FALSE COLOR CHART

Color	Level	Description
red	99 – 100%	White clipping
yellow	97 – 99%	Just below white clipping/white shoulder
pink	52 – 56%	One stop over medium gray (Caucasian skin)
green	38 – 42%	18% neutral gray
blue	2.5 – 4.0%	Just above black clipping/black slope
purple	0 – 2.5%	Black clipping

HOME

FPS

set sensor speed (0.750 - 200.000fps) 25.000fps
add/delete value; if user switch = fps: define values

SDI
> *link to* MENU > Monitoring > SDI

TC

view timecode
edit/reset/set to time

OPTIONS
Run mode (Rec run, Free run)
Mode (Regen, Preset)
Regen source (LTC in, Media) *set by menu*
Count mode (Non-Dropframe, Dropframe)
TC Offset (+/-100, 0)
TC BNC mode (Off, TC In, TC Out)

PROJECT RATE
> *link to* Menu > Recording > Project Settings
> \> Project rate

SHUTTER

set exposure time/shutter angle
add/delete value

SWITCH UNIT
shift to angle/time display

EI

set exposure index (160 - 3200ASA; 800ASA)
define EI switch values

IRIS
view current iris setting (LDS lens required)

OPTIONS
> Auto iris mode (Center, Integral)
> Auto iris offset (+/- 1/3-9/3 max; 0/3)

LOOK

view look settings

EDIT (press wheel)
add/delete/duplicate/export look file

SET GAMMA
> Rec (LogC, Look)
> SDI (LogC, Look)
> EVF/Monitor (LogC, Look)

LOOK PARAMETER
detailed view of CDL and Video Look Parameter values, can be edited (look should be a copy or custom look!)

WB

set white balance (2.000 - 11.000K; +/-16.0CC)

EDIT (press wheel)
> *add/delete values; define WB switch values*

OPTIONS
> Auto WB mode (Matrix, Center)
> *WB tracking on (switch) position IV*

INFO & SYSTEM STATUS

i

view information on
> Version
> System
> Card A/B
> USB
> Network
> Lens data
> User button

Export logfiles
Export update logfiles
Export user manual

!

view camera status

AUDIO

AUDIO SETUP

Audio recording (On, Off)
Test tone (Off, -9 dBFS, -18 dBFS, -20 dBFS)
MAXIMUM LINE LEVELS
IN A, B, C (+8 dBu, +24 dBu)

Display brightness (1-10; 6)
Display style (Day, Night)
BLUETOOTH
> Power (On, Off)

DEVICE LIST
> *see available/connected devices*

Profile
Talk-back channel
Talk-back monitoring (Off, L, L+R, R)

MENU

RECORDING

ProRes Codec (422 LT, <u>422</u>, 422 HQ, 4444)

Resolution (<u>HD</u>, 2K, 3.2K, 4K UHD)

PROJECT SETTINGS

Project rate (23.976p, 24p, <u>25p</u>, 29.97p, 30p, 48p, 50p, 59.94p, 60p, 50i, 59.94i, 60i)

Next reel count

Camera index

Camera ID prefix

REC BEEPER/TALLY

Rec beeper (<u>Off</u>, Start, Stop, Start + Stop)

Tally front (<u>On</u>, Off)

Tally rear (<u>On</u>, Off)

Prerecord max. duration (1-20s in HD, max. 7.6s in UHD)

MEDIA

Erase CARD A/B

Delete last clip CARD A/B

Prepare USB medium

SETUP

SAVE CURRENT SETUP TO USB
save user setup to USB media

SAVE CURRENT SETUP AS DEFAULT
sets current settings as user defaults

LOAD SETUP FROM USB
load a setup file from USB media

LOAD DEFAULT SETUP
load user defaults

FACTORY RESET
reset camera to ARRI's default settings

USER BUTTONS

User switch (<u>None</u>, Fps, Look, Exp. Time)

Button VF1/2 (<u>Off</u>, EVF Zoom, EVF Frame Lines, EVF Zebra/FC, EVF Gamma, EVF Surround, EVF Peaking, EVF Exp. Tool, EVF Waveform, Monitor Waveform, SDI Frame lines, SDI Zebra/FC, SDI Gamma, SDI Surround, SDI Peaking, SDI Exp. Tool, Select Card, Frame Line Color, Framegrab, Check Last Clip, Flip Monitor, Prerecording, Return In, BT Talk-back, Audio Solo)

CAMERA USER BUTTONS 1-8
same options as VF1/2

WCU Button 1-4
same options as VF1/2

LENS RET
same options as VF1/2

MONITORING 1of2

EVF/MONITOR

Surround view (<u>On</u>, Off)

Zoom position (<u>Centered</u>, Eye level)

PEAKING

Peaking mode (<u>Color</u>, Aperture)

Peaking level (1-20; <u>5</u>)

Peaking offset shift (+/- 5; <u>0</u>)

Color (<u>Red</u>, Green, Blue, Cyan, Magenta, Yellow, Black, White)

SETTINGS

EVF brightness (1-10; <u>6</u>)

Monitor brightness (1-10; <u>6</u>)

Monitor flip mode (<u>Auto</u>, Normal, Flipped)

EVF OVERLAYS

Frame lines (<u>On</u>, Off)

Center mark (Off, Dot, Small Dot, <u>Cross</u>)

Surround mask (Black Line, <u>Colored Line</u>, 25%, 50%, 75% Mask)

Status info (Off, Overlay, <u>Safe</u>)

STATUS COMPONENTS

Info 1/2 (<u>On</u>, Off)

Timecode (<u>On</u>, Off)

Audio (<u>On</u>, Off)

Lens data (On, <u>Off</u>)

MONITOR OVERLAYS

Frame lines (<u>On</u>, Off)

Center mark (Off, Dot, Small Dot, <u>Cross</u>)

Surround mask (Black Line, <u>Colored Line</u>, 25%, 50%, 75% Mask)

Lens data (On, <u>Off</u>)

SDI

SDI format (<u>422 1.5G</u>, 422 3G, 444 3G)

SDI framerate (23.976p, 24p, <u>25p</u>, 29.97p, 30p, 50i, 59.94i, 60i, 23.976psf, 24psf, 25psf, 29.97psf, 30psf)

SDI 1 image (Clean, <u>Processed</u>)

SDI 2 image (<u>Clean</u>, Processed)

SDI PROCESSING

Surround view (<u>On</u>, Off)

Exposure tool (On, <u>Off</u>)

PEAKING

Peaking mode (<u>Color</u>, Aperture)

Peaking level (1-20; <u>5</u>)

Peaking offset shift (+/- 5; <u>0</u>)

Color (<u>Red</u>, Green, Blue, Cyan, Magenta, Yellow, Black, White)

OVERLAYS

Frame lines (<u>On</u>, Off)

Center mark (Off, Dot, Small Dot, <u>Cross</u>)

Surround mask (Black Line, <u>Colored Line</u>, 25%, 50%, 75% Mask)

Status info (Off, Overlay, <u>Safe</u>)

STATUS COMPONENTS

Info 1/2 (<u>On</u>, Off)

Timecode (<u>On</u>, Off)

Audio (<u>On</u>, Off)

Lens data (On, <u>Off</u>)

MONITORING 2of2

FRAME LINES

FRAME LINE

choose frame line

Frame line color (Red, Green, Blue, Cyan, Magenta, Yellow, <u>White</u>)

Frame line intensity (1-4; <u>3</u>)

User rectangles (<u>Off</u>, Rect 1, Rect 2, Rect 1+2)

USER RECTANGLE 1/2

Width (0-999)

Height (0-999)

Offset left (0-999)

Offset top (0-999)

Reset all

EXPOSURE TOOLS

Select EVF/Mon. exp. tool (<u>Zebra</u>, False Color)

Select SDI exposure tool (<u>Zebra</u>, False Color)

ZEBRA SETUP

Zebra mode (High, Mid, <u>High+Mid</u>)

High zebra level (0-100%; <u>99%</u>)

High zebra color (Red, Green, Blue, Cyan, Magenta, Yellow, <u>Black</u>, White)

Mid zebra level (0-100%; <u>54%</u>)

Mid zebra range (0-100%; <u>2%</u>)

Mid zebra color (Red, Green, Blue, Cyan, Magenta, Yellow, Black, <u>White</u>)

EVF waveform (<u>On</u>, Off)

EVF waveform size (<u>Small</u>, Large)

Monitor waveform (On, <u>Off</u>)

Monitor waveform size (<u>Small</u>, Large)

Return in path config (<u>EVF/Mon</u>, SDI, EVF/Mon+SDI)

Color bars (On, <u>Off</u>)

SYSTEM

SENSOR

Image sharpness (0-5; <u>0</u>)

Image detail (0-5; <u>0</u>)

Genlock (<u>Off</u>, Slave, Master)

Mirror image (<u>Off</u>, V, H, V+H)

Sensor temperature (Normal)

Fan mode (Regular, Rec low, <u>Low noise</u>)

POWER

Bat onboard (BAT1) warning (9.0-36.0V; <u>13.5V</u>)

Bat onboard (BAT1) warning (0-99%; <u>10%</u>)

Bat in (BAT2) warning (9.0-36.0V; <u>22.0V</u>)

Bat unit preference (Volt, <u>Percent</u>)

SYSTEM TIME + DATE

Year

Month

Day

Hour

Minute

Timezone (info)

Daylight saving time (info) (<u>On</u>, Off)

BUTTONS + DISPLAY

Display style (<u>Day</u>, Night)

Button brightness (1-3; <u>1</u>)

LOCK CONFIG

CAMERA BUTTONS + SWITCHES

Select all/none (On, <u>Off</u>)

ND filter switch (<u>On</u>, Off)

US switch (<u>On</u>, Off)

EI switch (<u>On</u>, Off)

WB switch (<u>On</u>, Off)

AW button (<u>On</u>, Off)

REC button (On, <u>Off</u>)

User buttons 1-8 (<u>On</u>, Off)

EVF BUTTONS

Select all/none (On, <u>Off</u>)

REC button (On, <u>Off</u>)

PLAY button (<u>On</u>, Off)

EXP button (<u>On</u>, Off)

PEAK button (<u>On</u>, Off)

VF1/2 button (<u>On</u>, Off)

[M] button (On, <u>Off</u>)

Monitor buttons + wheel (<u>On</u>, Off)

LENS BUTTONS

Select all/none (On, <u>Off</u>)

RET button (On, <u>Off</u>)

VTR button (On, <u>Off</u>)

LICENSED FEATURES
add/delete license

FEATURES
view enabled features

HW INFO
export hardware info file to USB media

CAMERA UPDATE
commit firmware update via SUP package on USB media

AMIRA
Software Update Packet 2.0

U S E R   M A N U A L

Date: 31 March 2015

Imprint

Copyright

For further assistance

Arnold & Richter Cine Technik GmbH & Co. Betriebs KG
Tuerkenstr. 89
D-80799 Munich, Germany

E-mail: service@arri.com
www.arri.com/service

Document revision history

Version	ID	Release	Date
1.0	10000464	K08608	12 September 2014
1.1	10000464	K08658	19 December 2014
2.0	10000464	K08781	31 March 2015

Contents

1   For your safety / 为了您的安全

Before use, please ensure that all users comprehensively read, understand, and follow the instructions in this document. / 使用前，请确保所有的用户都已经阅读、理解，并遵循本文档内的操作说明。

1.1   Risk levels and alert symbols / 危险级别和警示标志

Safety warnings, safety alert symbols, and signal words in these instructions indicate different risk levels:

> ## ⚠ DANGER!
>
> *DANGER* indicates an imminent hazardous situation which, if not avoided, **will result in** death or serious injury.

> ## ⚠ WARNING!
>
> *WARNING* indicates a potentially hazardous situation which, if not avoided, **may result in** death or serious injury.

> ## ⚠ CAUTION!
>
> *CAUTION* indicates a potentially hazardous situation which, if not avoided, **may result in** minor or moderate injury.

> ## *NOTICE*
>
> *NOTICE* explains practices not related to physical injury. No safety alert symbol appears with this signal word.

Note: Provides additional information to clarify or simplify a procedure.

本文档内的安全警告、安全警示标志和标识词语指示不同的危险级别：

> ## ⚠ 危险
>
> 危险表示危急、有危害的情景，若不防范，则会导致死亡或严重的伤害。

> ## ⚠ 警告
>
> 警告表示有潜在危害的情景，若不防范，则可能会导致死亡或严重的伤害。

> ## ⚠ 小心
>
> 小心表示有潜在危害的情景，若不防范，则可能会导致中等或较轻的伤害。

> ## 提示
>
> 注意表示此行为不会导致人身伤害。因此此标识词语中不含警告标志。

注：注意中会提供用于解释或简化工作的额外信息。

1.2   **Vital precautions /** 重要安全措施

⚠ DANGER!
High voltage! Risk of electric shock and fire!
Short-circuits may entail lethal damage!
Before use, read and follow all valid instructions.
Use solely and exclusively as described in the instructions.
Never open. Never insert objects.
For operation, always use a power source as indicated in the instructions.
Always unplug the power cable by gripping the power plug, not the cable.
Never try to repair. All repair work should be done by a qualified ARRI Service Center.
Never remove or deactivate any safety equipment (incl. warning stickers or paint-marked screws).
Always protect from moisture, cold, heat, dirt, vibration, shock, or aggressive substances.
Never cover any fan openings.

⚠ 危险
高电压！有触电或起火风险！
短路将引起致命危险。
使用之前，请仔细阅读所有未过期的使用说明，并严格遵循。
切勿打开机身。切入插入任何物体。
操作时，请务必使用说明中指出的电源。
断开电源时请握住电源插头，而不是电线。
切勿尝试自行维修。所有的维修工作必须由具备资质的ARRI 维修中心进行。
切勿移除或毁坏任何安全设施（例如警告贴纸或涂漆标示的螺丝）。
务必避免潮湿、寒冷、炎热、多尘、震动、冲击或严酷的使用环境。
切勿覆盖任何风扇开口。

> ### ⚠ CAUTION!
>
> **Condensation! Risk of electric shock and fire!**
>
> Condensation may form on the sensor and electrical connections when exposing the camera to sudden changes of temperature or humidity!
>
> To avoid injury and damage, never operate the camera when condensation occurs.
>
> ### ⚠ 小心
>
> **冷凝！有触电或火灾风险！**
>
> 当将摄影机暴露于温度或湿度迅速变化的环境中时，影像传感器和电子部件连接处可能会产 为了您的安全 6 生的冷凝。
>
> 为了避免受伤或设备损坏，在冷凝发生时切勿操作摄影机。

> ### ⚠ CAUTION!
>
> **Heavy weight! Risk of injury and damage!**
>
> If placed on an unstable surface, the camera can fall and cause serious harm!
>
> Always place the camera on proper support devices. Safely attach it as described in the instructions.
>
> ### ⚠ 小心
>
> **设备重量较大！有受伤或设备损坏风险！**
>
> 若安置于不稳定的位置，则摄影机可能会掉落，并造成严重的伤害。
>
> 务必将摄影机安装于适当的支撑设备上。请按照说明中所描述的方法来安全地安装摄影机。

1.3   General precautions / 般安全措施

> ### NOTICE
>
> Even rugged cameras use components sensitive to improper use.
>
> Always unplug the camera from power sources before making changes to the setup or system (in particular: changing cables).
>
> Direct sunlight can result in camera housing temperatures above 60 °C (140 °F). At ambient temperatures above 25 °C (77 °F), protect the camera from direct sunlight.
>
> Protect the optical system and sensor: Never point the camera or viewfinder into direct sunlight.
>
> Avoid permanent sensor damage: Never let any direct light or reflections from high-energy light sources (e.g. laser beams) enter the camera's optical path.
>
> Protect the sensor: Always keep a lens or protective cap on the empty lens mount. Change lenses in dry, dust-free environments only.
>
> Always clean the sensor cover glass according to ARRI instructions.
>
> Only use the tools, materials and procedures recommended in this document. For the correct use of other equipment, see the manufacturer's instructions.

提示
即使本摄影机非常坚固，也是由敏感的组件所组成的，请谨慎使用。 当改变摄影机安装支撑设备或系统时（特别是更换电缆），请务必断开摄影机电源。 注意保护光学系统和影像传感器：切勿将摄影机或取景器直接面朝直射阳光。 避免对影像传感器造成永久性伤害：切勿让任何来自高能量光源（例如激光）的直射光或反 射光进入摄影机的光路系统。 注意保护影像影像传感器：空镜头卡口上务必安装镜头或保护盖。更换镜头时，务必在干燥、 无尘的环境中进行。 清洁影像传感器保护玻璃时，务必遵守ARRI说明书中描述的方法。 仅使用本文档中建议使用的工具、材料和操作方法。若要正确地使用其他设备，请参阅其制 造商的说明书。

2   Audience and intended use

NOTICE

The product is solely and exclusively available for commercial costumers and shall be used by skilled personnel only. Every user should be trained according to ARRI guidelines.

Use the product only for the purpose described in this document. Always follow the valid instructions and system requirements for all equipment involved.

The AMIRA is a 35 mm digital camera solely and exclusively for recording HD 1080, 2K, 3.2K or 4K UHD images suitable for a variety of distribution formats:

- ProRes 422, ProRes 422 LT, ProRes 422 HQ* and ProRes 4444* codecs
- REC 709 encoding (through use of look files) or Log C* encoding
- CFast 2.0 card recording
- Up to 200 fps* in HD/2K with full image quality
- 35 mm CMOS sensor
- EVF with OLED eyepiece
- Fold-away monitor for both live view and user interface access
- Ready out-of-the-box for single-user-centric workflow
- Slim, ruggedly built for high mobility

* Feature requires licensing.

3 Scope of delivery and warranty

> **NOTICE**
>
> Product and packaging contain recyclable materials. Always store, ship, and dispose of according to local regulations.
>
> ARRI is not liable for consequences from inadequate storage, shipment or disposal.

Delivery

On delivery, please check if package and content are intact. Never accept a damaged/ incomplete delivery. A complete delivery includes:

- AMIRA camera with lens mount according to order: PL, EF, B4
- Multi-viewfinder with AMIRA EVF cable
- Gold Mount or V-Lock battery adapter (if ordered)
- Camera handle with viewfinder adapter
- Four XLR connector caps (one spare; keep all four for later use!)
- Four BNC connector caps (remove before use)
- WPA-1 or BPA-3 base adapter (if ordered)
- WiFi antenna
- Bluetooth antenna
- USB memory stick
- 3 mm Allen key
- Quick Guide
- Original packaging incl. drying agent

Usually, the camera comes fully assembled. In the unlikely case that a handle, viewfinder, adapter, or antenna (etc.) is not assembled, see page 157 for instructions.

> **NOTICE**
>
> ARRI offers an increasing variety of product bundles and additional accessories.
>
> For details, please consult our website or your local ARRI Service Partner.

Warranty

For scope of warranty, please ask your local ARRI Service Partner. ARRI is not liable for consequences from inadequate shipment, improper use, or third-party products.

3.1 New features and changes in SUP 2.0

This list is valid for cameras upgraded from SUP 1.1. to SUP 2.0. See previous user manuals for a list of previous new features and changes.

New features

- 4K UHD and 3.2K recording, see page 106
- Denoising in 4K UHD, see page 131
- 6G SDI in 4K UHD mode, see page 121
- Audio monitor soloing of recording channels, see page 140
- Configurable camera locking, see page 134
- FPS switching during activated prerecording
- Sharpness/Detail parameters displayed in EVF during editing
- LDS status info bank on monitor status bottom
- User button function info screen

**Changes / Bugfixes**

- LDS: Iris overlay in top status info section
- Status info icons have reduced color scheme.
- UI: Menu items having On/Off as options have been exchanged for checkboxes. This speeds up de-/activation. Simply press the whell when the item is selected to toggle the state. A checkmark in the box means "On", an empty box means "Off".
- Zebra setup is now global for all paths.

