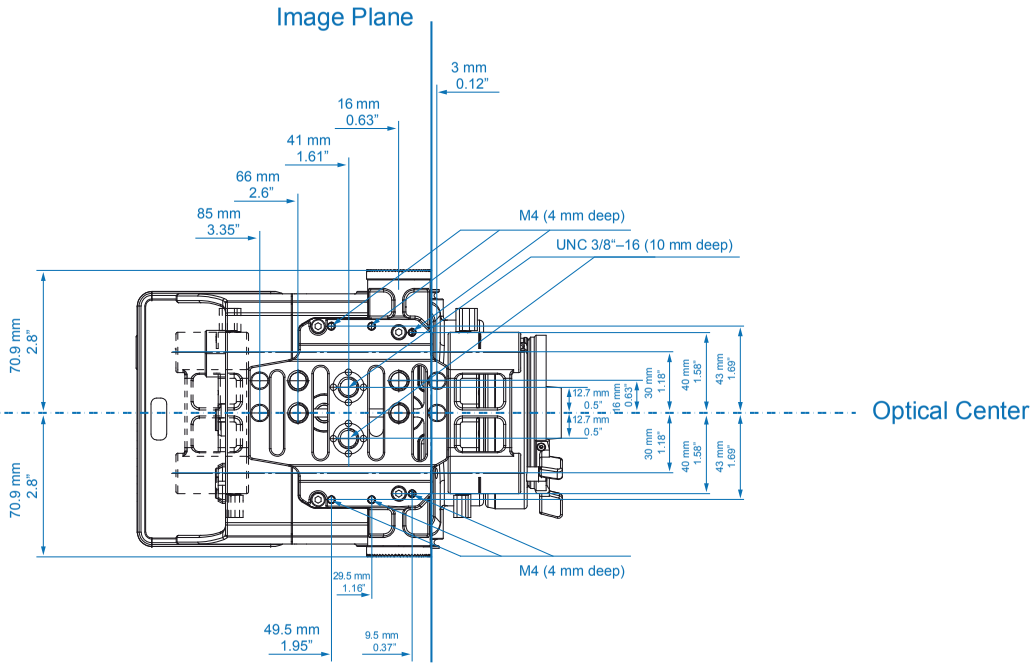
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Head with HEAD-PLATE-2 Right



Head with HEAD-PLATE-2 Top

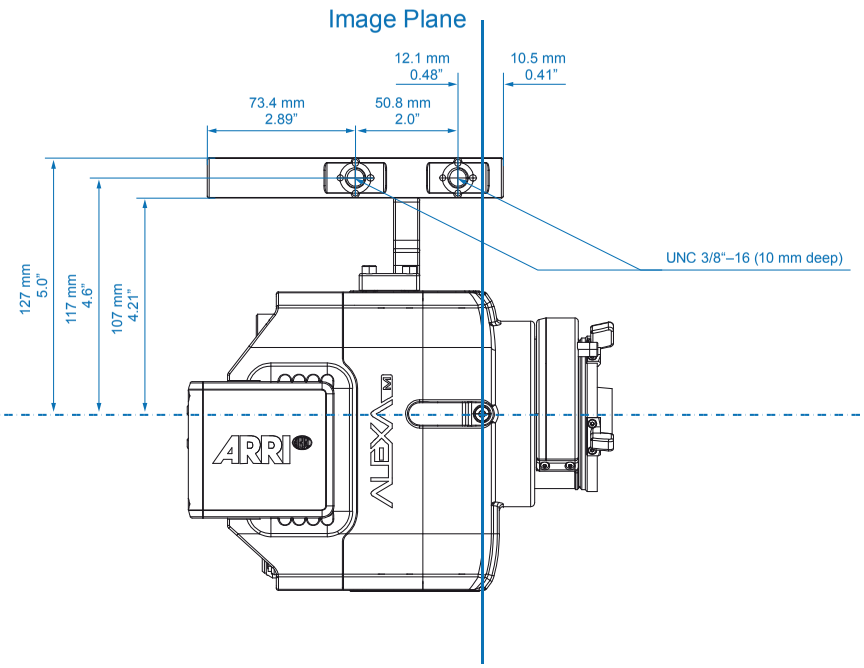


ALEXA M

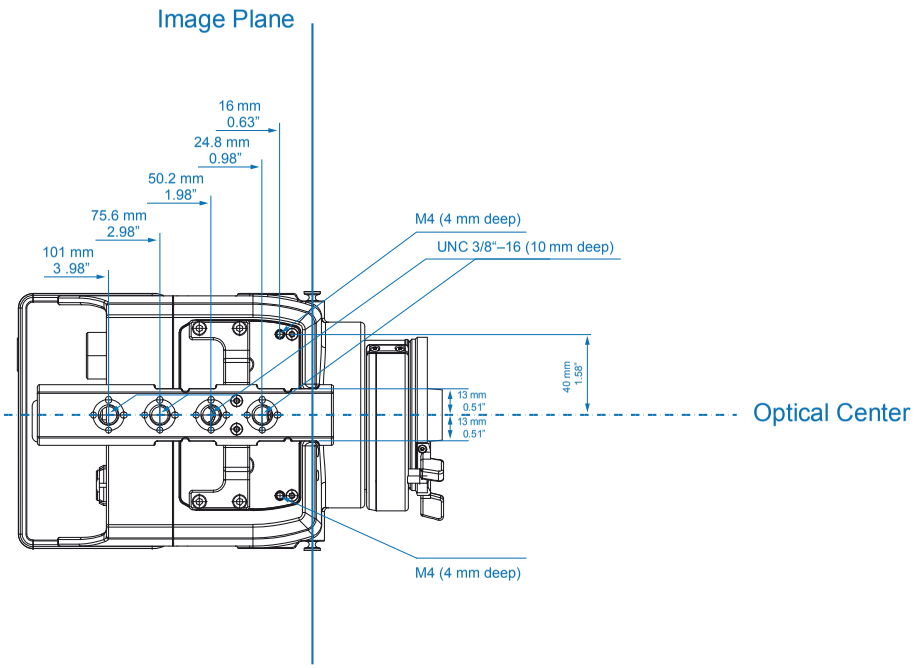
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Head with Handle Right



Head with Handle Top

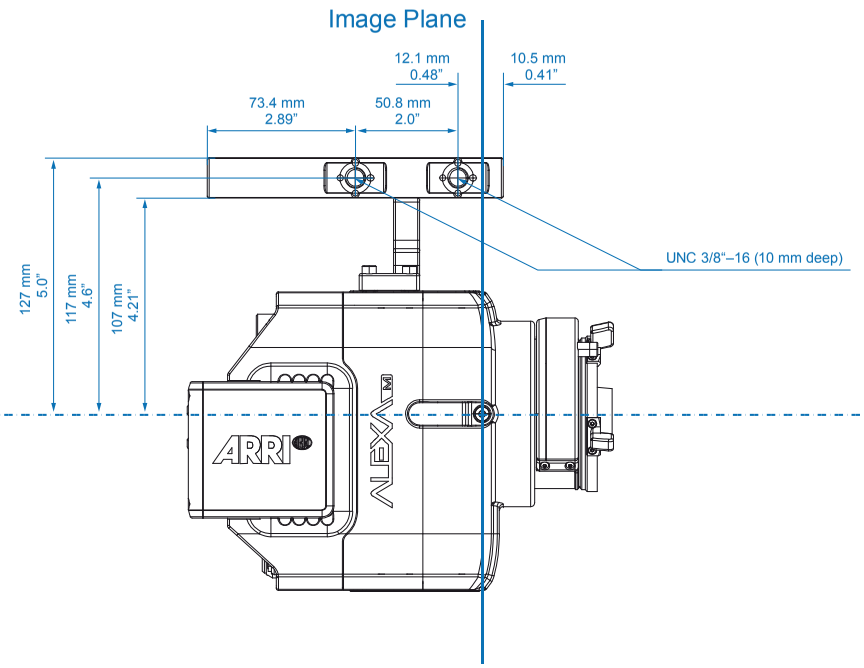


ALEXA M

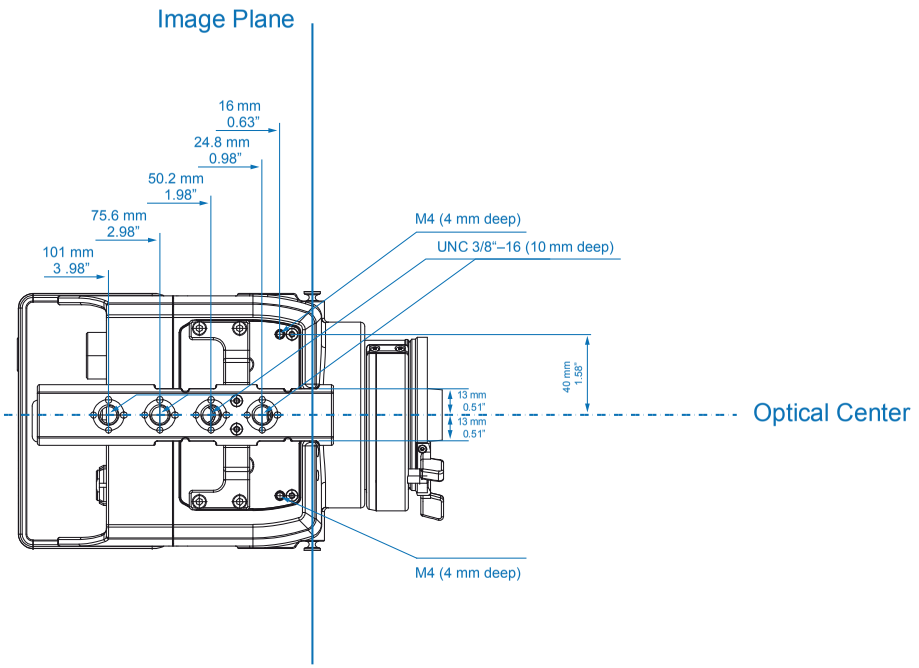
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