4 Camera layout

Right
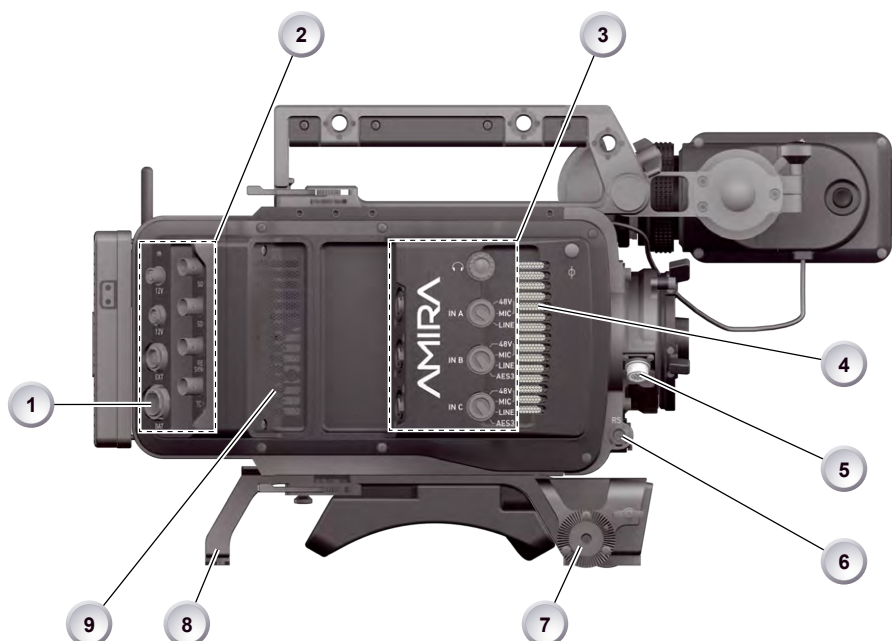
1	BAT power input	**6**	RS connector
2	I/O panel	**7**	Bracket rosette
3	Audio connector panel	**8**	WPA-1 with quick release connectors
4	Fan intake	**9**	Fan outlet
5	12-pin Hirose for ENG type lenses		

Left
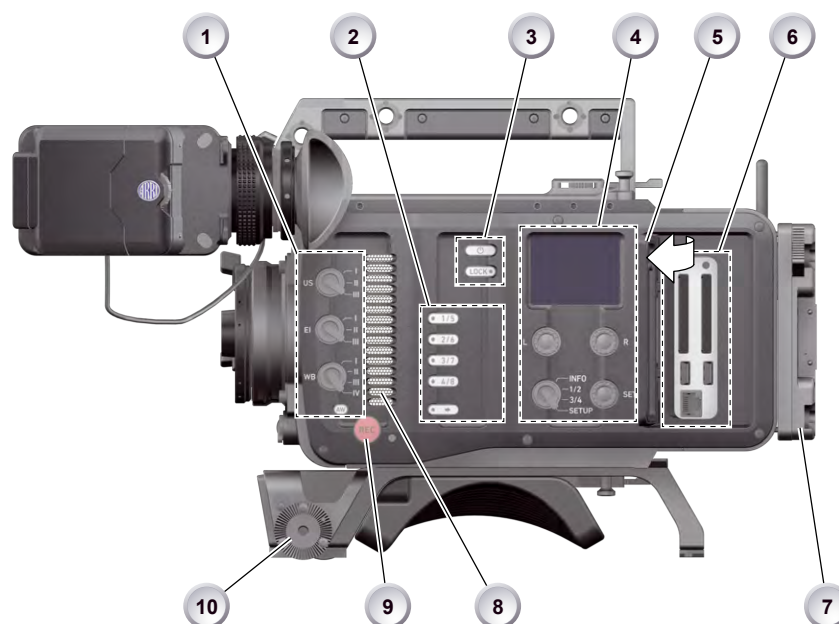
1	Operator panel	**6**	Media panel (behind lid)
2	User buttons	**7**	Battery adapter
3	Power button & camera lock	**8**	Fan intake
4	Audio control panel	**9**	Recording button
5	Lid	**10**	Bracket rosette

Top
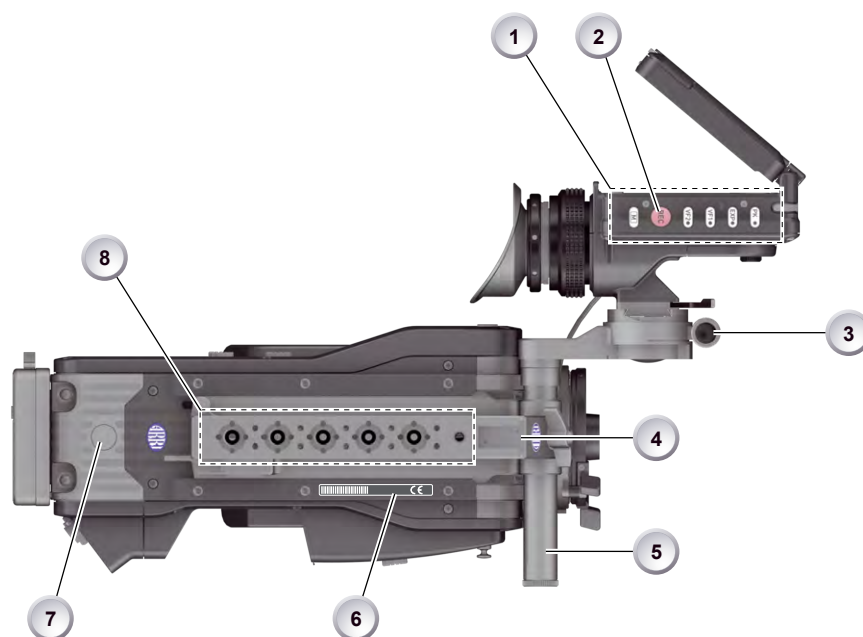
1	Viewfinder top buttons	**5**	Adjustable beam
2	Recording button	**6**	Camera type label
3	Viewfinder hinge with clamp	**7**	Level
4	Accessory shoe	**8**	Accessory threads on camera handle

Bottom
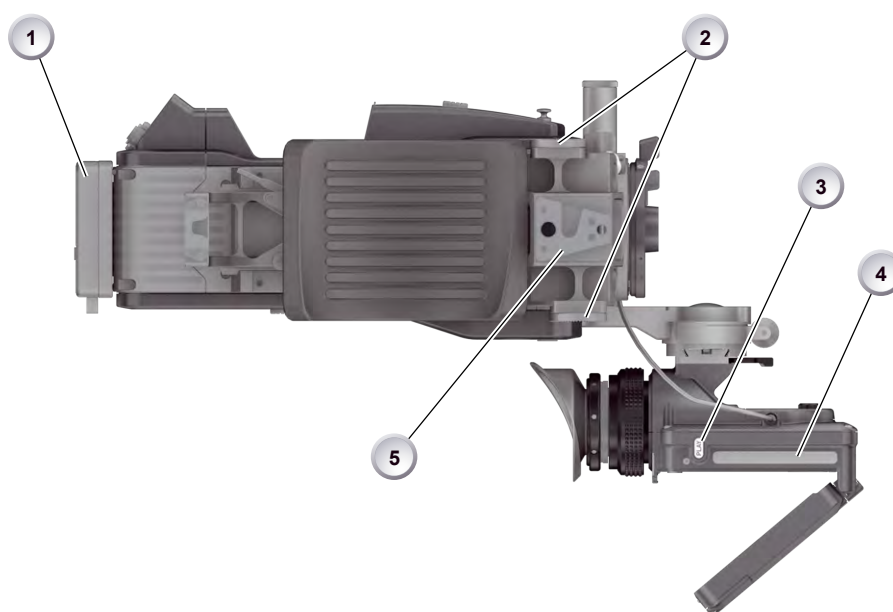
1	Battery adapter	**4**	Viewfinder type label
2	Bracket rosettes	**5**	WPA-1 quick-lock bracket
3	PLAY button		

Front
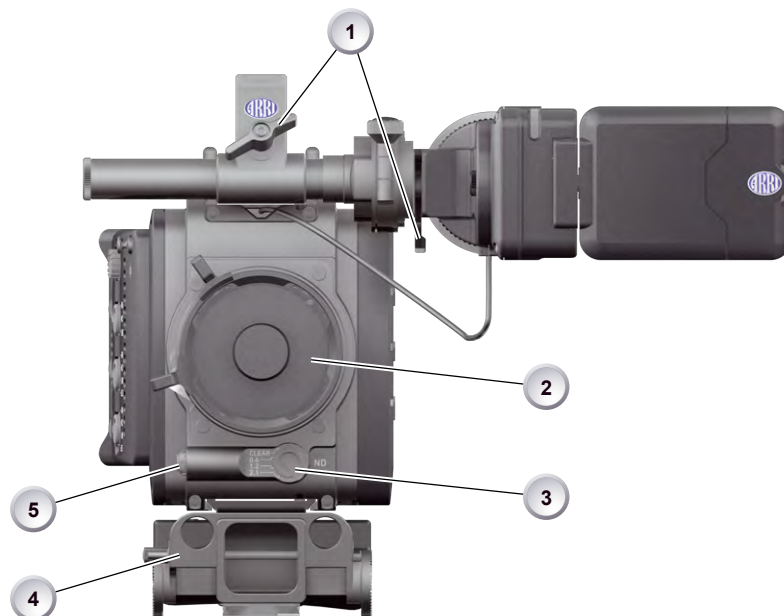
1 Clamps   **4** 15 mm rod receptacles
2 Lens mount (here: PL)   **5** RS connector
3 ND filter switch

Back
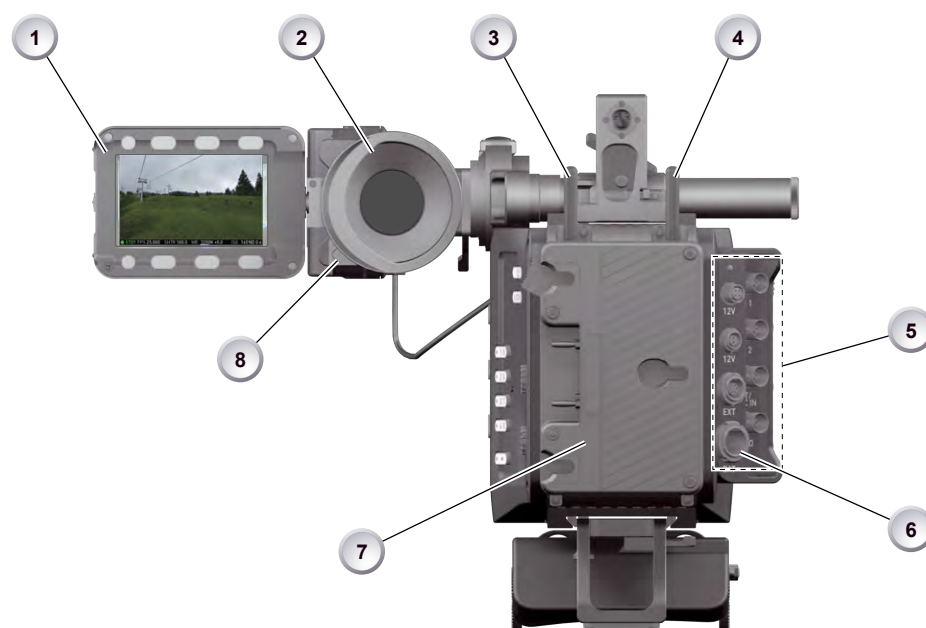
1 Fold-away monitor (viewfinder/GUI)   **5** I/O panel
2 OLED eyepiece   **6** BAT power input
3 Bluetooth antenna   **7** Battery adapter (here: Gold Mount)
4 WiFi antenna   **8** Proximity sensor for OLED eyepiece

4.1   Product identification

CE type labels with serial number are on the camera top (1) and under the viewfinder (2). An FCC conformity label is on the camera bottom.

5   Power supply

Depending on your battery demand, the camera offers either a Gold Mount or a V-Lock adapter. You can change both by yourself (see page 157). For further details, see our website or ask your local ARRI Service Partner.

NOTICE
For maximum operation time, always use fully charged batteries with 10.5 to 34 V DC (50 W minimum).

5.1   Changing a Gold Mount battery
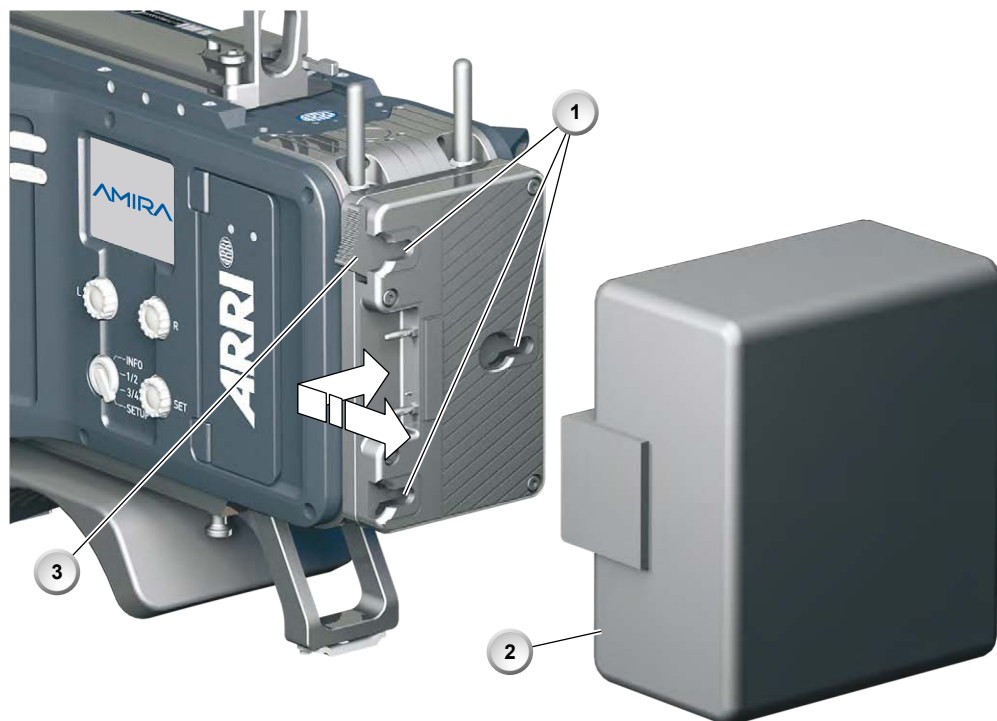
1. Place the battery pins in the mount receptors (1).
2. Slide the battery (2) to the right until the adapter audibly locks (1).
3. **To release:** With the lever pushed (3), slide the battery (2) to the left and backwards.

5.2   Changing a V-Lock battery

1. Place the battery's wedge into the V-shaped lock (1).
2. Slide the battery (2) downwards until the adapter audibly locks (1).
3. **To release:** With the pin pushed (3), slide the battery (2) up- and backwards.

5.3   BAT in

> **NOTICE**
>
> If the power supply to BAT is interrupted with the camera switched on, the camera will automatically repower and boot-up on reconnection.

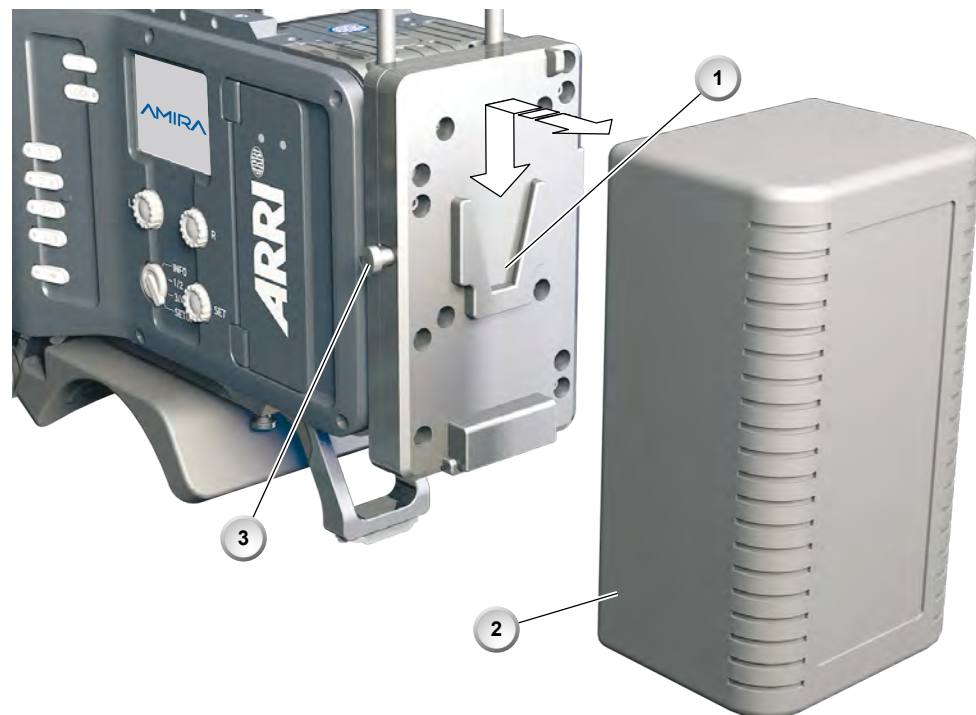 Use the BAT connector, and a KC50-S or KC50-SP-S cable, to supply the camera with 10.5 to 34 V DC.

5.4   Powering auxiliary devices via camera

You can supply auxiliary devices from the camera via several connectors (2.0 A max):

- **12 V** via 2-pin LEMO, 4-pin Hirose, or via D-tap on battery adapter
- **24 V** via RS
- **Camera voltage** via EXT

Note: For connector pin-out information, see appendix. With a critical power supply level, the camera switches off all auxiliary power supplies first.

6   Switching on/off

1. **To switch on:** Press the power button (1).

2. The ARRI and AMIRA logos appear in the audio display (2) and monitor (3).

3. **To switch off:** Press and hold the power button (1).

4. A countdown appears in the audio display, monitor, and viewfinder.

5. On reaching zero, the camera powers off.

6. **Note:** The *STBY* icon (1) signals that the camera is ready to record.

7. If not: Insert a CFast 2.0 card. See page 153.

8. Format the card for recording.

7 Connectors

NOTICE

Connecting or disconnecting devices or cables while recording can disturb the audio/image signal due to static electricity.

7.1 Front connectors

1 12-pin Hirose for ENG type lenses
2 3-pin Fischer RS
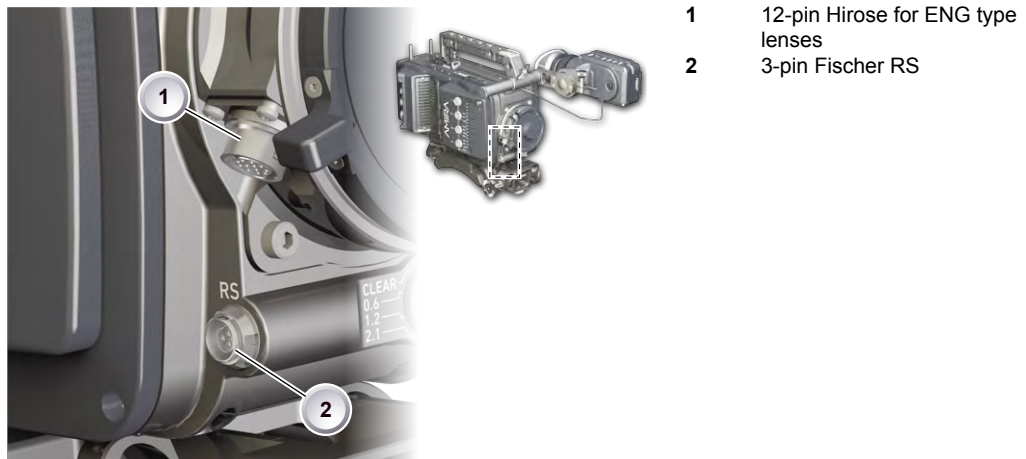
ENG (12-pin Hirose)

Supplies lens servos with power and provides access to lens servo functions.

RS (3-pin Fischer)

This 3-pin Fischer socket for RS input supplies external accessories with 24 V power (2.0 A). It also carries a frame pulse output and accepts an ARRI remote start/stop trigger.

7.2   Audio connector panel

NOTICE
Rubber caps protect the XLR connectors from dirt and moisture. Always cap unused XLR connectors.

1   Protective caps
2   Headphone out & volume
3   XLR 5-pin audio input
4-5   XLR 3-pin audio input
6   Preset options
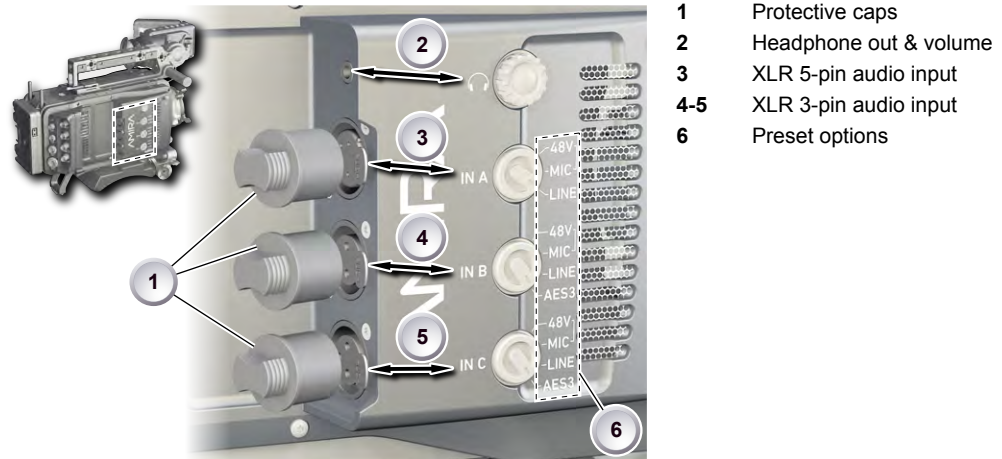
Headphone

Headphone 3.5mm stereo TRS ("Mini-jack") output for monitoring audio channels.

IN A (5-pin XLR)

XLR input for microphone signals (including 48V phantom power supply) and line level signals.

IN B & C (3-pin XLR)

XLR input for microphone signals (including 48V phantom power supply), line level signals and AES3 digital.