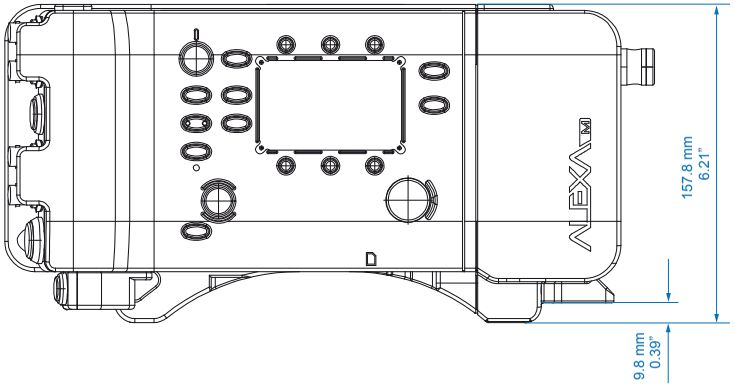
Head with Handle Right



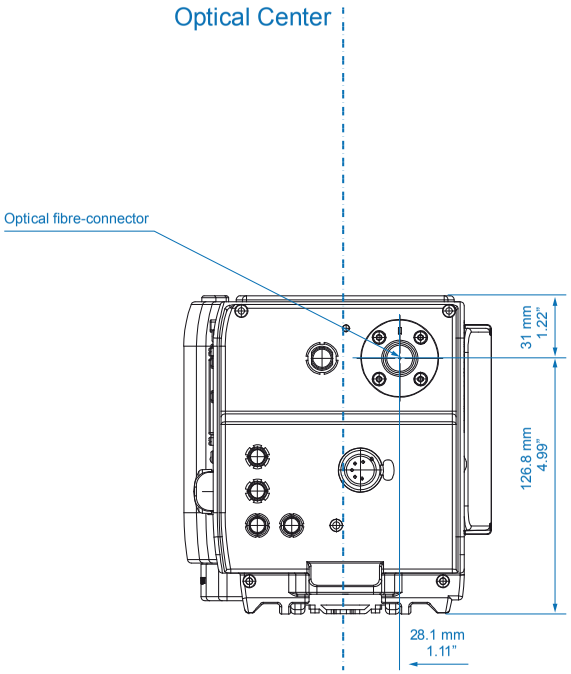
Head with Handle Top



Backend Right



Backend Front

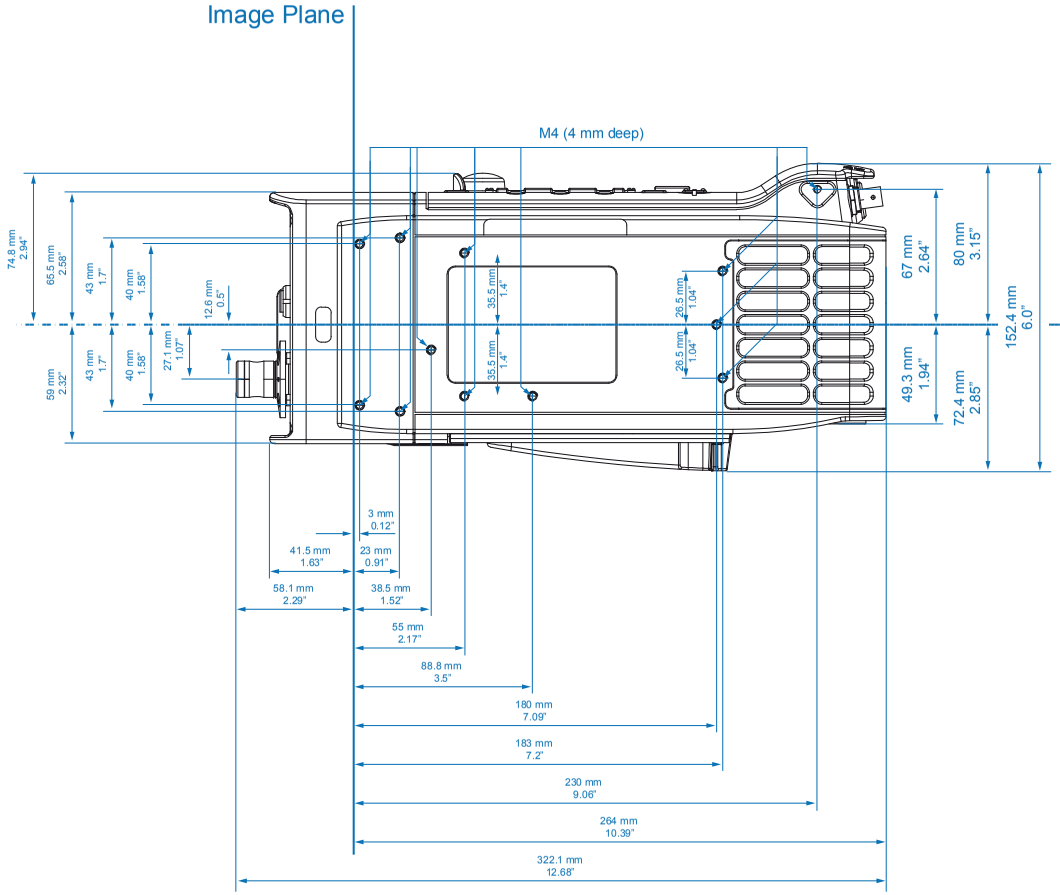


ALEXA M

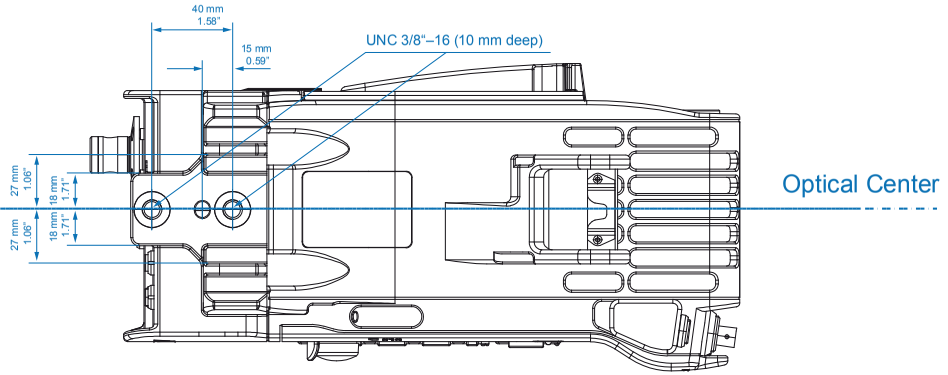
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Backend Top



Backend Bottom

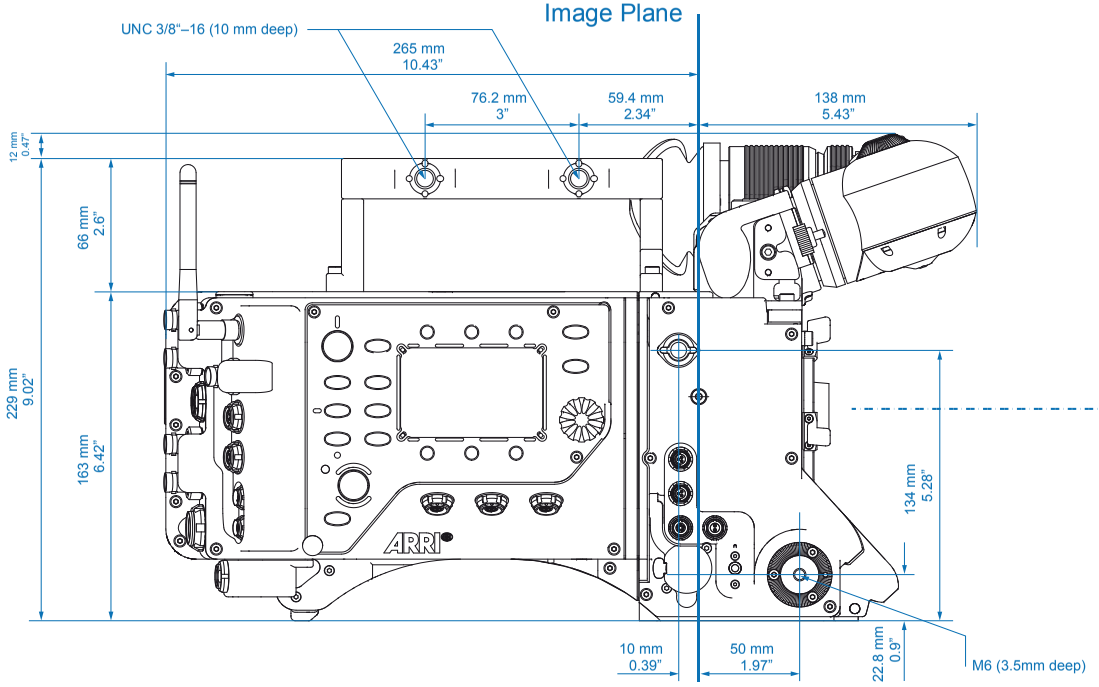


ALEXA Studio

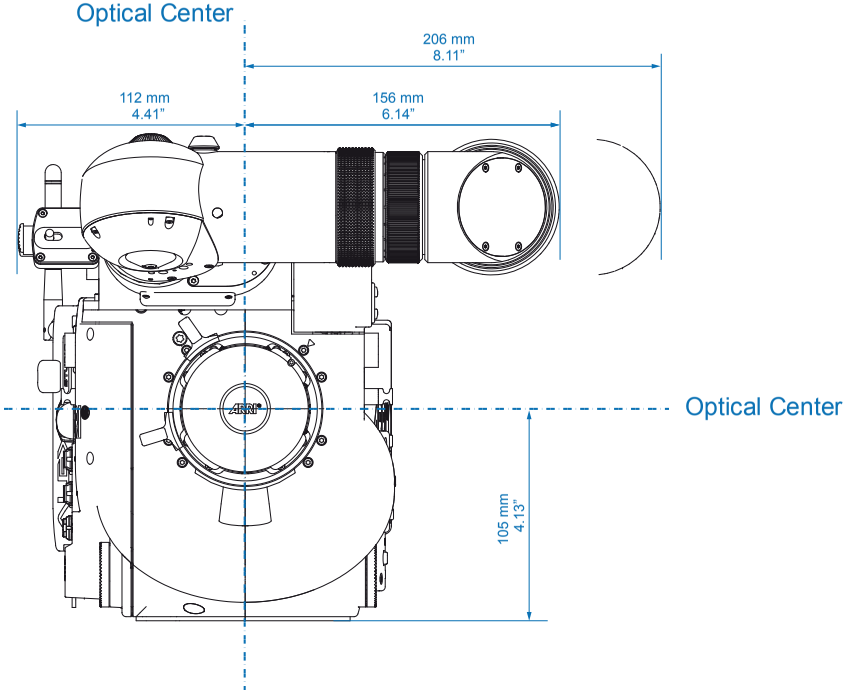
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Camera Right