Connecting audio devices

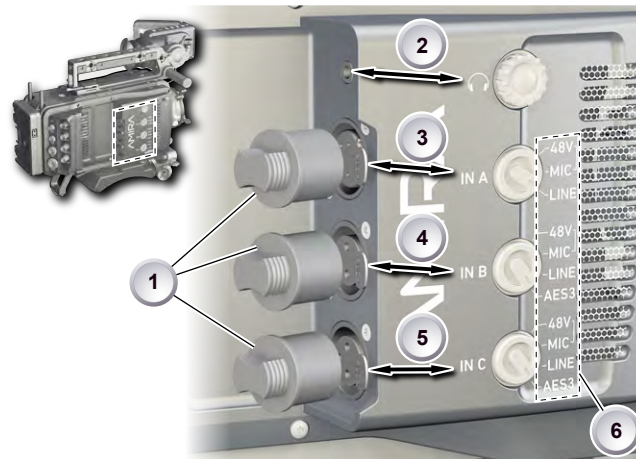

1. Uncap the needed connectors only (1).
2. Connect the headphone (2).
3. Set the headphone volume by turning the wheel (2).
4. Alternatively, you can use the *SET* wheel on the camera's left. See page 38.
5. Via switches (3 to 5), select the appropriate setting for your audio device (6):
   - *48V:* Analog microphone level signals with phantom power supply
   - *MIC:* Analog microphone level signals
   - *LINE:* Analog line level signals
   - *AES3:* Digital AES/EBU signals
6. Connect each device (3 to 5) until the connector audibly locks.
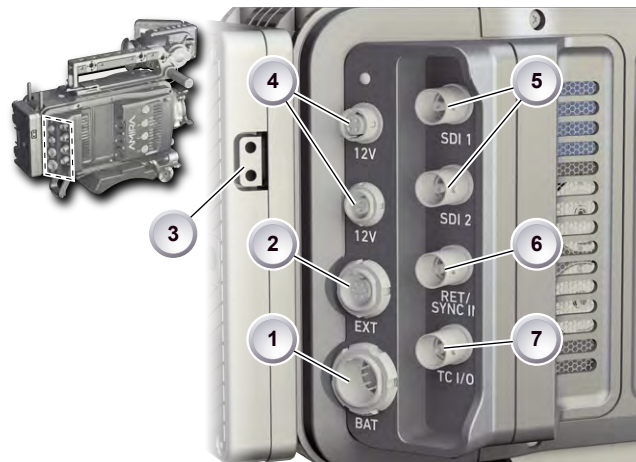
Disconnecting audio devices
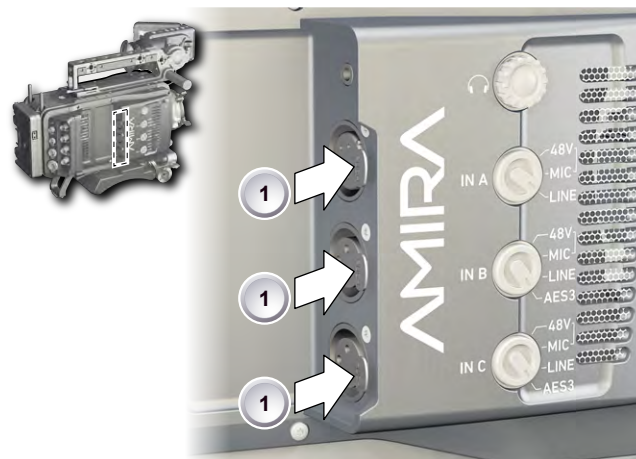
1. Press the *PUSH* button to unlock (1).
2. Remove the cable by pulling on the connector.
3. Replace with another cable.
4. Or: Cap the connector for protection.

7.3   I/O panel

> ### NOTICE
>
> If the power supply to BAT is interrupted with the camera switched on, the camera will automatically repower and boot-up on reconnection.

1	BAT main power in
2	EXT in/out
3	D-tap
4	Aux power out
5	HD-SDI image out 1 & 2
6	Return/sync in
7	Timecode in/out

12V (4-pin Hirose)
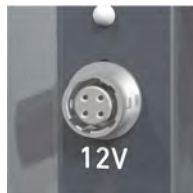
Supplies 12 V auxiliary power with a maximum power of 2.0 A (combined with the 2-pin LEMO).

12V (2-pin LEMO)

Supplies 12 V auxiliary power with a maximum power of 2.0 A (combined with the 4-pin Hirose).

D-tap

A D-tap on the battery adapter supplies accessories with 12 V DC from the camera.

EXT (6-pin LEMO)

A connector for external accessories, carrying two CAN buses and accessory power output at camera voltage level (2.0 A max.).

BAT (8-pin LEMO)

Via cables KC50-S (2 m, straight) and KC50-SP-S (coiled), this main power supply input accepts 10.5 to 34 V DC.
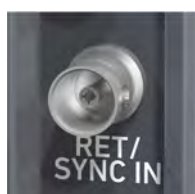
SDI OUT 1 & 2 (BNC)

Both BNC sockets (here: SDI 1) deliver image outputs in 1920x1080 422 1.5G, 422 3G and 444 3G single link formats.

RET/SYNC IN (BNC)

A BNC socket for Genlock input, or HD-SDI return image signal (configurable). Supports Black Burst, Tri-Level Sync and HD-SDI genlock signals.

You can feed HD-SDI return signals from another image source to the camera RET connector. The signal must be a 1920x1080 422 1.5G SL according to SMPTE 274M and 292M. Via the camera menu, you can set the output routing of the RET in signal.
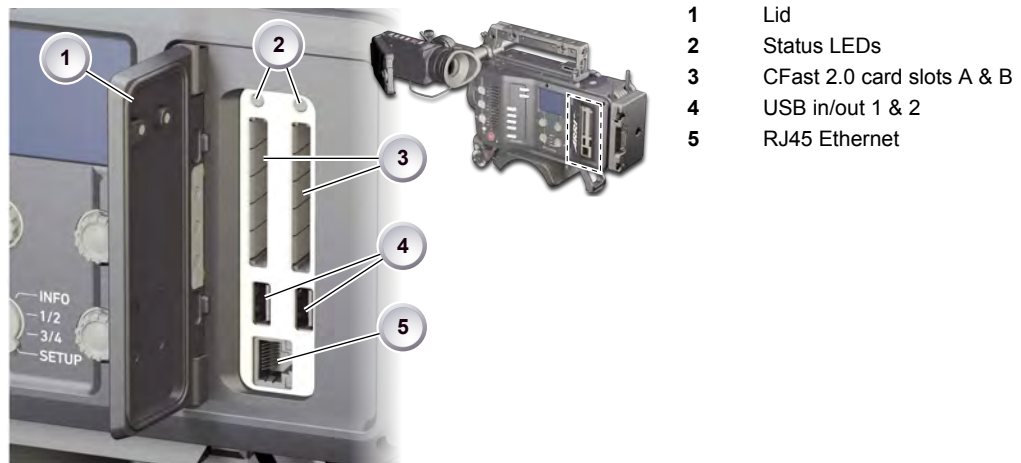
TC I/O (BNC)

A Timecode in-/output (BNC interface) to be configured via camera menu.

- For external TC feeds to the camera. **Note:** Always use Genlock together with Timecode to prevent TC drifts
- For camera TC feeds to other devices.

7.4   Media panel

1	Lid
2	Status LEDs
3	CFast 2.0 card slots A & B
4	USB in/out 1 & 2
5	RJ45 Ethernet

Card A & B (CFast 2.0)

Storage media slots for CFast 2.0 recording cards.

USB 1 & 2

Interface for USB memory sticks with FAT file system. Can also be used to charge USB devices.

Note: Only one USB memory stick can be used at a time. Independent from slot, the stick connected first becomes active. Meanwhile, the second slot can still be used to charge a device.

Ethernet LAN

This RJ45 remote and service interface works via LAN.

7.4.1 Preparing a USB memory stick

USB memory sticks for the AMIRA must have a specific folder structure which can be created with the camera.
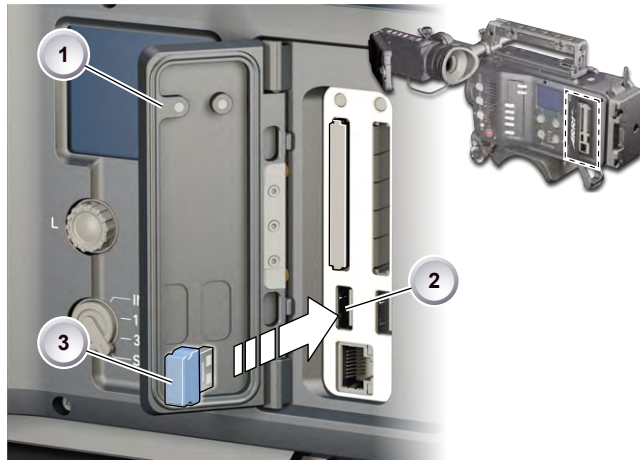
1. To prepare a USB memory stick: Open the media lid (1).
2. Connect a FAT-formatted USB stick (3) to the camera (2).
3. **Note:** To avoid file corruption, never remove the USB stick during write access.
4. Via jogwheel, open *MENU > Media > Prepare USB medium*.

7.4.2   Changing a CFast 2.0 card

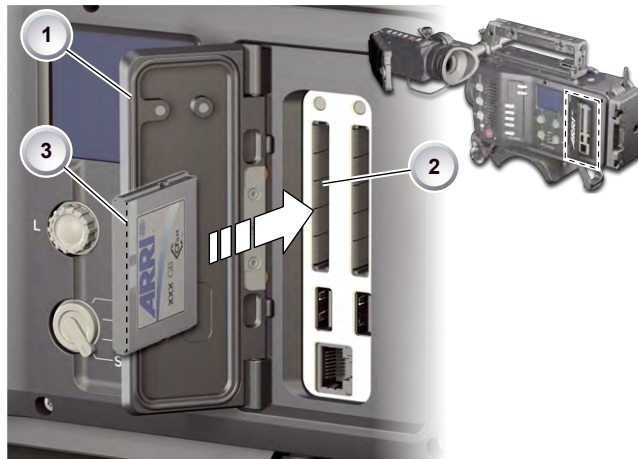| *NOTICE* |
|---|
| Avoid damage to the contacts of both camera and card. Always insert cards as described in this document.

Never change memory cards when recording - this may damage the recorded clip. |

1.   Open the lid (1).

2.   Align the card's positive edge (3) facing the camera rear.

3.   With the contact pins first, gently insert the card, until it audibly locks (2).

4.   Gently close the lid (1). **Never** force it closed on an unlocked card.

5.   To quickly change the active card you can set up a user button. See page 147.

6.   **For card removal:** Open the lid (1).

7.   Push the card in until it audibly unlocks (2).

8.   Remove the card.

8   Lens mount/filters
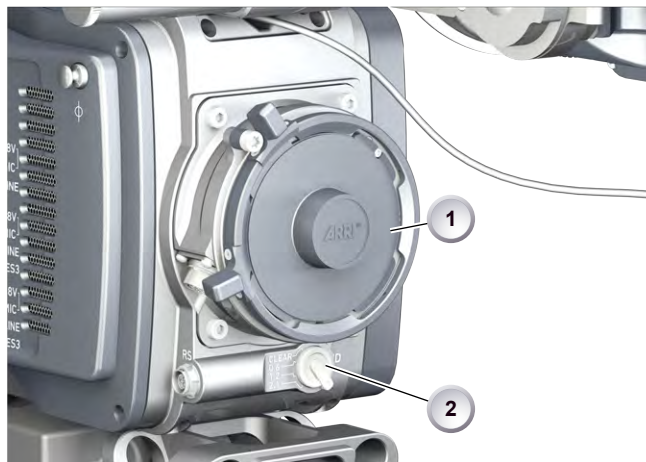
1   Lens mount (here: PL)
2   ND filter switch (clear - 0.6 - 1.2 - 2.1)

8.1   *ND* filter switch
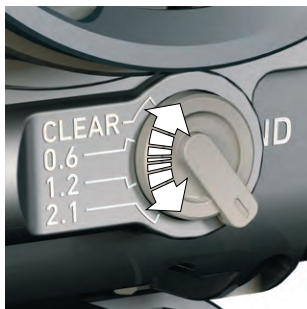
The ND filter switch controls the internal ND filter module. Filter densities of 0.6, 1.2 and 2.1 allow quick exposure changes and compensation over a range of seven stops.

1.   To activate a filter: Switch to the desired filter position.

8.2   Changing a lens

NOTICE
Protect the sensor: Always keep a lens or protective cap on the empty lens mount.
Change lenses in dry, dust-free environments only.
Never exceed the maximum lens dimensions.
Have every lens properly shimmed as prescribed by the manufacturer.

Note: Please use a lens support system for EF lenses above 2 kg/4.4 lbs.
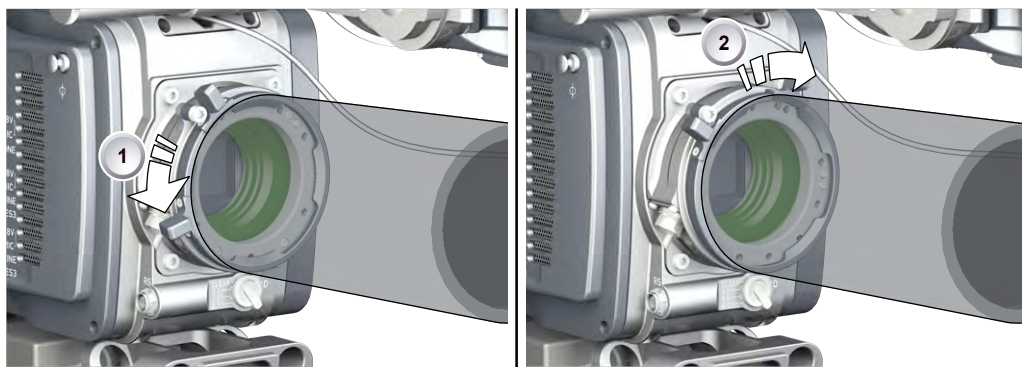
PL mount

1. Observe maximum lens dimensions.
2. Unlock the lens mount counter-clockwise (1) and remove the lens or cap.
3. **Never** touch the sensor.
4. Either: Mount the next lens and lock (2) the lens mount clockwise.
5. Or: Always cap and lock (2) an empty lens mount clockwise.

EF mount
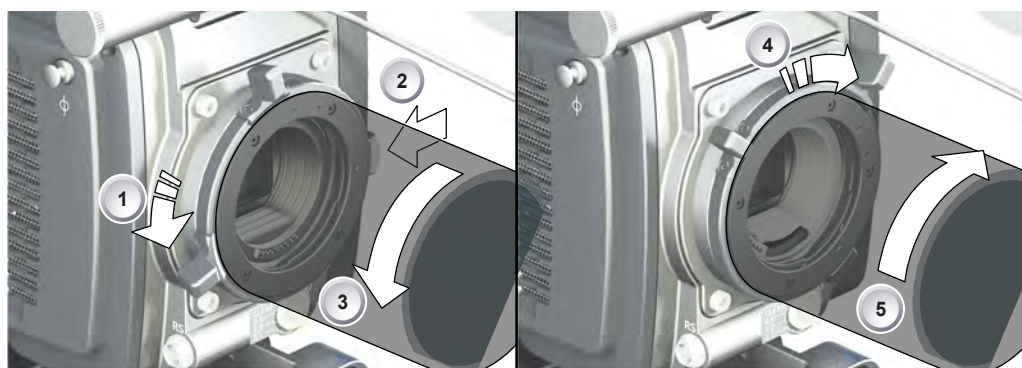
1. Observe maximum lens dimensions.
2. Turn the lever counter-clockwise (1) to unlock the mount.
3. Either: Unscrew the cap.
4. Or: Press and hold the button (2) to unlock the lens.
5. Counter-clockwise, unscrew the lens (3).
6. **Never** touch the sensor.
7. Either: Mount the next lens:

- ○ Align the dots of both lens and lens mount.

- ○ Push the lens into the mount.

- ○ Turn the lens clockwise (5) until the bayonet locks.

- ○ Turn the lever clockwise (4) to tighten the lens to the lens mount.

8. Or: Always cap the empty lens mount.

8.3 Lens control

Control of lens iris is possible with ENG PL mount and EF lenses. You can control the iris manually, via user button, or via auto iris.

8.3.1 Manual iris adjustment

HOME > EI > IRIS
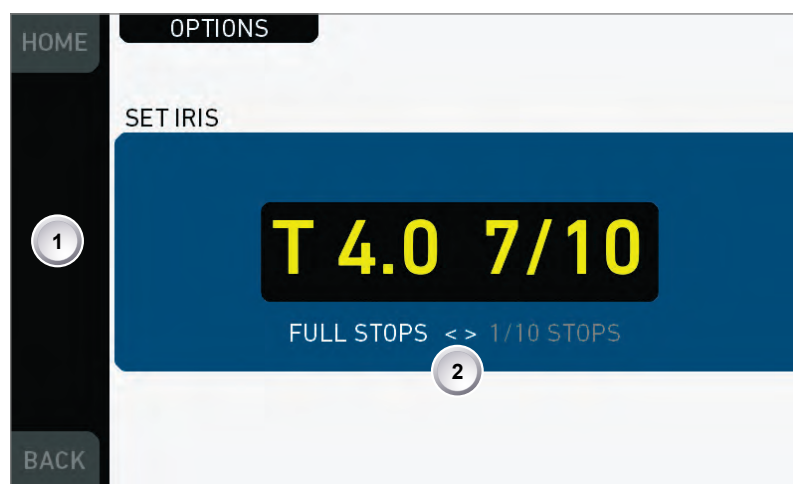
Pressing the wheel (1) changes the step size between full and sub-stops (2). **Note:** Sub-stop precision depends on the lens type and is automatically set by the camera.

On the live screen, you can activate and deactivate iris adjustment (1) by short-pressing the lower round (not oval!) button (2). Keeping the button pressed (2) activates iris adjustment until it is released. (2). **Note:** Depending on the image flip, the round buttons may appear on the right.

Pressing the wheel (1) changes the step size between full and sub-stops (2). **Note:** Sub-stop precision depends on the lens type and is automatically set by the camera.
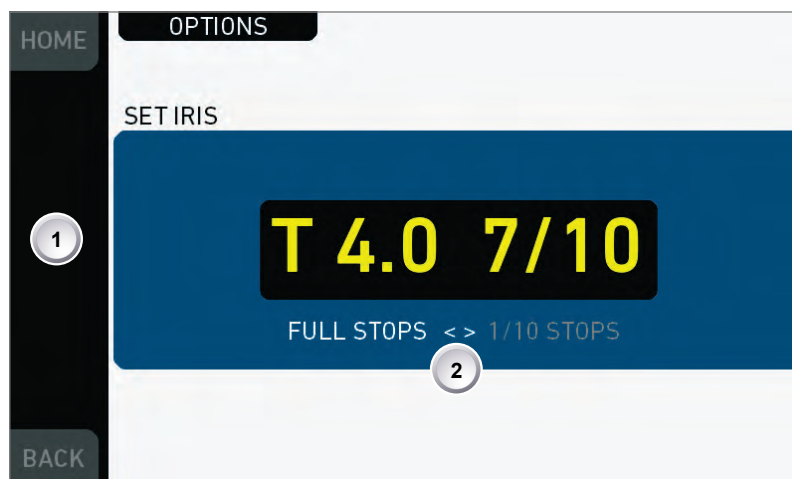
8.3.2   Iris control via user button

MENU > User button > Button X

For iris control, assign one user button each with *Open Iris* and *Close Iris.* See page 140.

8.3.3   Auto iris

HOME > EI > IRIS > OPTIONS

HOME	OPTIONS	
1 I R I S	Auto iris mode	Integral
	Auto iris offset	2/3
BACK		
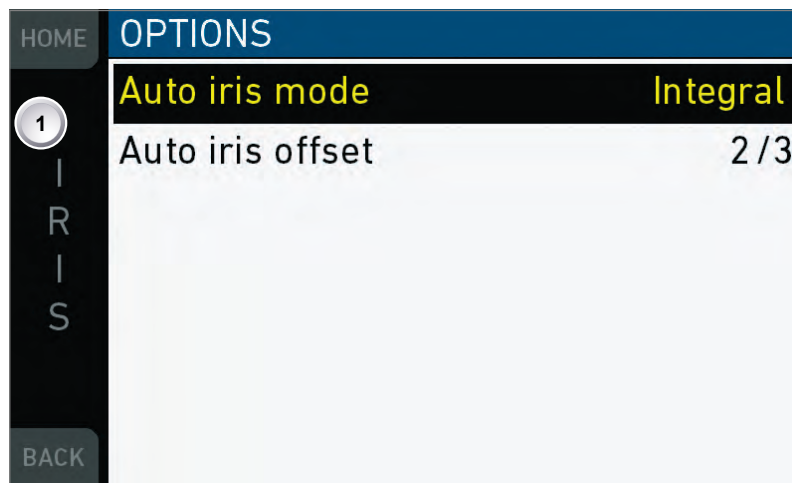
Via jogwheel (1), you can define the auto iris behavior.

Auto iris mode: Defines the iris calculation:

- *Integral:* Iris is calculated based on full image content.
- *Center:* Iris is calculated with higher priority on image center.

Auto iris offset: Corrects the auto iris calculation result by up to +/- 3 stops in 1/3 stop step sizes. Activate via user button.