Camera Front



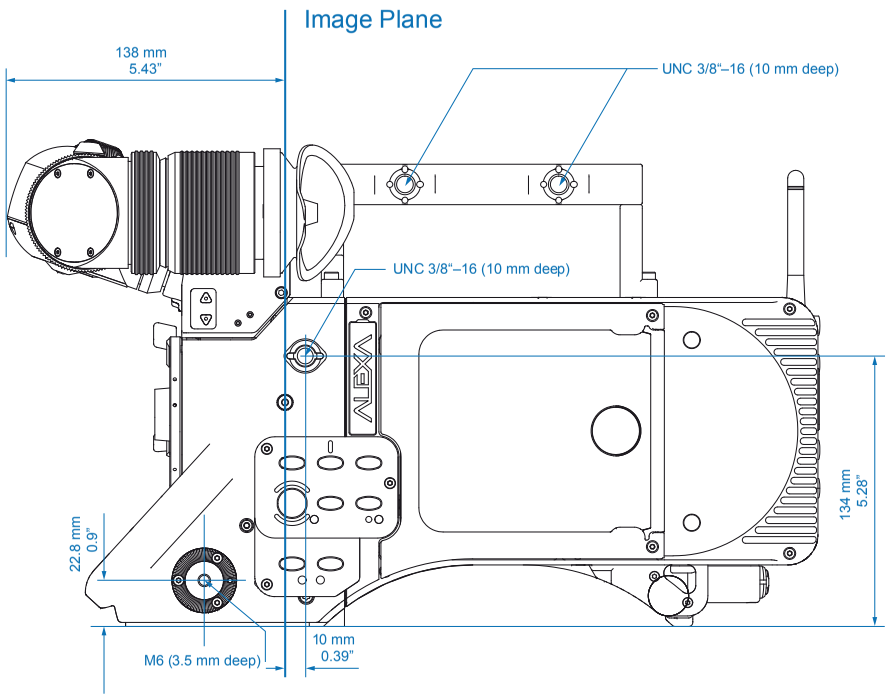
ALEXA Studio	Length	Width	Height	Weight
Body, SxS Module	364 mm - 14.33"	177 mm - 6.97"	163 mm - 6.42"	8.0 kg - 17.6 lb
Body, SxS Module, Camera Center Handle (CCH-1), Optical Viewfinder OVF-1	402 mm - 15.9"	268 mm - 10.55"	241 mm - 9.49"	10.2 kg - 22.5 lb

ALEXA Studio

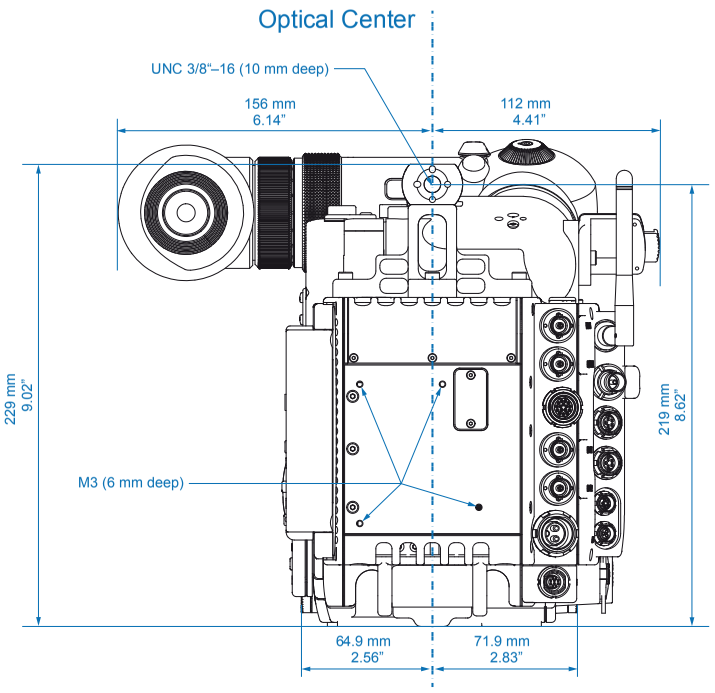
CAMERA DIMENSIONS – **Version 2012-03**

Technical Data are subject to change without notice.

Camera Left

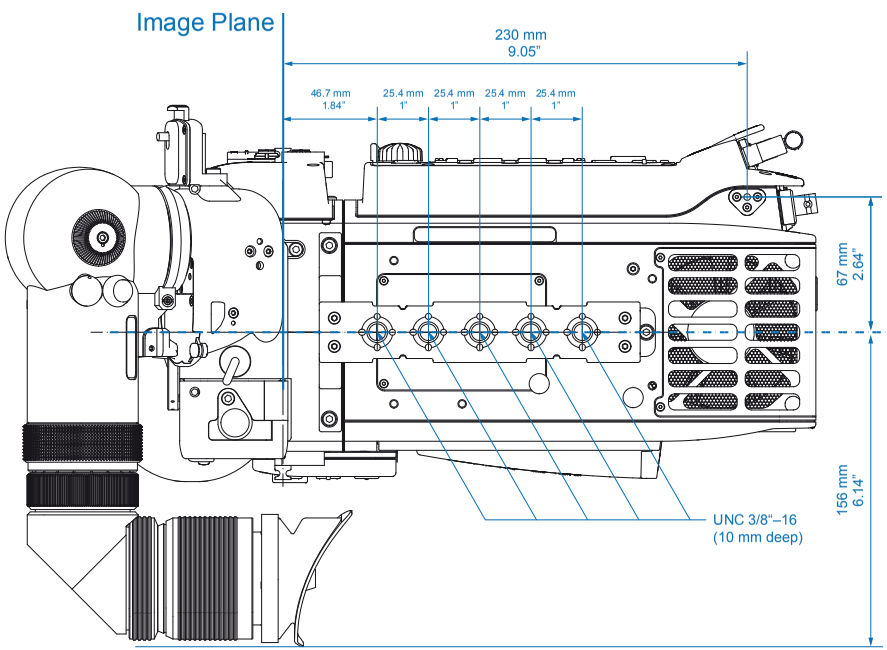


Camera Back

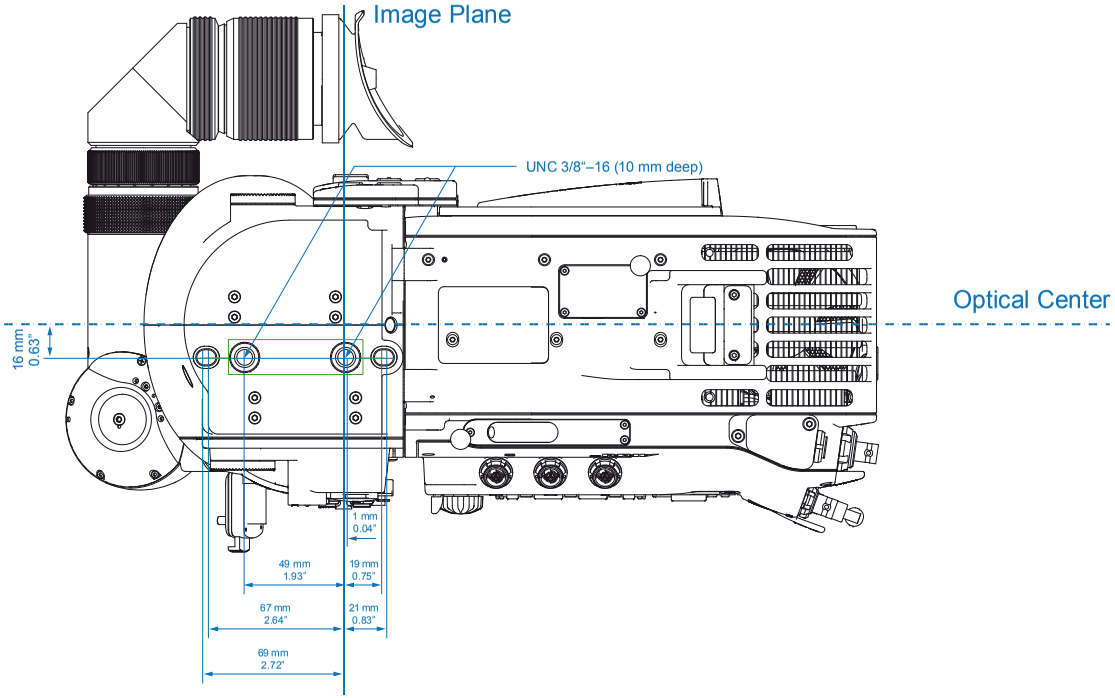


ALEXA Studio

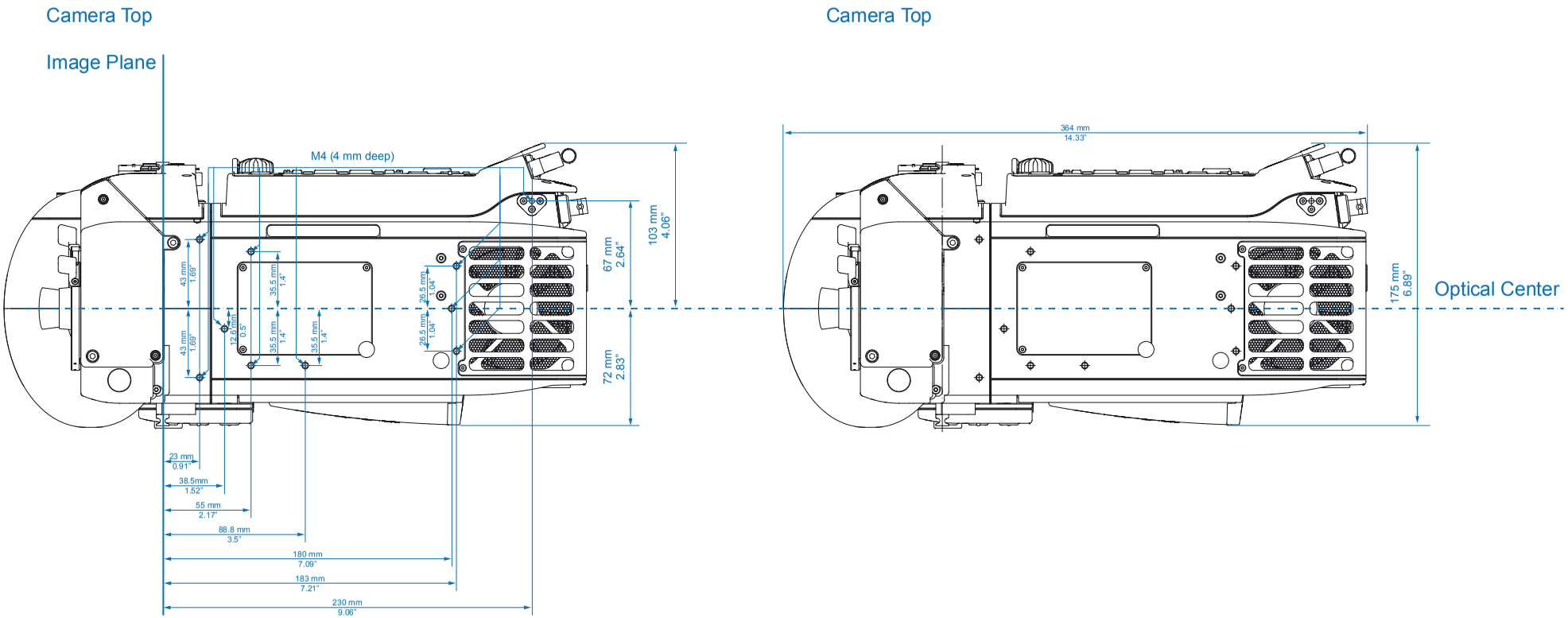
Camera Top



Camera Bottom



ALEXA Studio



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

Quick-option for choosing REC and MON fps

AUDIO

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

Change volume of channel 1 and 2 with jogwheel

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)

Limited to 11.2°-180.0° on ALEXA STUDIO with enabled mirror shutter

Enable mirror shutter on ALEXA Studio

EI

set exposure index (160ASA-3200ASA; 800ASA)
ND FILTER*STUDIO (On/Off)

BACK & JOGWHEEL

press BACK while turning the jogwheel to change the display brightness

continued on next page

HOME

COLOR

SET LOOK
choose/delete/load look from SD
ARRI LCC look loaded by default

set COLORPATH
EVF (LOOK ON/OFF FOR REC709)
MON OUT (LOOK ON/OFF FOR REC709)
SxS, REC OUT } (LOOK ON/OFF FOR REC709)

GAMMA
COLOR > GAMMA >>
SxS (REC709, LOGC)
REC OUT (REC709, LOGC, ARRIRAW)
MON OUT (REC709, LOGC)
EVF (REC709, LOGC)

WB

set WHITEBALANCE (2000K-11000K, Auto WB; 5600K; and CC SHIFT)
add/rename/delete value

MENU

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*HS (ProRes 422 Proxy/422 LT/422/422 HQ)
(DNxHD 115/120/145 or DNxHD 175x/185x/220x)
SxS resolution (HD (1920x1080/2K (2048x1152/1536*4:3))
Dual Recording (On/Off)
Quick format SxS CARD 1/2
Erase SxS CARD 1/2

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
RAW 1.5G DL/RAW 3G SL/RAW 3G DL
or MON OUT clone)
Scan format (psf/p)
Output range (Legal/Extended/Raw)