9   Audio control panel

1	Audio function switch
2	Audio display
3	Left/right gain controls
4	Audio *SET* jogwheel

9.1   Channel configuration

> ### NOTICE
>
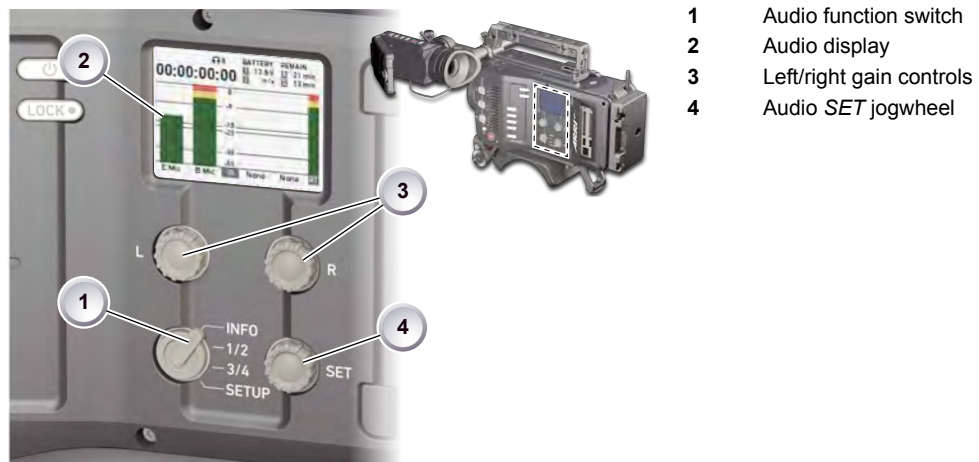> Audio is disabled if the sensor frame and project rates are not equal. With audio recording disabled or otherwise switched off, neither audio in/output nor audio processing is possible.

Checking the audio status

1. Select *INFO* (1) to display current status information (2).

2. *L* and *R* (3) are now deactivated.

3. Turning the depressed *SET* jogwheel (4) will change the headphone volume.

Adjusting channel gain

1. Select *1/2* or *3/4* (1).
2. Adjust channel 1 (or 3) gain via left gain control (2).
3. Adjust channel 2 (or 4) gain via right gain control (2).
4. To change channel 1/2 (or 3/4) setup: Select the desired parameter via *SET* jogwheel (3).
5. To enter the edit mode: Press *SET* (3).
6. To change a parameter: Turn the *SET* jogwheel (3).
7. To confirm and leave the edit mode: Press *SET* (3) again.

Editing the audio setup

1. Select *SETUP* (1) for adjusting overall audio parameters (2).
2. To navigate and adjust: Press and turn the *SET* jogwheel (3).
3. To enter or confirm: Press *SET* (3).
4. Select the desired parameter via *SET* jogwheel (3).
5. To enter the edit mode: Press *SET* (3).
6. To change a parameter: Turn the *SET* jogwheel (3).
7. To confirm the value: Press *SET* (3) again.

9.2 Headphone volume

Use the headphone volume wheel (see above).
Or: Use the audio control panel (see below):

1. Switch to *INFO* (1).
2. The volume level shows next to the headphone icon in the display.
3. Turn the depressed *SET* jogwheel (2).

10 Audio menu

Note: For line level input, the camera supports a maximum analog input level of 8 dBu by default. Higher levels will result in clipping.

On the audio control panel, you can fully control, change, and edit the audio setup without the risk of camera parameter changes.

The audio function switch (1) toggles between *INFO* screen, channel *1/2* and *3/4* configurations, and audio *SETUP* on the display (2).

The *L* and *R* jogwheels (3) control left and right channel gain.
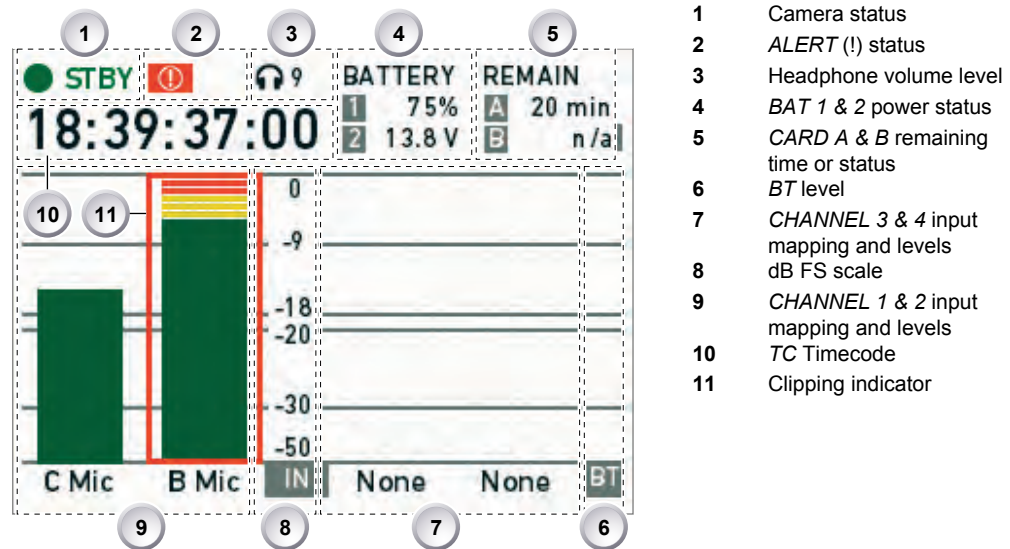
With the *SET* jogwheel (4), you navigate through the audio setup menu.

Note: Additional audio meters are available on the camera monitor (fixed). And on the EVF display (configurable via *MENU > Monitoring > EVF/Monitor > EVF overlays > Status elements > Audio*).

10.1 *AUDIO > INFO*

1. Turn the audio function switch to *INFO* (1).
2. **Note:** The *INFO* position locks the left and right gain controls.
3. The audio *INFO* screen opens:

1	Camera status
2	*ALERT* (!) status
3	Headphone volume level
4	*BAT 1 & 2* power status
5	*CARD A & B* remaining time or status
6	*BT* level
7	*CHANNEL 3 & 4* input mapping and levels
8	dB FS scale
9	*CHANNEL 1 & 2* input mapping and levels
10	*TC* Timecode
11	Clipping indicator

INFO shows the audio levels, the input channel mapping, and the most important camera parameters:

- Camera status (1): *STBY* (ready for recording). *REC* (recording). *PLAY* (playback). None (card missing, full or not yet formatted).

- The alert *(!)* icon appears (2) whenever alert messages are available. See page 63.

- Headphone volume (3) from level *1* (= off) to *64* (= maximum).

- Power status (4): *BATTERY 1* (onboard). *BATTERY 2* (BAT IN). Can be set to percent or volt, depending on battery. See page 133.

- Remaining card capacities (5), in minutes.

- Audio levels (7 and 9) for all four channels and BT (6), in dB FS.

- Reference scale (8) for audio levels in dB FS.

- Current timecode (10). *TC* settings are accessible via user monitor. See page 73.

- Clipping indicator: If the channel shows a red frame, the audio signal is clipping. If the audio meter is not at its peak, the input signal itself is clipping.

10.2 *AUDIO > 1/2*
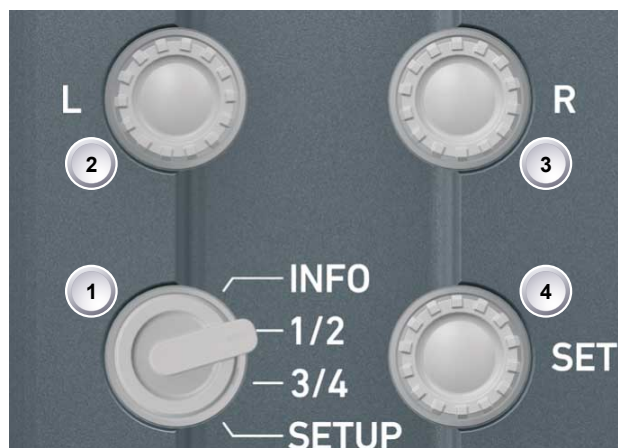
1. Turn the audio switch to *1/2* (1).

2. The left gain control (2) now addresses recording channel one. For channel two, use the right gain control (3).

3. Select and change parameters with the *SET* jogwheel (4).

4. The audio *1/2* screen allows you to configure gain control mode, filtering, headphone monitoring, and input selection for channel one and two:
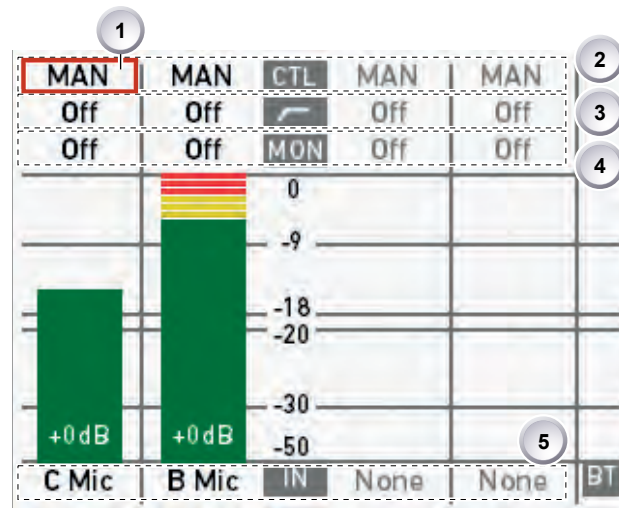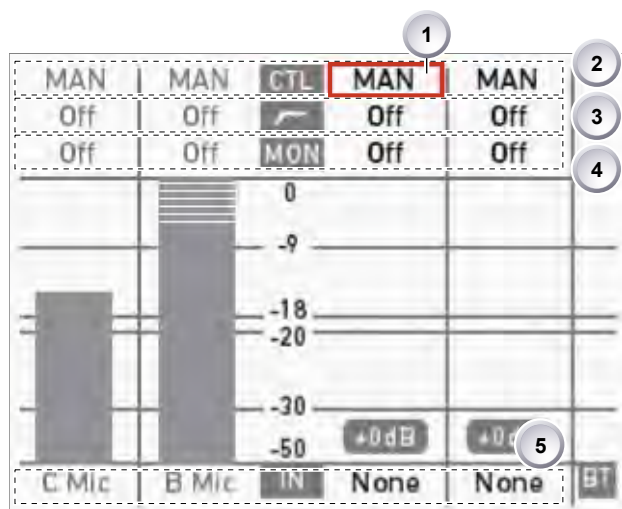

1	Cursor (here: on channel one)
2	*CTL*: Gain control mode per channel
3	Highpass filter per channel
4	*MON*: Headphone monitoring per channel
5	*IN*: Input selection

- Cursor (1): Can be moved by turning the *SET* jogwheel.

- Gain control mode (2): *MAN* (manual via *L/R* wheels, in 1-dB steps). *MAN + L* (manual plus limiter, in 1-dB steps).

  - A limiter prevents the signal from clipping if the input signal level combined with the set gain results in signal levels exceeding -6 dB FS.

- Highpass filter (3): Frequencies below the set value are filtered from the signal. *Off* (no filtering), *80 Hz,* or *160 Hz.*

- *MON* (4) routing of audio channel to headphones: *L* (to left headphone channel only). *R* (to right headphone channel only). *L+R* (mono mix on both). *Off* (no routing).

- *IN:* Input source mapping to the respective recording channel. Available channels depend on the XLR input configuration. Setting e.g. *IN B* to *LINE* enables *B Line.* As *IN A* is a stereo input, *A1* and *A2* are also available. Setting *IN B* or *IN C* to *AES* provides *AES1* and *AES2.*

10.3 *AUDIO > 3/4*

1. Turn the audio funtion switch to *3/4* (1).

2. The left gain control (2) now addresses recording channel three. For channel four, use the right gain control (3).

3. Select and change parameters with the *SET* jogwheel (4).

4. The configuration of channels three and four is identical to that of channel one and two above.
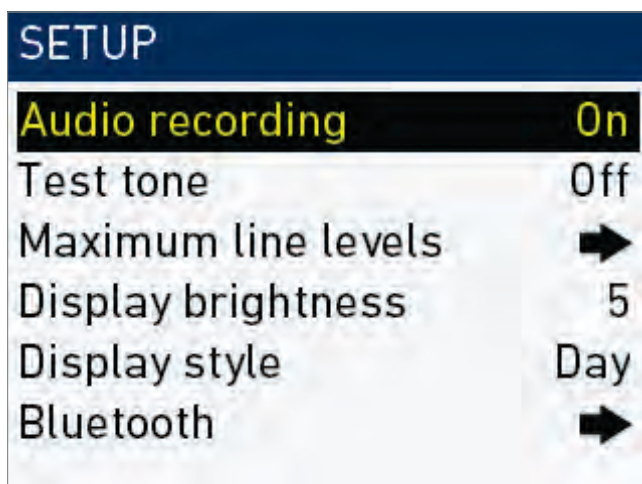

1	Cursor (here: on channel three)
2	*CTL*: Gain control mode per channel
3	Highpass filter per channel
4	*MON*: Headphone monitoring per channel
5	*IN:* Input mapping

10.4 *AUDIO > SETUP*

1. Turn the audio function switch to *SETUP* (1).

2. By turning and pressing the *SET* jogwheel (2), you can now adjust basic settings on the following screen:

Audio recording: Switches audio recording on or off. *Off* deactivates audio inputs and all outputs; no audio channels are recorded.

Test tone: Activates a 1 kHz test tone on all recording channels.

Maximum line levels: Switches the maximum line level for Input A, B and C between +8 and +24 dBu. **Note:** Requires a camera hardware modification available in April 2015.
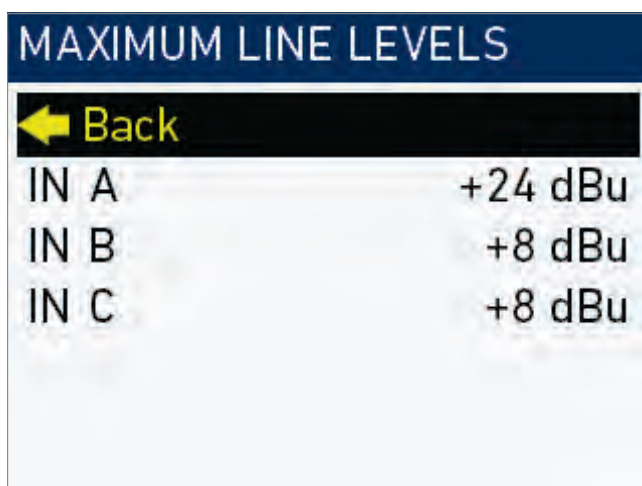
Display brightness: Sets the audio display backlight from level 1 (= minimum) to 10 (= maximum).

Display style: Sets both audio display and camera monitor to day or night style.

Bluetooth: Allows you, e.g., to monitor audio recording or to record talk-back tracks via Bluetooth devices and profiles.
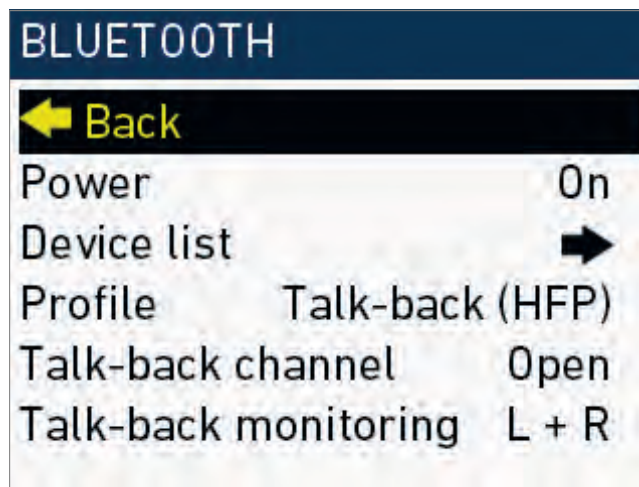
10.4.1 Maximum line levels

Audio > Setup > Maximum line levels

Note: The new camera hardware modification for *Maximum line levels* is available in April 2015.

10.4.2 Bluetooth

*Audio > Setup > Bluetooth*

Allows you to monitor audio recording with a Bluetooth headset. Monitors the same channel configuration as the headphone out. Also allows you to record a talk-back track (e.g., for work instructions, comments etc.).

- *Power:* Switches Bluetooth on or off

- *Device list:* Shows the available Bluetooth devices

- *Profile:* Sets the Bluetooth connection profile

  - *HFP* is required for talk-back function

  - *A2DP* has a higher audio signal quality

  - **Note:** Selected profile must be supported by Bluetooth headset. A2DP mode may, depending on the device, cause a delay of up to 5 frames. With HFP, audio is only available on right channel (R).

- *Talk back channel:* Sets the talk-back channel to *Open* (signal is recorded) or *Muted* (signal is not recorded). Can also be assigned to a user button

- *Talk-back monitoring:* Configures the monitoring of the recorded talk-back channel to the headphones out. Configuration is also valid during playback. Can be set to *Off, L* (left out), *R* (right out), *L+R* (left and right out).

Connecting to a Bluetooth device

1. Open the *Bluetooth* menu.

2. Set *Power* to *On.*

3. Set the desired profile.

4. Via *SET* jogwheel, navigate to the device list:
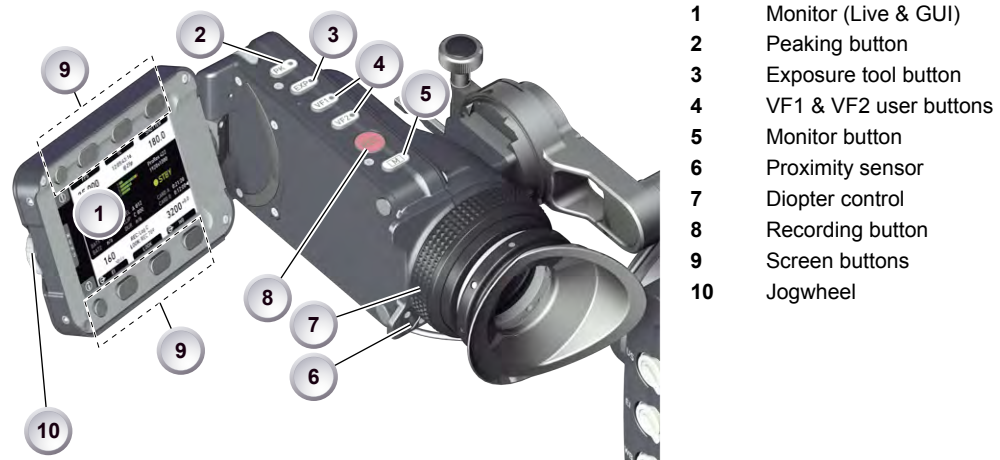
Audio > Setup > Bluetooth > Device list
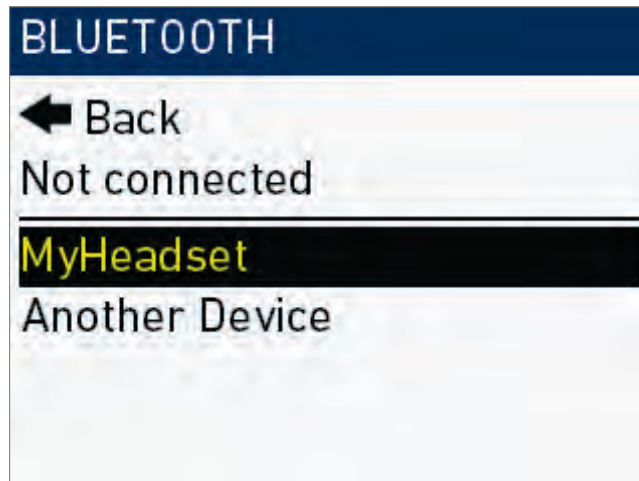
5. Ensure the Bluetooth device is active and visible.

6. Select the desired Bluetooth device from the list.

7. Press the *SET* jogwheel for connection:

   o In case of a power-down or device disappearance, the camera will remember the paired device.

   o Upon reappearance, the camera automatically reconnects to the device.
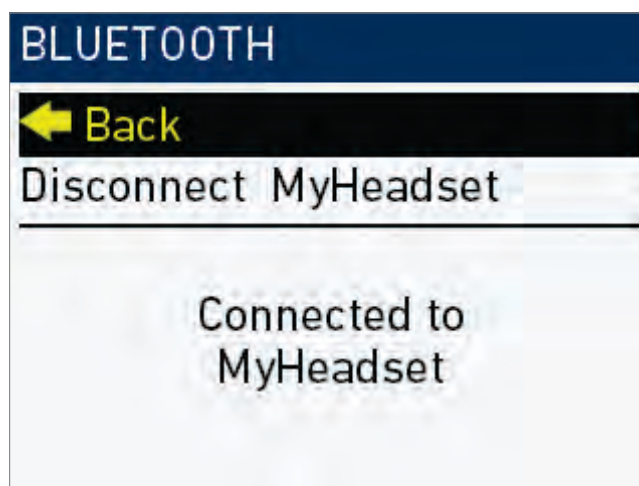
8. To disconnect: Select *Disconnect XX* and press the *SET* jogwheel.

11   Main controls and viewfinder

|	
1	Monitor (Live & GUI)
2	Peaking button
3	Exposure tool button
4	VF1 & VF2 user buttons
5	Monitor button
6	Proximity sensor
7	Diopter control
8	Recording button
9	Screen buttons
10	Jogwheel

Proximity sensor

This infrared sensor automatically deactivates the viewfinder's internal OLED panel when you withdraw your eye.

Note: To avoid hardware damage, always keep the sensor unobstructed.

Note: Left-eye or camera right-side operation of the EVF may degrade the sensor function .