REC OUT fps sets sensor fps (On/Off)

Options may differ depending on selected sensor mode

continued on next page

***ANAMORPH** = requires Anamorphic Desqueeze License ***DNxHD** = requires DNxHD License ***HS** = requires High Speed License
***PLUS** = ALEXA PLUS only ***PLUS 4:3** = ALEXA PLUS 4:3 only ***STUDIO** = ALEXA STUDIO only ***M** = ALEXA M only

MENU

MONITORING menu

Electronic viewfinder >>
- Brightness (0-5)
- 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 horizon(On/Off)
  - LDS info (On/Off)
- Peaking (Off/On) >>
  - Peaking (On/Off)
  - Peaking level (Low/Medium/High)
- Anamorphic desqueeze*ANAMORPH (Off/1.3x/2.0x/2.0xmag)
- Zoom position (Centered/Eye level)

MON OUT >>
- Framerate (23.976/24/25/29.97/30fps)
- Scanformat (psf/p)
- 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 horizon (On/Off)
  - LDS info (On/Off)
  - Show reel + clip number (On/Off)
  - Camera index letter (On/Off)
- Peaking (Off/On) >>
  - Peaking (On/Off)
  - Peaking level (Low/Medium/High)
- False color (On/Off)
- Anamorphic desqueeze*ANAMORPH (Off/1.3x/2.0x/2.0xmag)

Frame lines >>
- Frame line 1 (choose/add/delete; Off)
- Frame line 2 (choose/add/delete; Off)
- User rectangles >>
  - User rectangles (Off/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 horizonsensitivity (1x, 2x, 4x, 8x, 16x)
False color index >>

continued on next page

MENU

PROJECT menu

Sensor Mode*STUDIO/M/PLUS 4:3 (16:9/4:3)
SxS resolution (Menu > Recording > SxS Cards)
Codec (Menu > Recording > SxS Cards)
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
- Secne
- Take
- User Info 1/2

SYSTEM menu

Sensor >>
- Sensor mode*STUDIO/M/PLUS 4:3 (16:9/4:3)
- Sensor temperature (Standard/High humidity)
- Mirror image horizontal (On/Off)

Power >>
- BAT1 (Plug) warning (10.0-30.0V; 21.0V)
- BAT2 (Onboard) warning (10.0-30.0V; 12.0V)

External sync >>
- Eye index (L/R)
- Sensor sync (Off/EXT master/EXT slave)
- HD out phase (+/-30 clocks; 0 clocks)
- Send HD sync trigger >
- Settings sync (Off/ETH master/ETH slave)

Test signal >>
- Color bar (On/Off)
- Enable test tone (On/Off)
- Test tone level (0 dB(fs)/-9 dB(fs)/-18 dB(fs))

Display + beeper >>
- Display button brightness (0-8)
- 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 (On/Off)
- Mode (Ad Hoc/Infrastructure)
- SSID (set SSID name)
- Security mode (None/WEP 64)
- Password (set Password)
- IP Address (adjust IP address)
- Subnet (adjust subnet mask address)
- Frequency band (2.4 GHz/5 GHz)
- Channel (1 thru 11)

Only available if WNA-1 connected

continued on next page

***ANAMORPH** = requires Anamor gh Speed License
***PLUS** = ALEXA PLUS only ***PLUS** nly

MENU

Firmware >>
- Select update file >>
- Licensed features >>
  - install/delete licenses; save hardware info

LDS *M

see Lens Data for PLUS/STUDIO on the following pages

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 (On/Off)
  - Active on MON OUT (On/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

USER

USER BUTTON ASSIGNMENT

set Button 1, 2, 3
- None
- MON OUT surround
- MON OUT gamma
- MON OUT look
- 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 look
- 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
- Color bars
- Grab GUI

set Button 4, 5, 6
- None
- MON OUT surround
- MON OUT gamma
- MON OUT look
- MON OUT frame lines
- MON OUT status info
- MON OUT false color
- MON OUT peaking
- MON anam. desqu.*ANAM
- Return in active
- Frame lines color
- Toggle SxS
- Color bars
- Format Card1
- Format Card2
- False color index
- Mirror shutter

***ANAMORPH** = requires Anamorphic Desqueeze License ***DNxHD** = requires DNxHD License ***HS** = requires High Speed License
***PLUS** = ALEXA PLUS only ***PLUS 4:3** = ALEXA PLUS 4:3 only ***STUDIO** = ALEXA STUDIO only ***M** = ALEXA M only

PLAY

SxS PLAYBACK screen

start Playback of last clip *(press wheel or PLAY 2x on operator's side)*
+/- 10%
CLIPLIST
OPTIONS
  PLAY Options >>
  Clip end action (Pause/Loop)
  Show frame lines (On/Off)
  Status info on MON OUT (On/Off)
STEPSIZE (1 frame/1 second)
CIRCLE CLIP

INFO

SYSTEM INFORMATION screen

LIVE INFO
  SAVE TO SD
VERSION
SxS CARDS
SYSTEM
FPS INFO

GRAB

FRAME GRAB TRIGGER

save Framegrab to SD Card

TC

TIMECODE screen

SET TC (SET TO TIME/RESET/MANUAL)
OPTIONS
  Timecode Options >>
  Source (Int TC/Ext LTC)
  Mode (Rec run/Free Run)
  Generator (Regen/Jam Sync)
  User bit source (Internal/LTC in UB)
USERBITS (set Userbits)
PROJECT (Menu > Project)

LOCK

BUTTON LOCK

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

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***PLUS** = ALEXA PLUS only ***PLUS 4:3** = ALEXA PLUS 4:3 only ***STUDIO** = ALEXA STUDIO only ***M** = ALEXA M only

WRS*PLUS/PLUS 4:3 & STUDIO

RADIO

STATUS
Channel: 0
Units: 0
Ready/Off

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

CAM LEVEL

STATUS READOUT FROM SENSORS
Tilt: 0.0°
Roll: 0.0°

CAM LEVEL > RESET
use to reset your null balance

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

Options may differ depending on the lens you're using (LDS/Non-LDS)

IRIS/ZOOM/FOCUS CLM

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

IRIS/ZOOM/FOCUS CLM
set DIRECTION
set TORQUE (only for CLM-3 & 4)
CALIBRATE/CALIBRATE ALL motors

ELECTRONIC VIEWFINDER **EVF-1**

ZOOM

magnify EVF image 2.25x (toggle mode)

EXP

false color exposure check (toggle mode)

continued on next page

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ELECTRONIC VIEWFINDER **EVF-1**

CAM

FPS

set sensor speed (0.75 fps - 60fps /120fps*HS; 24fps)

SHUTTER

set shutter angle (5.0°-358.0°; 172,8°;
in High Speed Mode 5.0°-356.0°)*HS

EI

set exposure index (160ASA - 3200ASA; 800ASA)

WB

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

EVF

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 *STUDIO

VIEW

switch to VIEW-mode (Operator sees an image)
press VEW + GATE for spinning mirror

GATE

switch to GATE-mode (sensor & all video outs "see" an image)
press GATE + VIEW spinning mirror

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