11.1 EVF image/monitor
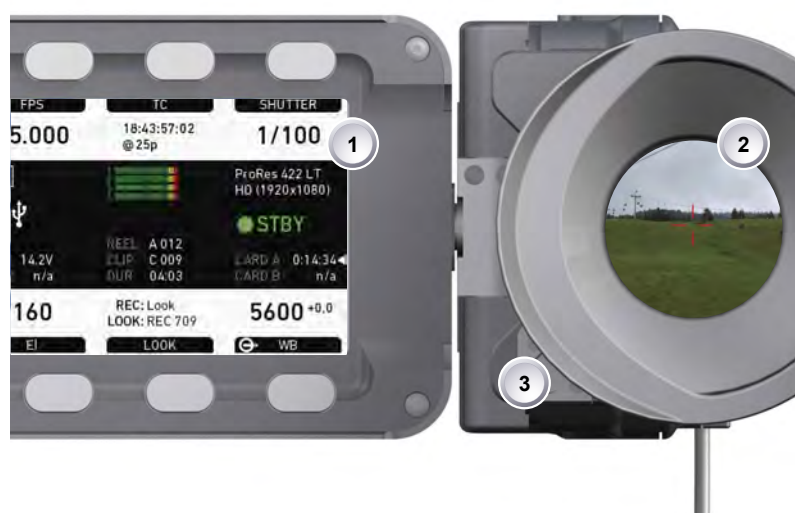
When you look through the eyepiece, the sensor (3) activates the EVF display (2).

You can add status data from the home screen (1) to the viewfinder image (2).

If activated, overlays around the EVF image show essential camera, audio, and recording statuses.

You can modify/deactivate these status bars via the *EVF overlays* and *EVF status components* menu. See page 119 and page 120.

Note: In *Overlay* mode (see below), all status bars appear **on** the active viewfinder image.
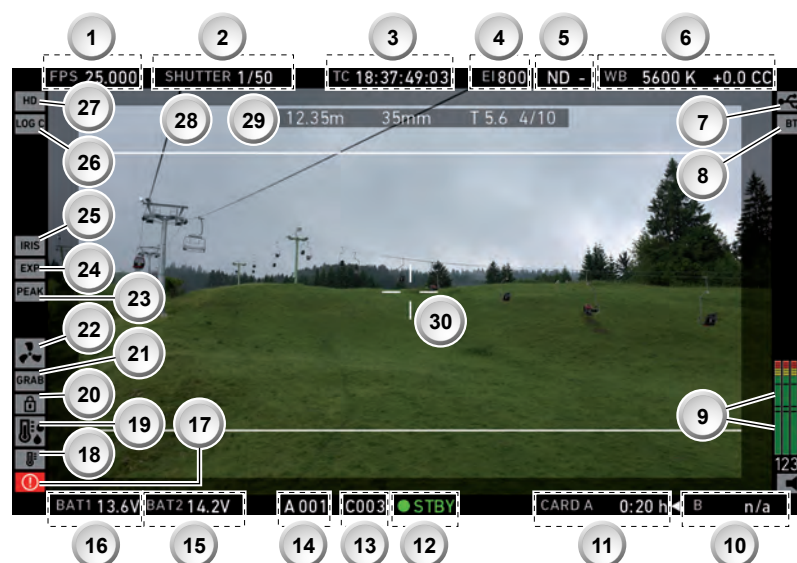
1	Sensor *FPS*	**16**	*BAT1* onboard battery status
2	*SHUTTER* status	**17**	*ALERT* (!) status
3	*TC* Timecode (if enabled)	**18**	Camera temperature warning (warning=red)
4	*EI* Exposure index	**19**	High humidity mode (if active)
5	Internal *ND* filter (if active)	**20**	Camera lock (if active)
6	*WB* White balance	**21**	Image grab (if active)
7	USB connection status	**22**	Fan mode (has been changed by camera)
8	Bluetooth	**23**	Peaking (if active)
9	Audio meters (if active)	**24**	Exposure tool (if active)
10	*CARD B* status (arrow = active)	**25**	Auto iris adjustment (if active)
11	*CARD A* status	**26**	Gamma setting
12	Camera status	**27**	Recording image format
13	Clip index & counter	**28**	Frameline
14	Camera index & reel counter	**29**	Lens data overlay (focus distance, focal length, iris value)
15	*BAT2* power input status	**30**	Center mark
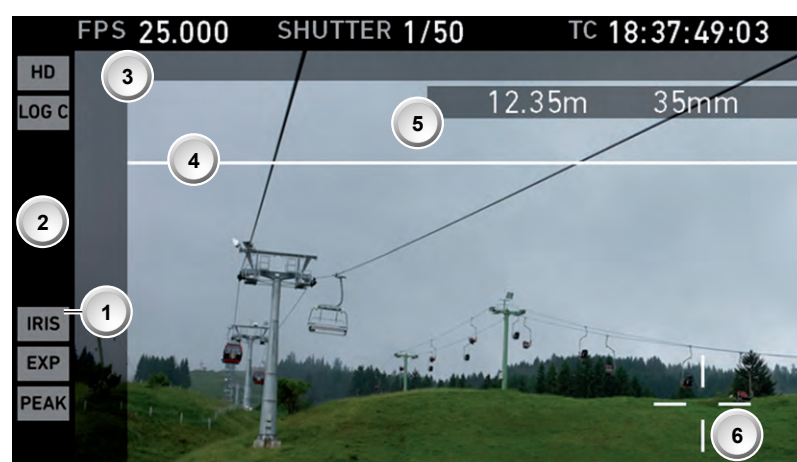
1	Auto iris adjustment (if active)	**4**	Frameline
2	Black frame (indicating safe mode)	**5**	Lens data overlay
3	Surround mask	**6**	Center mark (here: cross)

In *Safe* mode, all status bars appear in a black frame (2) **outside** the active viewfinder image.

Note: If surround view is active, the area is marked by a surround mask (3). See page 116 and page 119.

11.2 *PK* peaking button

1. To activate peaking on monitor (1) and viewfinder (3): Press *PK* (2).
2. Peaking highlights the image parts that are in focus for better focus judgement.
3. For *PK* settings: Go to *MENU > Monitoring > EVF/Monitor > Peaking*.

11.3 *EXP* exposure tool button

The *EXP* button (2) activates the set exposure tool on the monitor (1) and EVF image (3). Use the tool for evaluation of the image exposure levels. An activated tool lights up the button (2).

For *EXP* setting: Go to *MENU > Monitoring > EVF/Monitor > Exposure tool.*

In *Zebra* mode, the tool overlays up to two luminance ranges with diagonal stripes. *High zebra* ranges above, *Mid zebra* around the user-defined luminance value.

False color mode overlays predefined luminance ranges as follows:

Luminance range	Signal level	Color
White clipping	100 to 99 %	Red
Just below white clipping	99 to 97 %	Yellow
One stop over medium gray (Caucasian skin)	56 to 52 %	Pink

|		
18 % medium gray	42 to 38 %	Green
Just above black clipping	4.0 to 2.5 %	Blue
Black clipping	2.5 to 0.0 %	Purple

11.4 *VF1 & VF2* user buttons

1. Via the camera menu (see page 105 and page 147), you can assign a function to both *VF1* and *VF2* buttons (1).

11.5 Recording

NOTICE
Pressing a recording button returns the user interface to the home screen and disables the menu access.
Recording also disables the *US* switch and the home screen buttons for *FPS, TC, Shutter,* and *Look* settings.
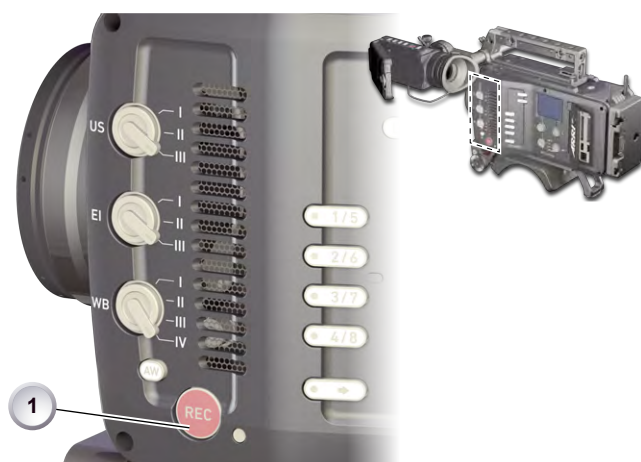
1. Prepare the camera.
2. Preset all switches and buttons.
3. Press *REC* (1) on the left camera side.

4.   Alternatively, press *REC* (1) on the viewfinder.

NOTICE
Never change memory cards when recording - this may damage the recorded clip.

| *NOTICE* |
| --- |
| Connecting or disconnecting devices or cables while recording can disturb the audio/image signal due to static electricity. |

11.6   *PLAY* button

1.   Press *PLAY* (1) for one second to see the last clip of the active CFast 2.0 card.
     ◦   Playback is active on monitor, on EVF and on SDI out.

2.   You may toggle between play and pause by briefly pressing *PLAY* (1) again.

3.   To exit playback: Press *PLAY* (1) for one second.

4.   Extended playback control is available via the on-screen navigation (see below).

11.6.1 Playback screen controls

- Playback loads the last active clip (paused on the first frame).
- Press *ARROW* (7) to hide/show button info overlays
- To toggle between *PLAY/PAUSE:* Press the lower mid screen button (5) or the jogwheel.
- While paused: Scroll up/down via the jogwheel to load the next/previous frame.
- While playing: Scroll up/down via the jogwheel to increase or decrease the playback speed up to 16x both forward and backwards.
- Press *SKIP FWD* (3) to load the next available clip.
- Press *SKIP REV* (2) to load the previous available clip.
- Press *CLIPLIST* (6) to select another clip for playback from a list of all clips on the inserted cards.
- Press *OPTIONS* (4) to set the clip end action.
- Press *EXIT* (1) to end playback.

CLIPLIST
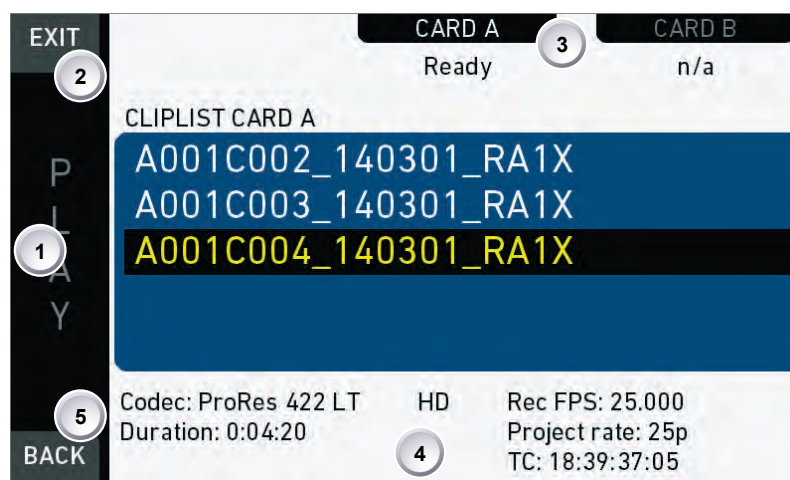
1. On the playback screen, open the clip list of the active recording card (here: A).
2. You may toggle between cards by pressing the card-related screen button (3).
3. **Note:** Label turns gray and displays n/a (3) if card slot is empty.
4. Via jogwheel (1), scroll to the required clip.

5. Additional information on the selected clip shows (4):

    ○   *Codec:* ProRes codec of clip recording.

    ○   *HD/2K/3.2K*/4K* UHD:* Clip format.

    ○   *Duration:* Clip duration at playback speed.

    ○   *Rec FPS:* Sensor frame rate of clip recording.

    ○   *Project rate:* Playback frame rate of clip.

    ○   *TC:* Timecode start value of clip.

6. To play the selected clip: Press the jogwheel (1).
7. To end playback: Press *EXIT* (2).
8. To return to the play screen without loading a new clip: Press *BACK* (5).

* requires installed 4K UHD license.

OPTIONS
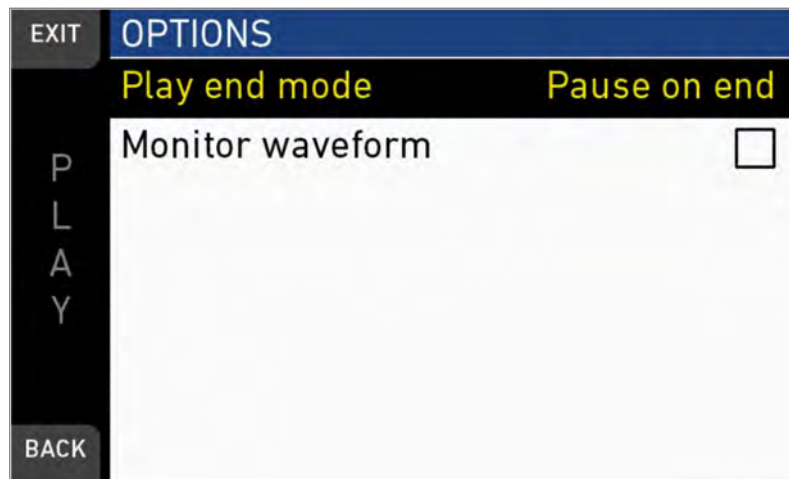
Pressing *OPTIONS* on the play screen allows you to modify the playback behaviour.

Play end mode: Sets the playback behavior at the end of a clip:

●   *Pause on end:* Playback pauses at the end of this clip.

●   *Pause on start:* Playback pauses at the beginning of this clip.

●   *Loop:* Playback continues from the beginning of the same clip again.

●   *Play next clip:* Playback continues with the next clip in the cliplist.

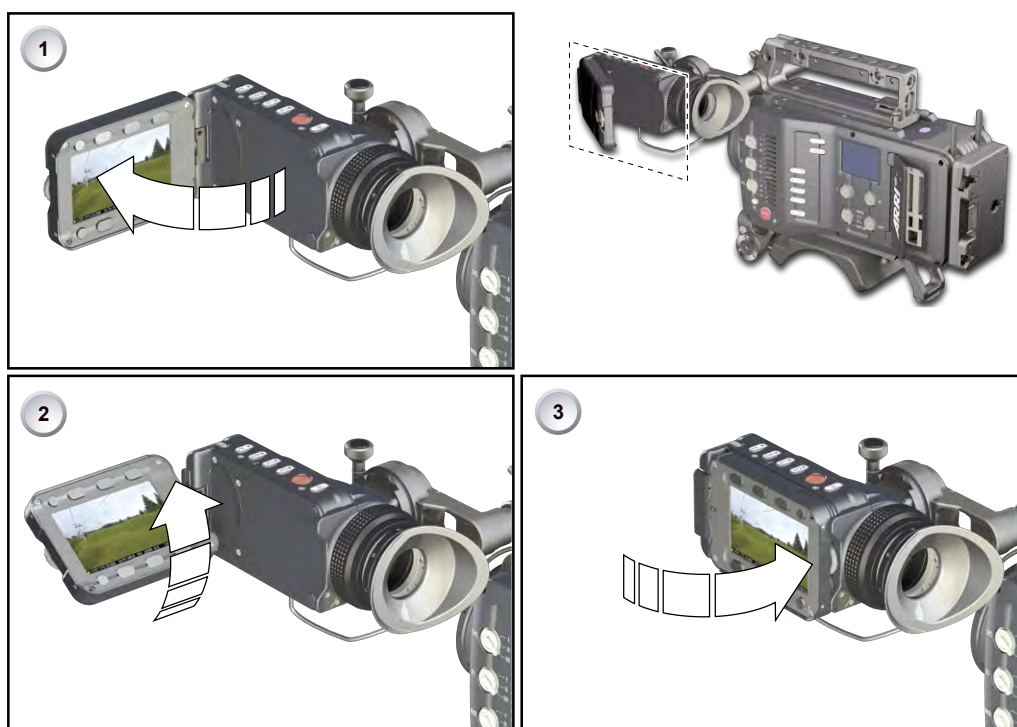●   *Exit playback:* Camera exits playback.

Monitor waveform: Sets the waveform overlay on monitor to On or Off.

11.7 Diopter adjustment

1. Twist the ring left or right for diopter adjustment (1).
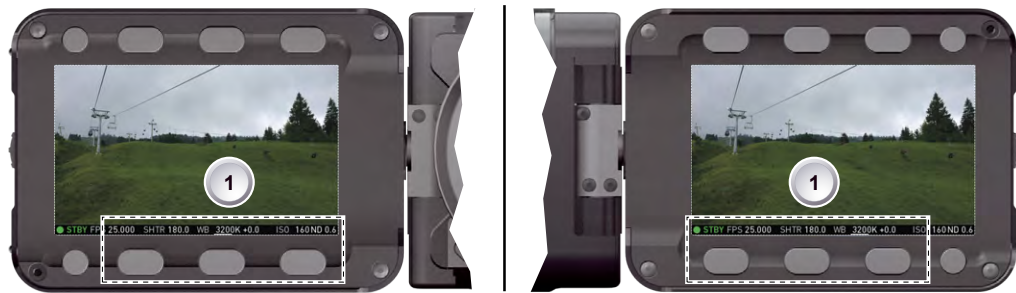
11.8 Adjusting the monitor

1. Fold (1), swivel (2) and flip (3) the monitor according to your needs.
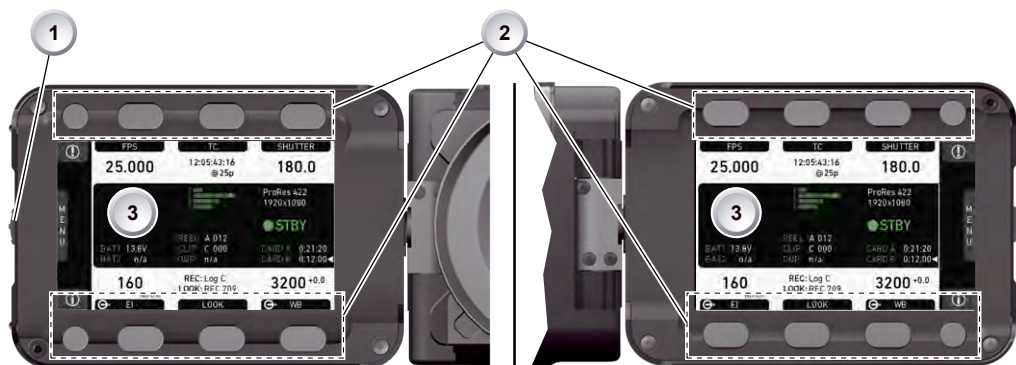
11.9 Changing the monitor mode

1. To change the monitor mode between live view and user interface: Press *M* (1).

2. In live mode, toggle the status bar content (1) via the lower buttons.

3. Via the camera menu, you can activate a location sensor that automatically flips the user interface to match a left- or right-sided monitor position (3).
4. **Note:** the jogwheel (1) and the screen buttons (2).

12 Live monitor

Below the camera live image, the live screen shows image and camera status. You can toggle the bar's content via the left or right oval button below. The center oval button returns you to the main status bar.

1	Surround mask	**6**	Exposure index
2	Camera temperature warning (warning=red)	**7**	White balance
3	*ALERT* message	**8**	Shutter value (° or sec)
4	Center mark	**9**	Sensor frame rate
5	Active ND filter	**10**	Camera status (here: Standby)

Surround mask

This grayed-out frame marks all non-recorded parts of the sensor image. Can be deactivated.

If surround view is active, the non-recorded area is masked. Style options are: Black line, colored line, or semitransparent mask (as shown here).

Center mark

Marks the image center. Can be set to *Off, Cross, Dot* or *Small Dot.*

13   User monitor

Screen buttons and jogwheel
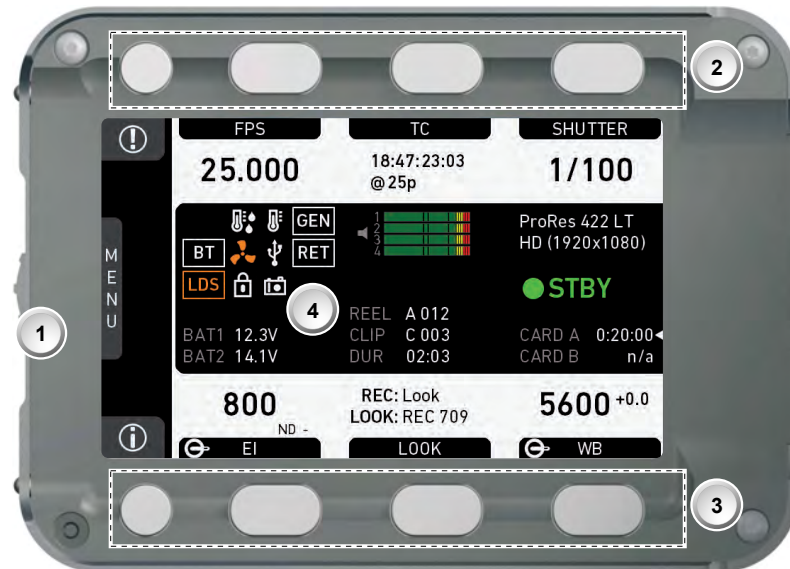
There are eight screen buttons, four above (2) and four below (3) the display (4). Their function depends on the screen content (4) and is labeled directly above or below each button.

Unlabeled buttons have no function for that screen. A grayed-out label means: function currently not available. Via jogwheel (1), you can:

- Scroll or navigate through lists and menus.
- Change values (by scrolling up or down).
- Confirm settings (by pressing the wheel).

On the home screen (4), pressing the jogwheel (1) opens the camera menu.

Home screen

The home screen gives access to essential camera parameters and statuses. Oval screen buttons and a jogwheel allow quick parameter editing. To return to the home screen from any other screen: Press *HOME.*
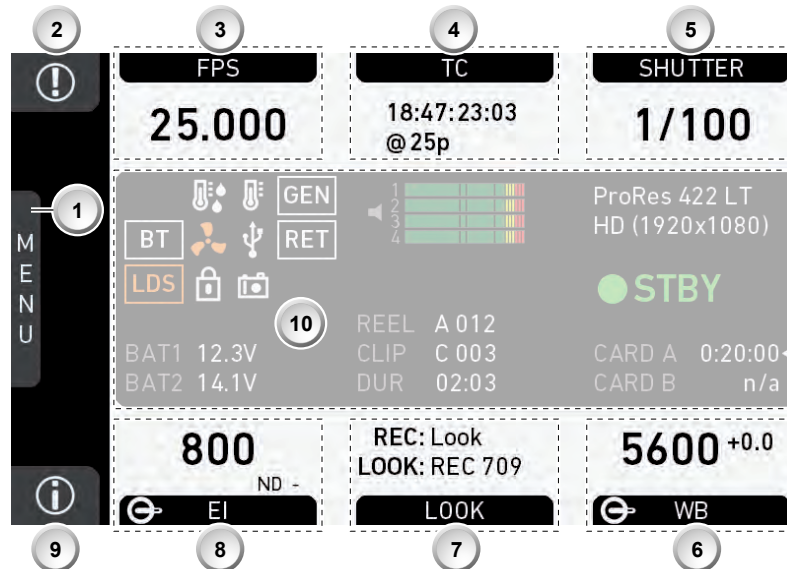
1	*MENU* jogwheel	6	*WB* button
2	*ALERT* message button	7	*LOOK* button
3	*FPS* button	8	*EI* button
4	*TC* button	9	*INFO* button
5	*SHUTTER* button	10	Status section

Note: The switch icons for *WB* and *EI* (6 and 8) are permanent. For *FPS, SHUTTER* and *LOOK* (3, 5, 7), the switch icon only shows for the function that is assigned to the *US* user switch. See page 149.
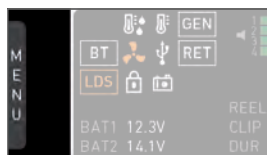
MENU jogwheel

Press the jogwheel to enter the camera menu.

ALERT message button

If red: Alert messages are available (critical to camera functionality). Press the round button to read them.
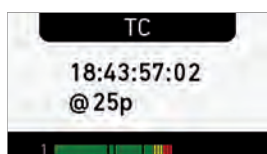

FPS button

FPS shows the sensor frame rate, allowing adjustments from 0.750 to 100.000 (200.000 with valid license).

Note: The switch icon in the black label only shows if the *US* user switch is set to *FPS*.

Note: If sensor fps does not match the project rate, the FPS label turns orange and shows an exclamation mark.

TC button

Shows the current Timecode values and the active project rate, allows adjustment of *TC* formats and values.

SHUTTER button

Shows shutter settings adjustable either as angle (5.0 to 356.0 °) or exposure time (1/1 to 1/8000 s).

Shutter angle, sensor rate and exposure time relate as follows: Exp time=Shutter angle/(360*fps).

Note: The switch icon in the black label only shows if the *US* user switch is set to *SHUTTER*.

INFO button

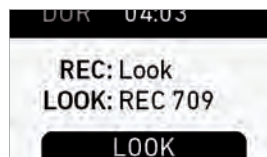Provides access to the camera info screens (See Chapter 14.2).

EI button

Shows the current *EI* rating and active ND filter value. Allows you to set the exposure index in ASA.

Base sensitivity for the AMIRA is 800 ASA. The *EI* rating can be adjusted from 160 to 3200 ASA.

Note: ASA and ISO ratings are identical.

LOOK button

Shows the REC path gamma setting and the name of the active look. Opens the look screen, which provides further access to gamma settings of all image paths and global look.

Note: The switch icon in the black label only shows if the *US* user switch is set to *LOOK*.
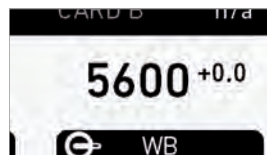
WB button

WB shows the camera's current white balance (= pre-adjusted color temperature of a light source).

You can adjust *WB* from 2,000 to 11,000 Kelvin (here: 5,600) in steps of 10 K for red/blue correction.

Also, you can color-compensate for green/magenta tints in a range from -16.0 to +16.0. Positive or negative CC color compensation values then appear in superscript (here: +0.0).

For automatic white balance: Press *AW* (on operator panel) twice within one second. This stores the auto-white balance result in the currently active switch position.

13.1 Status section

The status section on the home screen shows key data on recording, voltage, locking, etc.:
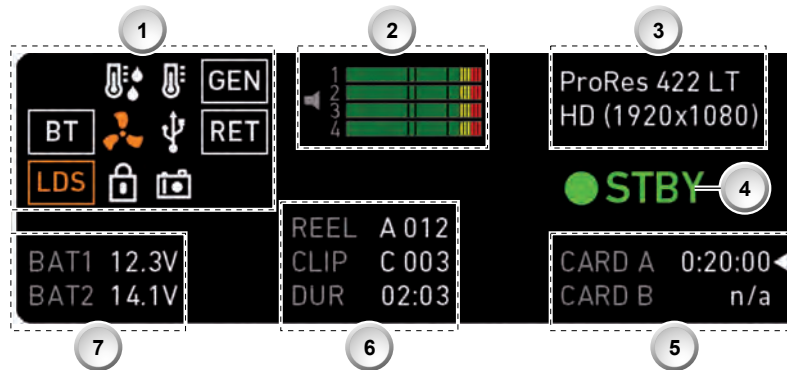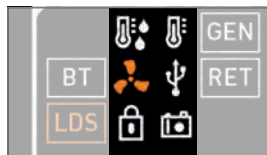

1 Status icons
2 Audio meters
3 Codec/resolution
4 Camera status
5 Card A/B status
6 Recording status
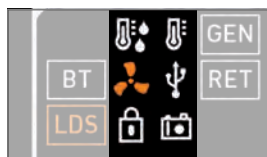**7** Battery voltage

BT and LDS icons

BT: Camera Bluetooth is active.

LDS: Indicates an error on the LDS interface.

Humidity icon

Indicates an active High Humidity mode (see *MENU > System > Sensor > Sensor temperature*)
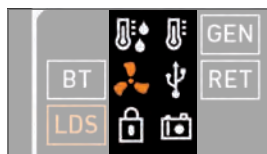

Temperature icon

Alerts on temperature issues:

- White: Sensor temperature warning
- Orange: Sensor temperature critical or System temperature warning
- Red: System temperature error

(see *INFO > System info*)

Fan icon

Icon color shows the fan noise status:

- *Grey:* About to increase above 20 dBa.
- *Orange:* Higher than 20 dBa.

USB icon

Icon color shows USB memory status:

- *White:* Ready
- *Gray:* Read only
- *Orange:* Not usable

Lock and Camera icons

Lock: Appears only if camera is locked. See page 146.

Camera: Grab is active.

GEN icon

Visible if Genlock is activated via *MENU > System > Genlock*. Icon color shows the Genlock status.

- *White:* Genlock active
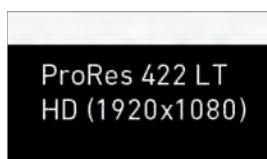- *Orange:* Genlock signal missing

RET icon

Return In activated on EVF/Mon and/or SDI. Icon color shows the status:

- *White:* RET active
- *Orange:* RET signal missing

Audio meters

Show current level of camera audio channel signals. If audio is disabled, an icon appears.

Codec/Resolution

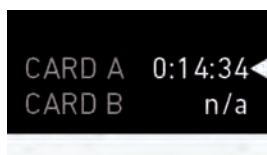Currently active ProRes codec and recording resolution.

Camera status

STBY: Ready for recording.

REC: Recording.

ERASE: Erasing a CFast 2.0 card. Active erasure disables recording.
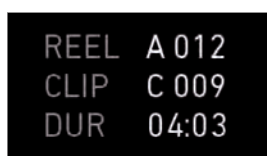
None: Card missing/invalid/full.

Card A & B status

Remaining capacity of CFast 2.0 card in slot A or B, at current FPS and codec combination in real time.

Arrow: Indicates selected recording medium.

When card capacity is less than 2 minutes, capacity values starts flashing.

Recording status

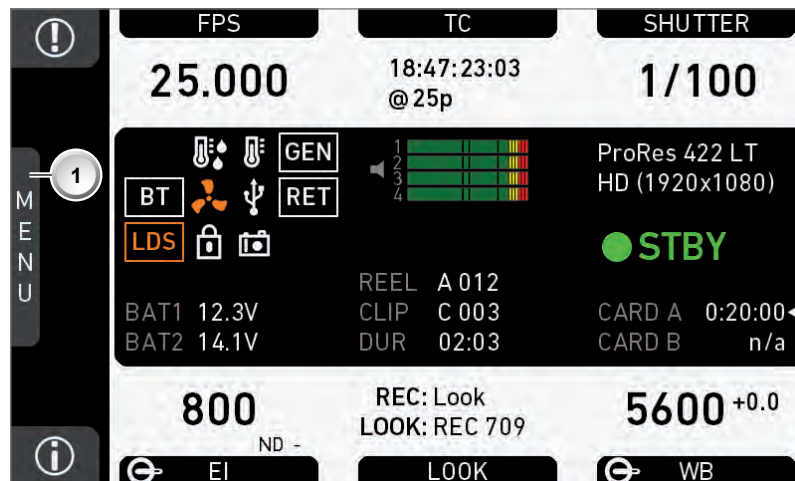*REEL:* Current reel of active recording medium.

CLIP: Current clip of current reel.

DUR: Duration of currently recorded clip (during REC) or last recorded clip (during STBY).
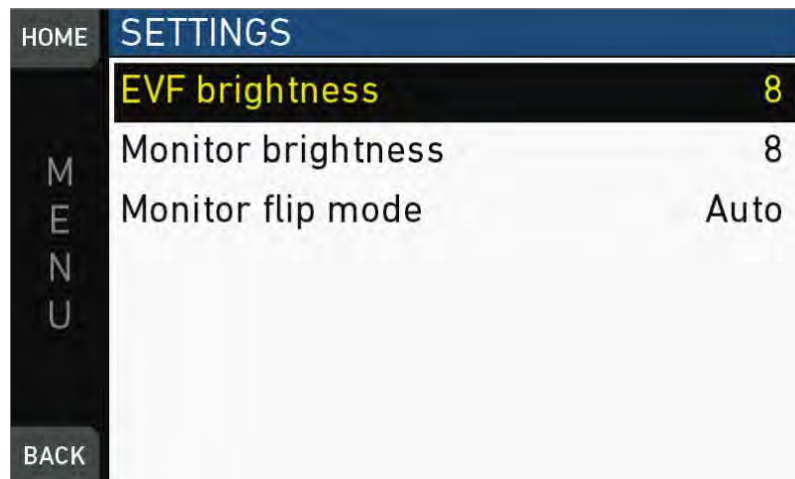
BAT 1 & 2

Current battery supply levels.

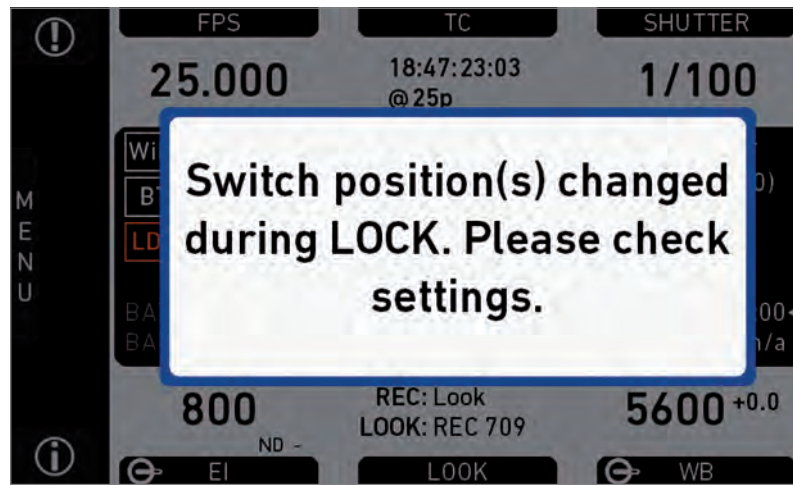## 13.2 Adjusting the monitor brightness

1. Open the home screen.

2. Via jogwheel (1), open *MENU > Monitoring > EVF/Monitor > Settings*.

3. Scroll to *Monitor brightness*.

4. Press the jogwheel.

5. Adjust the brightness by scrolling to the required value: 1 (= minimum) to 10 (= maximum).

6. Press *HOME*.

13.3 Message popups

Message popups appear on the monitor to inform the user about occurences and potential problems requireing the user's attention.

Messages of informative character have a blue frame, while messages of attentive character have a red frame.

Popups disappear when any screen button or the wheel is pressed.

14 Home screen

> **NOTICE**
>
> Only *EI* and *WB* home screen labels show a permanent switch icon, as these functions have dedicated switches.
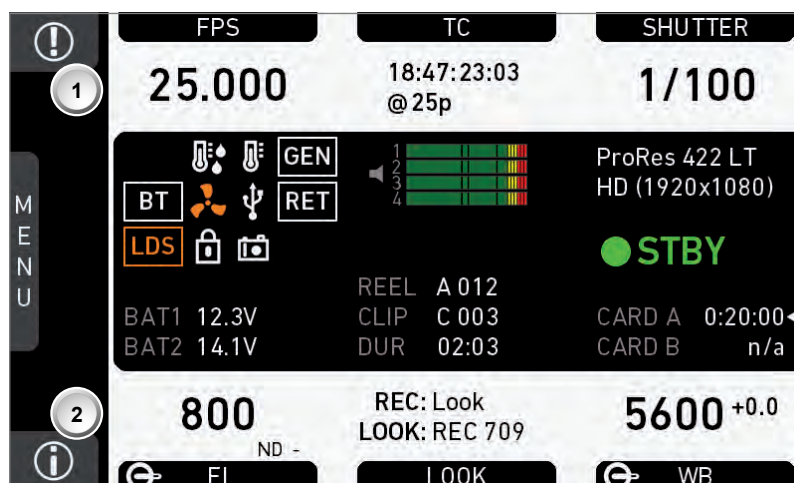>
> *FPS, SHUTTER,* and *LOOK* bear a switch icon only if assigned to the *US* switch.
>
> You can change/edit only the value of an active switch position.
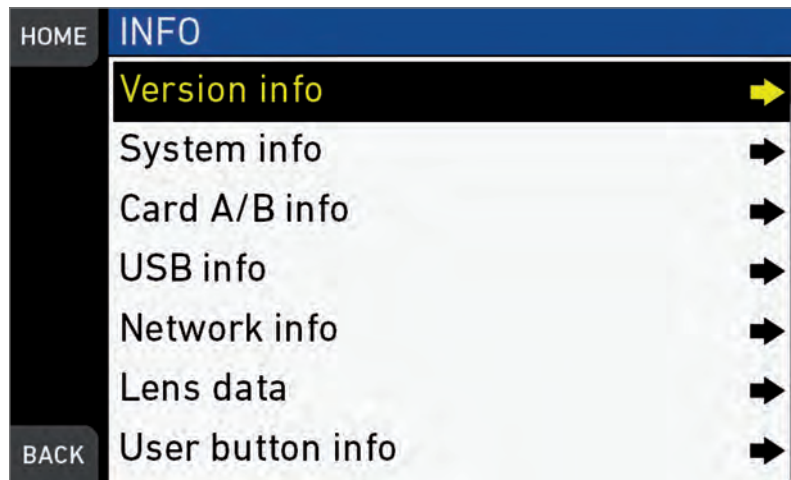
14.1 *ALERT* messages

> **NOTICE**
>
> *ALERT* messages communicate critical system states to the user. They require immediate action and remain active until the critical state changes back to normal.

1. Check the home screen.
2. A red (1) icon indicates available messages.
3. Press red (1) for critical *ALERT* messages.
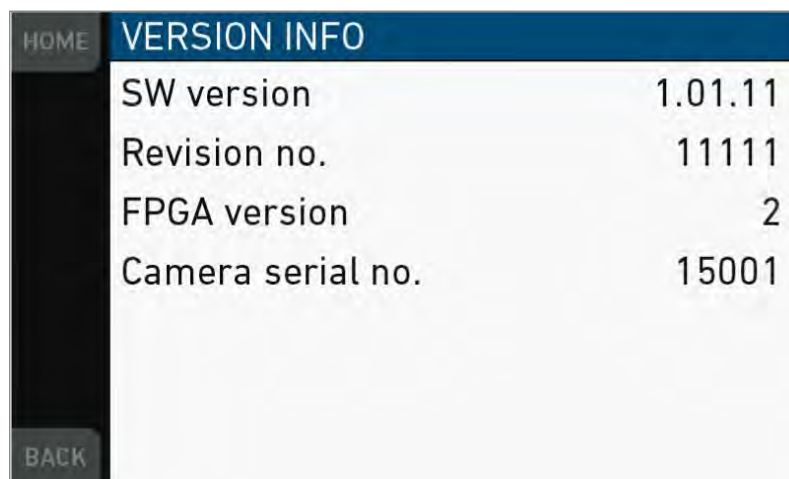
14.2 Info screens

HOME > i

Pressing the [i] button opens the INFO list that offers access to detailed information / subscreens:

- Version info
- System info
- Card A/B info
- USB info
- Network info
- Lens data
- User button info
- Export logfiles (automatic and manual)

Version info

System info

Card A/B info

USB info

Network info

Lens data

User button info

Export logfiles

14.3 *FPS* settings

NOTICE
Maximum frame rate is 100 fps without an advanced or premium license. Advanced and premium licenses enable a maximum of 200 fps.
Always use CFast 2.0 cards with maximum write rates. 60-GB cards are slower than 120-GB cards and may limit the fps (depending on the currently set codec).
Always adjust the fps/codec combination to match the write rate. An excessive combination may disable recording.

14.3.1 Setting/adding an *FPS* value
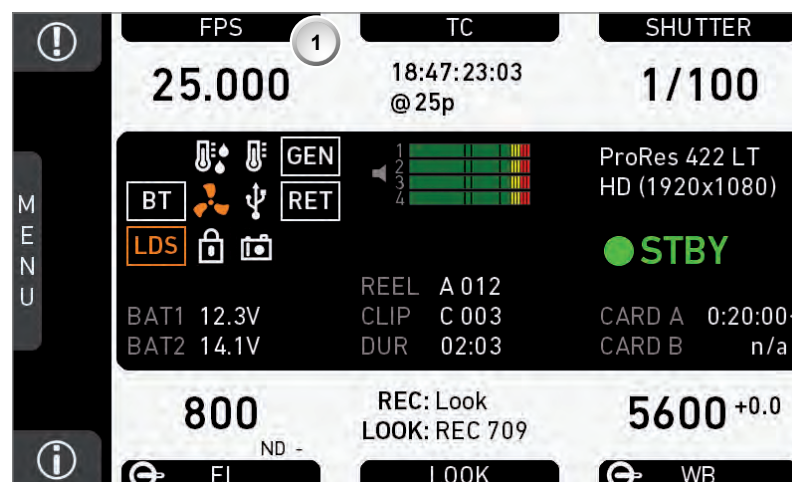
1. **Note:** A switch icon next to *FPS* (1) means: user switch is set to *FPS.*

2. Press *FPS* (1) to set the sensor frame rate:

    ○ **No** switch icon: A list opens (skip forward to "FPS list").

    ○ **With** icon, a switch screen opens:
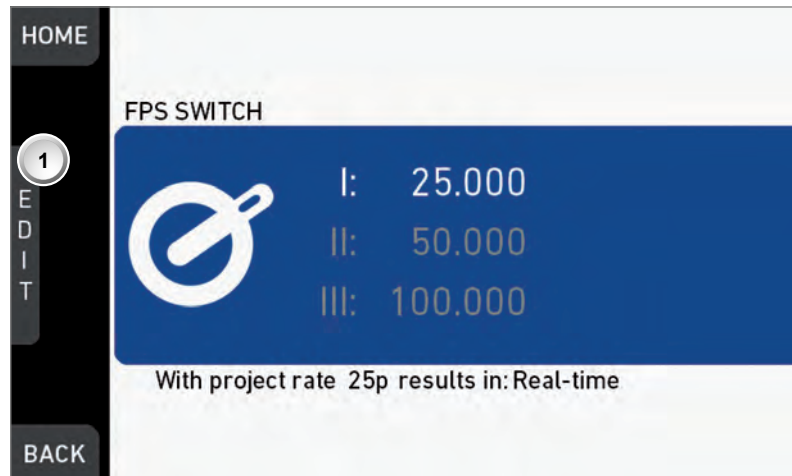
3. **Note:** You can only change the frame rate for the current switch position.

4. Press the jogwheel (1) to open the *FPS* list.

FPS list
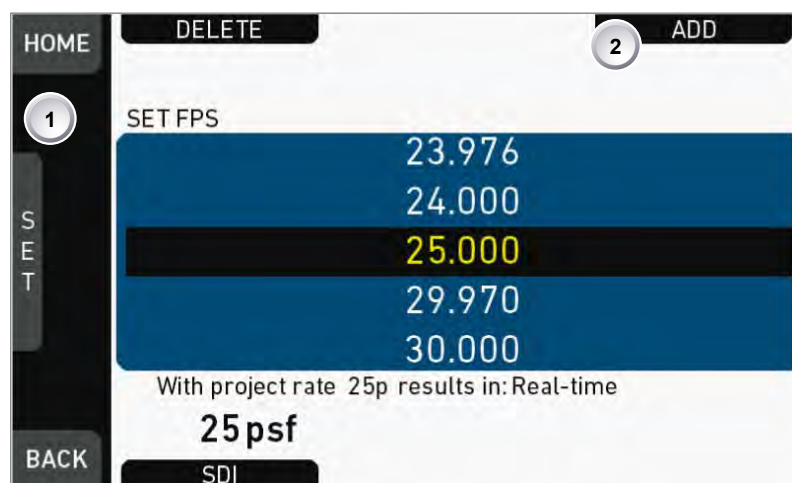
1. Via jogwheel (1), scroll to the required value.

2. Press the wheel (1) to activate the value.
   ▶ If the value is not listed: Press *ADD* (2).
   ▶ **Note:** *ADD* is disabled on reaching the maximum number of 16 list entries.
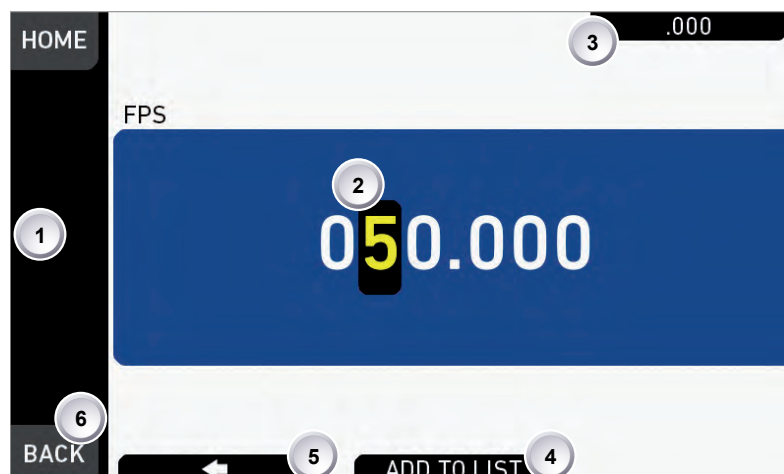
3. Upon pressing *ADD,* an editor opens.

4. Create a value with the jogwheel (1):

   ○ Scroll up or down to increase/decrease.

   ○ Press the wheel to select the next digit (2).

   ○ For the previous digit: Press *ARROW* (5).

   ○ To zero the decimals: Press the *ZERO* button (3).

5. Press *ADD TO LIST* (4) to save the changes. **Cancel** with *BACK* (6).

14.3.2 Deleting an *FPS* value
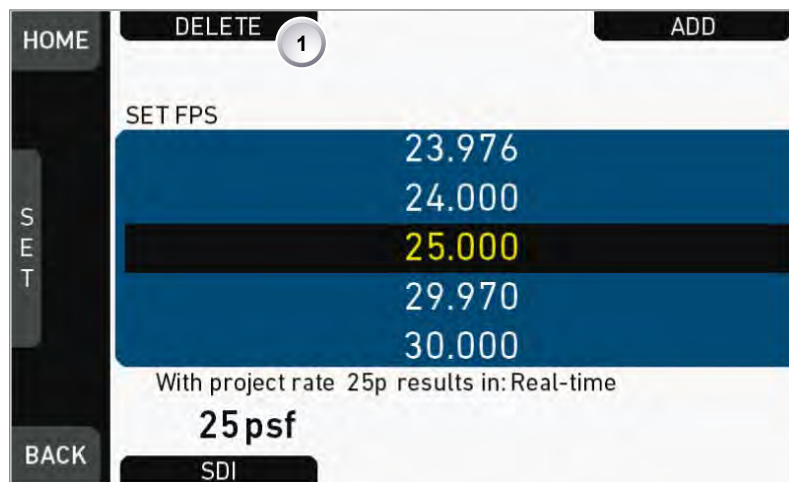
1. Open the *FPS* list.
2. Press *DELETE* (1).
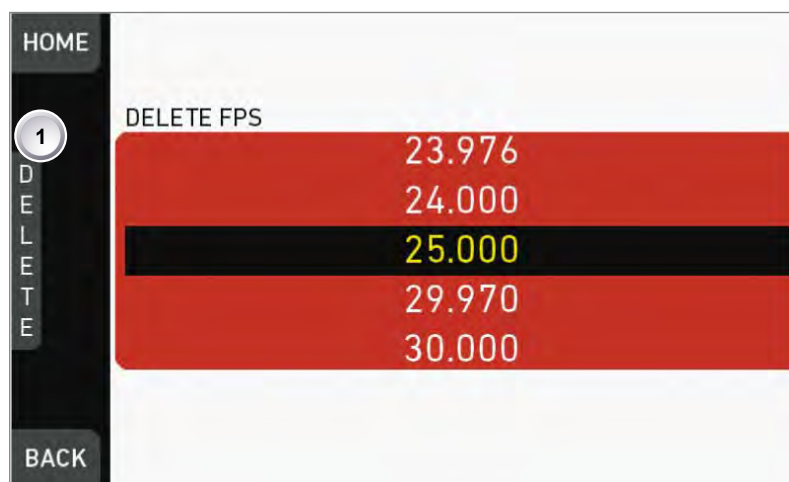
3. The list turns red.
4. Via jogwheel (1), select the obsolete entry.
5. **Note:** You cannot select a currently active value.
6. Press *DELETE* (2).
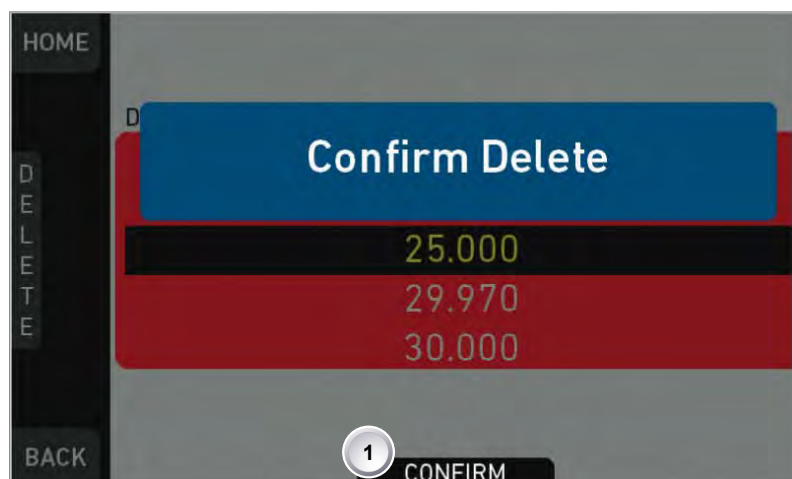
7. Press *CONFIRM* (1). **Cancel** with *BACK.*
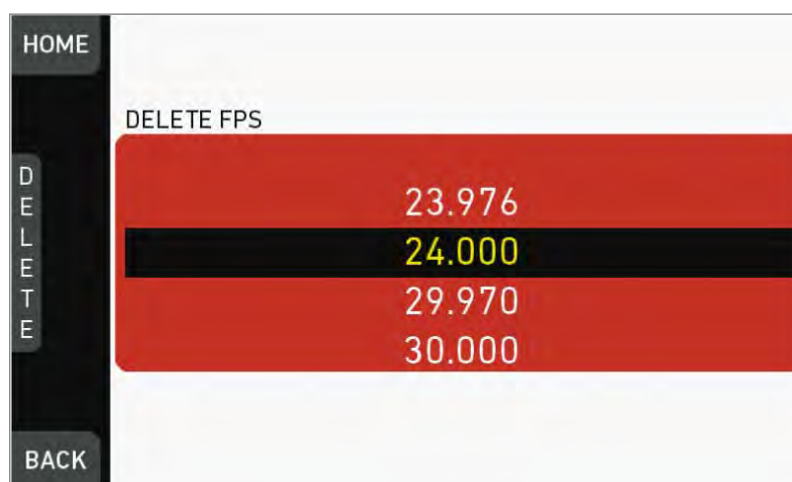
8. The entry is deleted.

14.4 *TC* settings
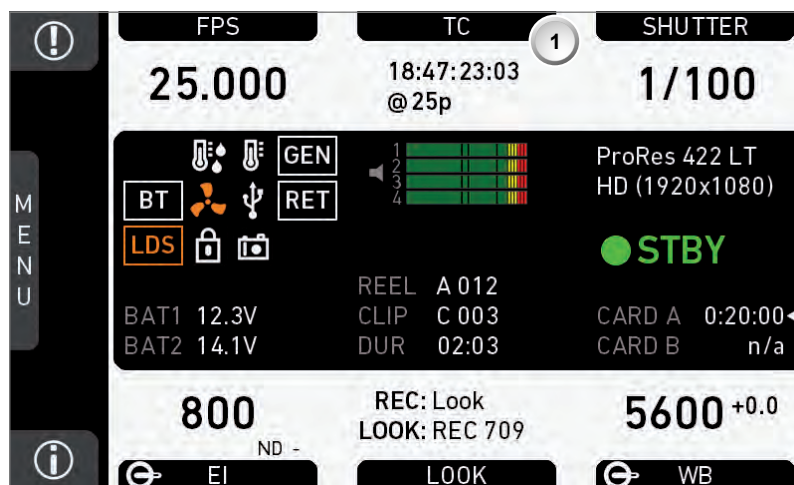
1. Press *TC* (1) on the home screen.
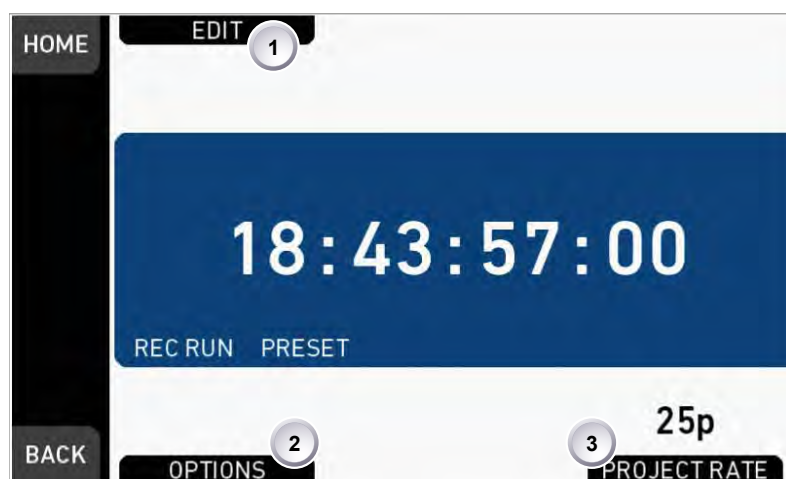
2. Current timecode and project rate show.
3. To change the active format: Press *OPTIONS* (2).
4. To change the project rate via the recording menu: Press *PROJECT RATE* (3).
5. Press *EDIT* (1) to change the current TC value.
6. **Note:** *EDIT* (1) is available only with TC not in *Regen* mode.
   - Disable *Regen* via *OPTIONS > Mode > Preset* (2).

7. For TC = 00:00:00:00: Press *RESET* (3).

8. For TC = current system time: Press *SET TO TIME* (4).

9. Via jogwheel (1), you can change each value:

    o   Scroll up or down to increase/decrease.

    o   Press the wheel to select the next digit pair (5).

10. Press *DONE* (2) to save the changes. **Cancel** with *BACK.*
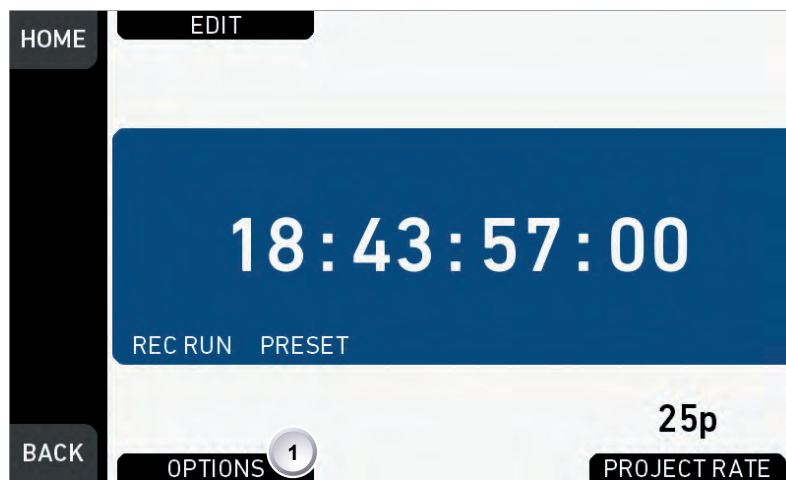
11. The Timecode editor closes.

12. If applicable: Press *OPTIONS* (1) to set/change the timecode modes or (dis)able
    Regen:

TC options
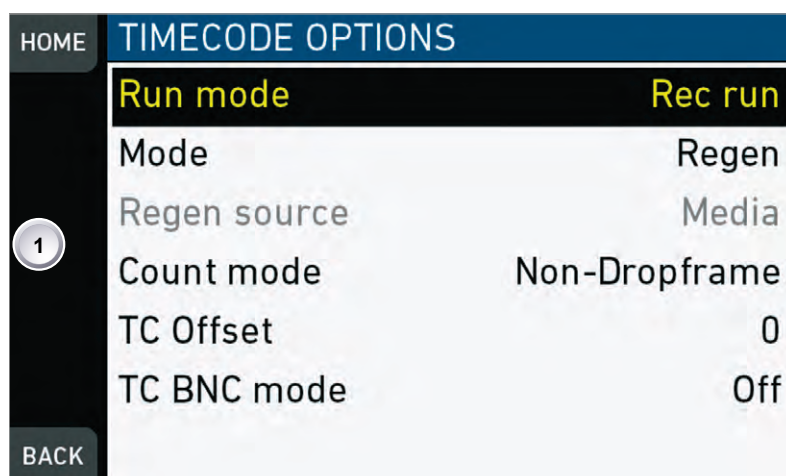
Run mode

Rec run: Timecode increases during recording only.

Free run: Timecode increases with every new frame. **Note:** Only possible if sensor fps = project fps. Otherwise, the camera temporarily switches to *Rec run*.

Mode

Note: You can edit Timecode only in *Preset* mode. The *Regen* mode disables *EDIT*.

Preset: The camera uses its internal counter.

Regen: The correct TC value is regenerated from the active *Regen source.* Disables the TC editor.

Regen source

Based on the TC run mode, the camera determines the Regen source automatically.

Free run regenerates timecode from the TC input connector.

Required: Connect a valid LTC signal, go to *TC BNC mode* and set connector to *TC In*.

Rec run regenerates timecode from the active recording card by continuing seamlessly from the last active value.

Count mode

Sets the preference on how timecode is counted with non-integer project rates: 29.97p, 59.94p, 59.94.

Non-dropframe: TC increases with every frame without compensation, resulting in a 1,001 count for 1,000 frames.

Dropframe: TC values are dropped with a defined pattern (frame counts 00 and 01 of every minute, except every 10th minute) to readjust for the drift. A semicolon between TC seconds and frames indicares active dropframe Timecode.

TC Offset

Adds/substracts an offset to LTC input signals to compensate for TC offsets in external devices.

TC BNC mode

Sets the mode of the TC I/O connector:

Off: Connector not in use.

TC In: Camera samples TC signal from connector.

TC Out: Camera outputs internal TC signal via connector.

14.5   *SHUTTER* settings

You can select your preferred shutter unit: *Shutter angle* converts exposure time into the angle of a virtual rotating mirror shutter as in film cameras.

Note: A fixed angle creates varying exposure times with varying frame rates. You can set angles from 5.0 to 356.0 degrees.

Exposure time shows the effective sensor exposure time. With varying frame rates, it remains identical and can be set from 1/1 to 1/8000 seconds.

Note: Maximum exposure time with a given frame rate is 1/fps. For constant exposure time over the full range of used frame rates, set it to 1/(highest used frame rate).

14.5.1 Selecting a *SHUTTER* unit
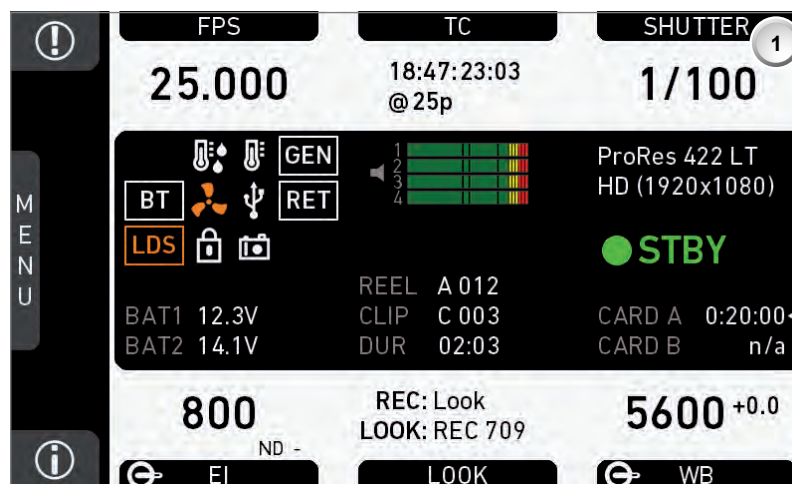
1.   **Note:** A switch icon next to *SHUTTER* (1) means: user switch is set to *SHUTTER.*

2.   Press *SHUTTER* (1) to set the shutter unit:

     ○   **No** switch icon: A list opens (skip forward to "SHUTTER list").

     ○   **With** icon, a switch screen (here: exposure time) opens:
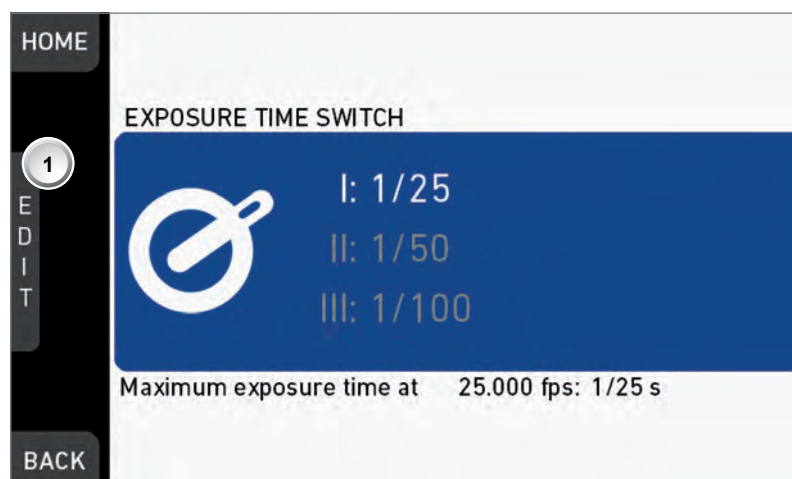
3.   Press the jogwheel (1) to open the *SHUTTER* list:

SHUTTER list

1. Press _SWITCH UNIT_ (1).
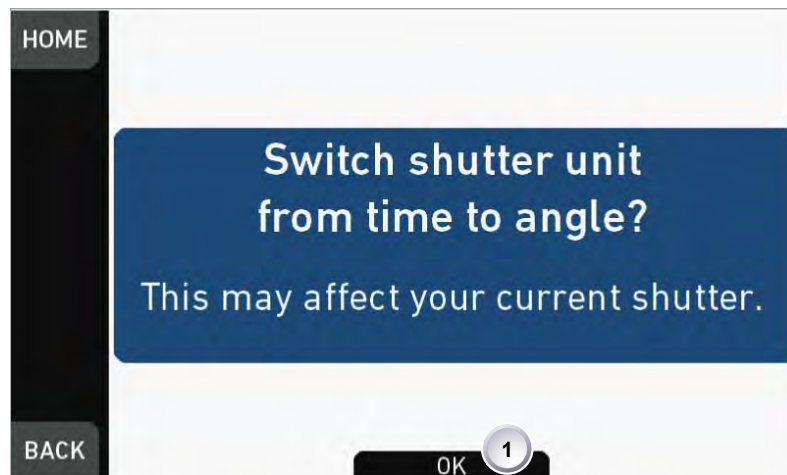
2. Confirm with _OK_ (1).
3. The camera returns to the home screen.
4. The shutter unit has changed (e.g. from time to angle).

Note: How to adjust the shutter for filming a monitor

1. Set unit to angle.
2. Go to _SHUTTER > SELECT > ADD_.
3. Select the third digit (single degrees).
4. Adjust the shutter value until the monitor image flickers the least.
5. Select the fourth digit (sub-degrees).
6. Fine-adjust the shutter value until there is no more flicker visible.
7. Add the shutter value to the list.

14.5.2 Setting/adding a *SHUTTER* value
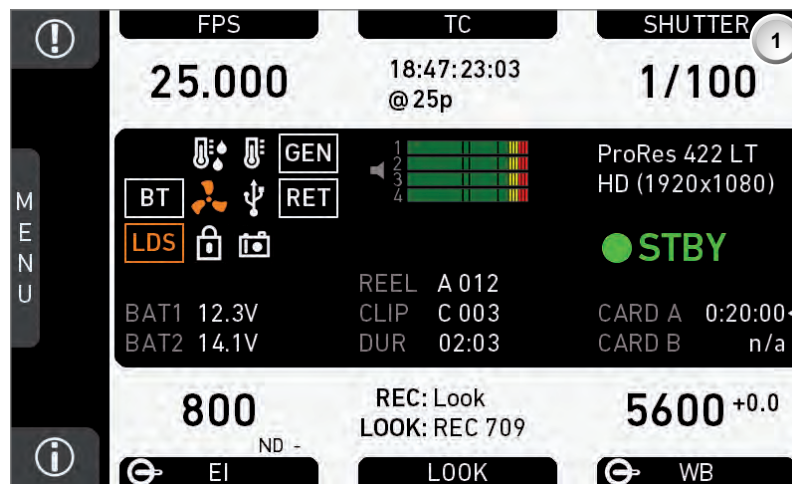
1. **Note:** A switch icon next to *SHUTTER* (1) means: user switch is set to *SHUTTER*.
2. Press *SHUTTER* (1) to set the shutter rate:
    ○ **No** switch icon: A list opens (skip forward to "SHUTTER list").
    ○ **With** icon, a switch screen opens:
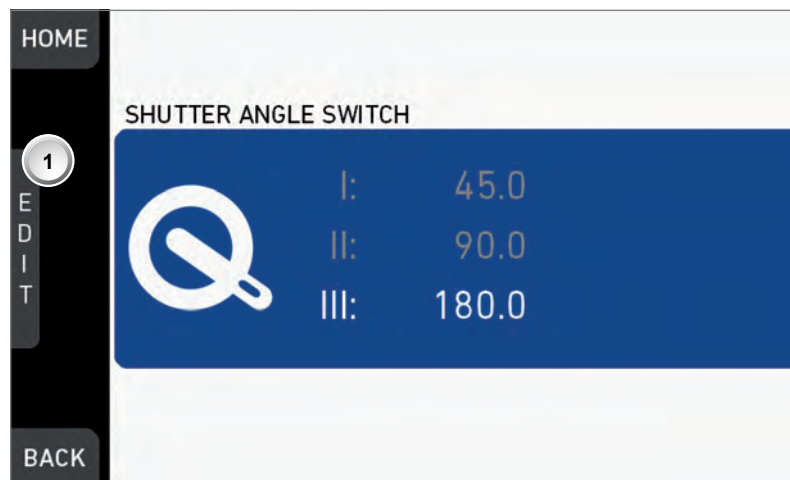
3. **Note:** You can only change the shutter rate for the current switch position.
4. Press the jogwheel (1) to open the *SHUTTER* list:

SHUTTER list

1. Via jogwheel (1), scroll to the required value.
2. Press the wheel (1) to activate the value.
    ▶ If the value is not listed: Press *ADD* (2).
    ▶ **Note:** *ADD* is disabled on reaching the maximum number of 16 list entries.
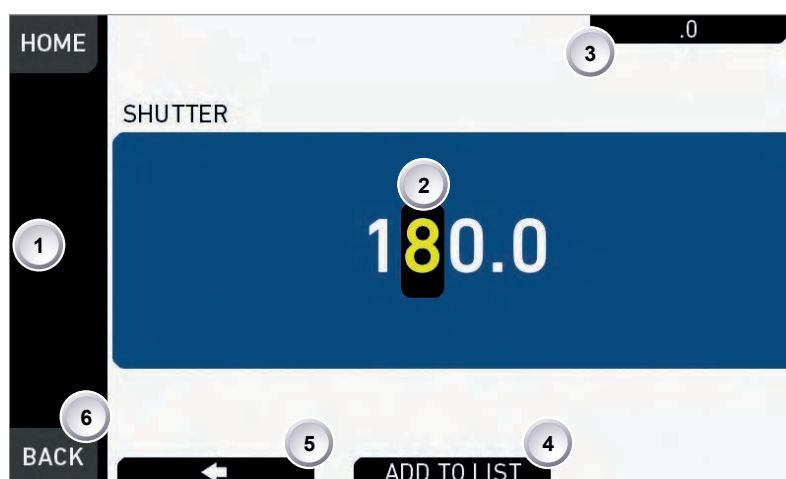
3. Upon pressing *ADD,* an editor opens.
4. Create a value with the jogwheel (1):
    ○ Scroll up or down to increase/decrease.
    ○ Press the jogwheel to select the next digit (2).
    ○ For the previous digit: Press *ARROW* (5).
    ○ To zero the decimals: Press *.0* (3).
5. Press *ADD TO LIST* (4) to save the changes. **Cancel** with *BACK* (6).

14.5.3 Deleting a *SHUTTER* value

1. Open the *SHUTTER* list (here: angle).
2. Press *DELETE* (1).
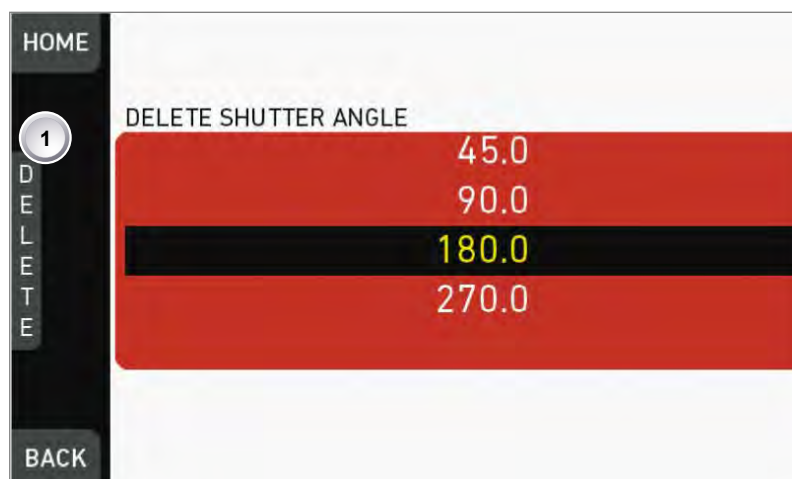
3. The list turns red.
4. Via jogwheel (1), select the obsolete entry.
5. **Note:** You cannot select a currently active value.
6. Press *DELETE* (2).
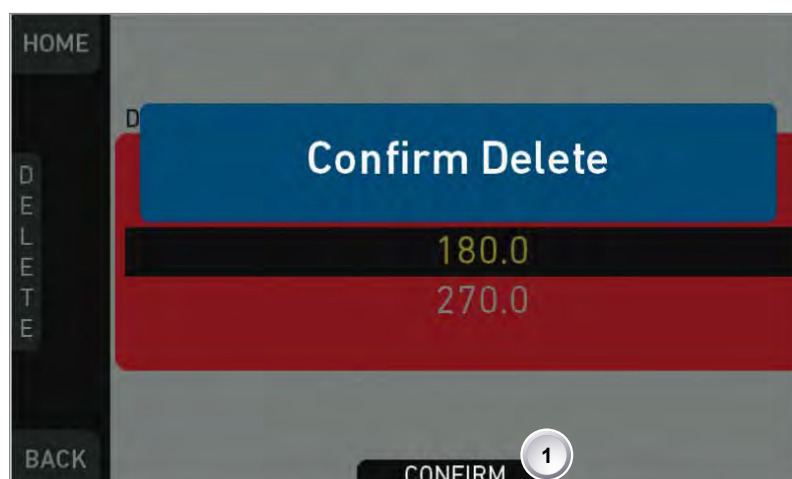
7. Press *CONFIRM* (1). **Cancel** with *BACK.*
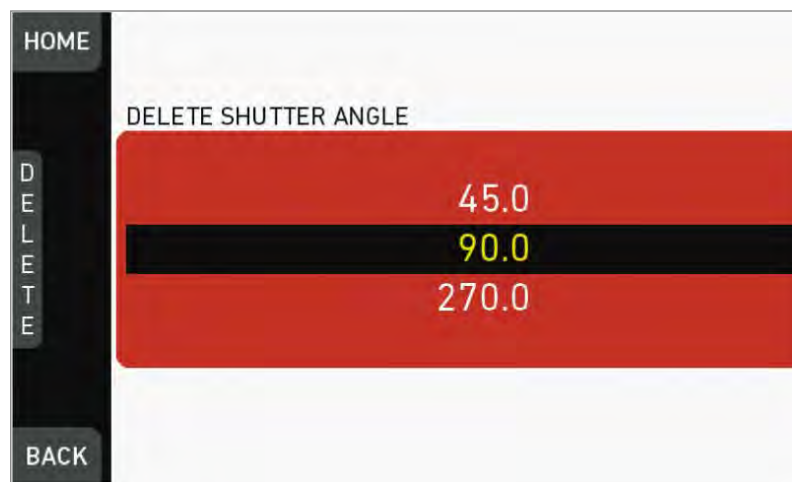
8. The entry is deleted.

14.6 *WB* settings

14.6.1 Setting/adding a *WB* value
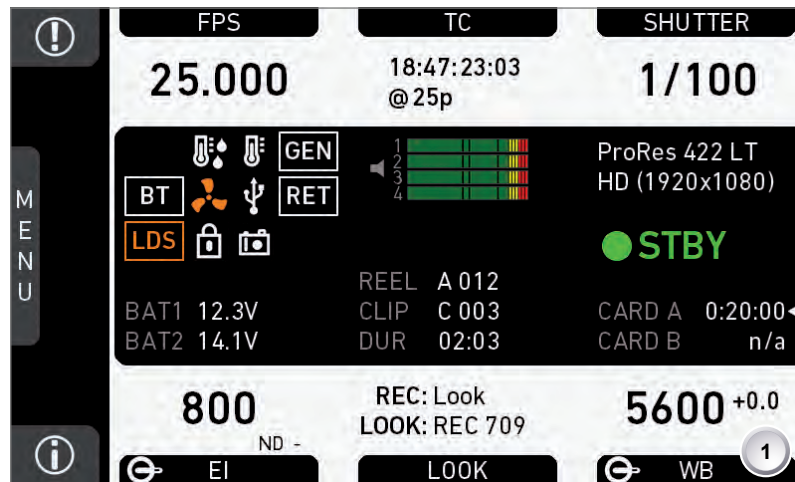
1. Press *WB* (1) on the home screen.
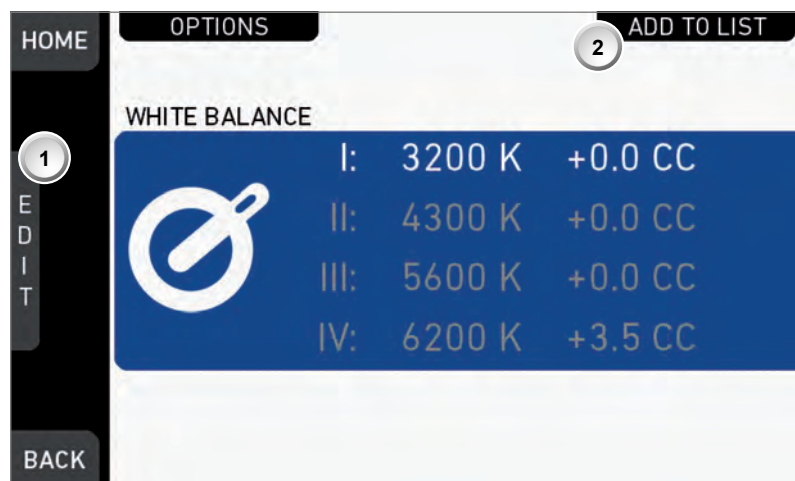
2. A switch screen shows the preset white balance values.

3. You can only add/change the value for the current switch position:

   o **To add a value:** (e.g., a still unlisted *AW* result): Press *ADD TO LIST* (2).

   o **To change a value:** Press the jogwheel (1) to open the *WB* list:

WB list
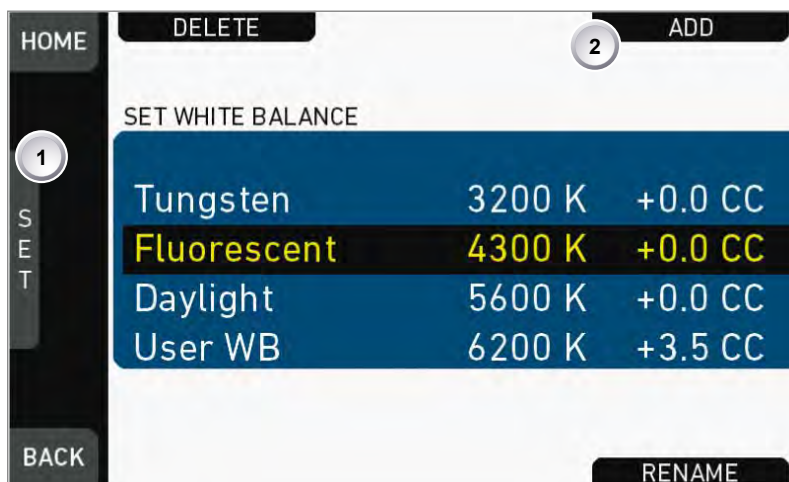
1. Via jogwheel (1), scroll to the required value.

2. Press the wheel (1) to activate the value.

    ▶   If the value is not listed: Press *ADD* (2).

    ▶   **Note:** *ADD* is disabled on reaching the maximum number of 16 list entries.
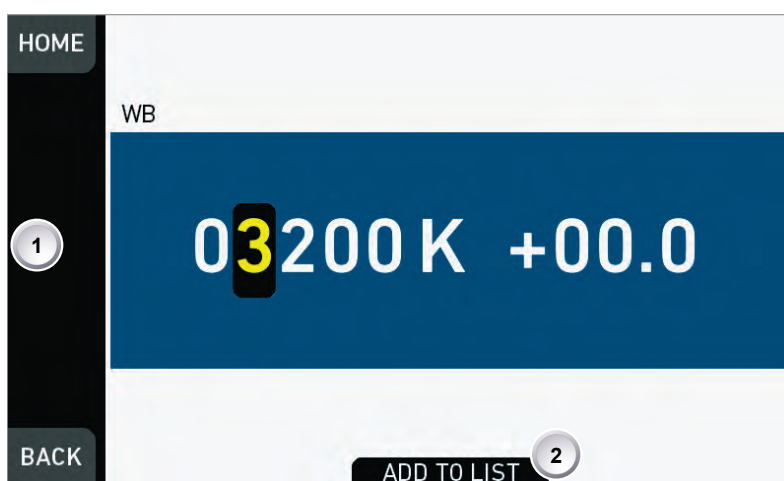

3. Upon pressing *ADD,* an editor opens.

4. Create the *WB* and *CC* values with the jogwheel (1).

    o   Scroll up or down to increase/decrease.

    o   Press the jogwheel to select the next digit.

5. Press *ADD TO LIST* (2) to save the changes. **Cancel** with *BACK.*

14.6.2 Renaming a *WB* value

1.   Open the *WB* list.
2.   Via jogwheel (1), scroll to the required file.
3.   Confirm by pressing the jogwheel.
4.   Press *RENAME* (2).
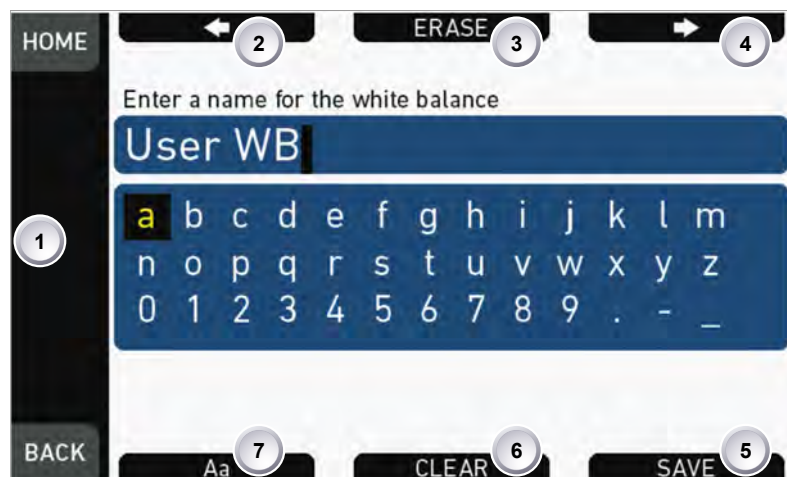
5.   An editor opens:

     ○   *Aa* (7) toggles between upper/lower case.

     ○   *ERASE* (3) deletes the selected character.

     ○   *ARROW* buttons move the cursor back (2) and forth (4).

6.   Via jogwheel (1), select/confirm characters to form a name.
7.   Press *SAVE* (5) when complete.
8.   **Note:** Saving a file with an already existing name is not allowed.
9.   You can also *CLEAR* (6) an entire string/name.

14.6.3 Deleting a *WB* value
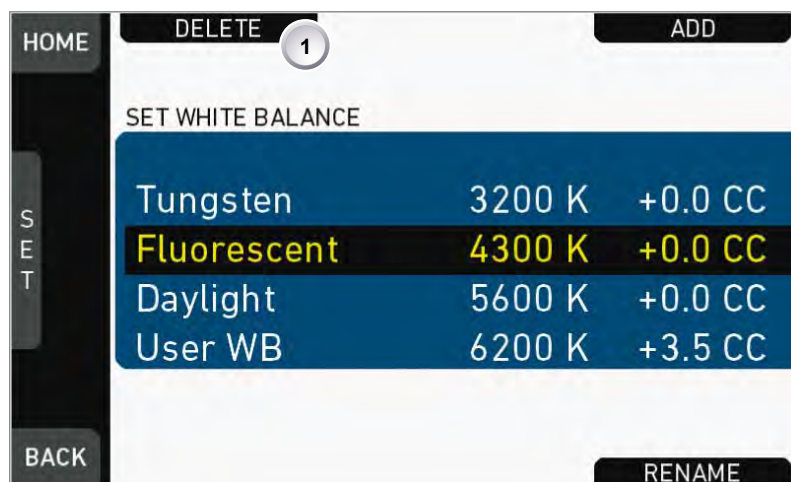
1. Open the *WB* list.
2. Press *DELETE* (1).
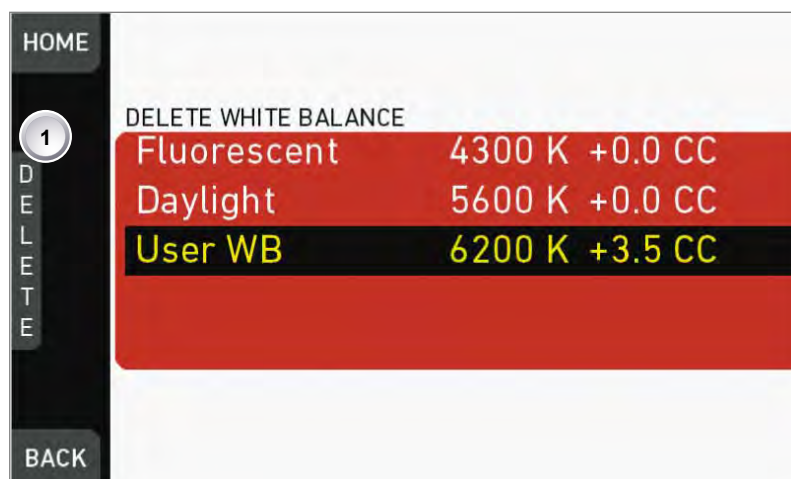
3. The list turns red.
4. Via jogwheel (1), select the obsolete entry.
5. **Note:** You cannot select a currently active value.
6. Press *DELETE* (2).
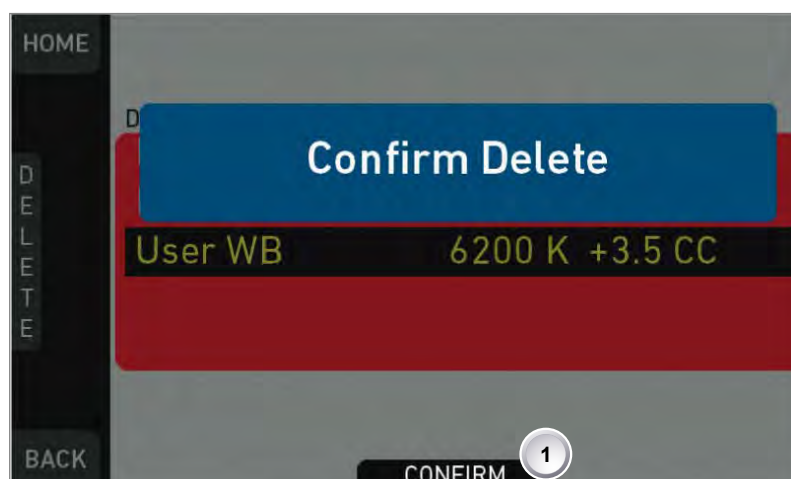
7. Press *CONFIRM* (1). **Cancel** with *BACK.*
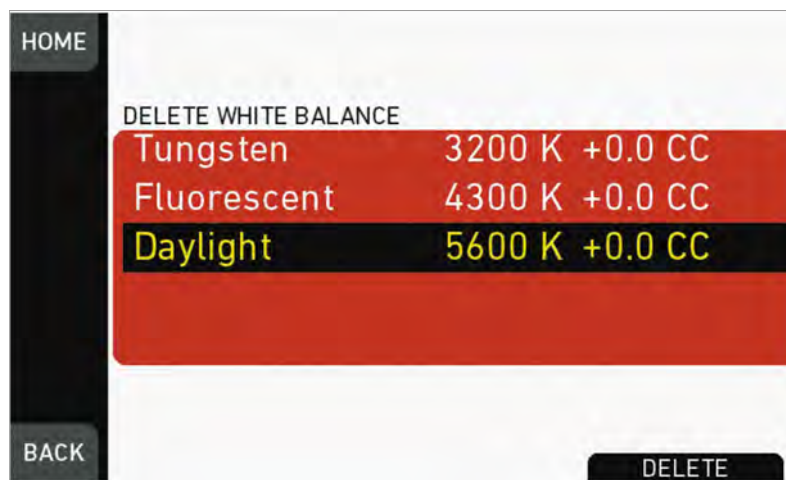
8. The entry is deleted.

14.6.4 *WB* Options
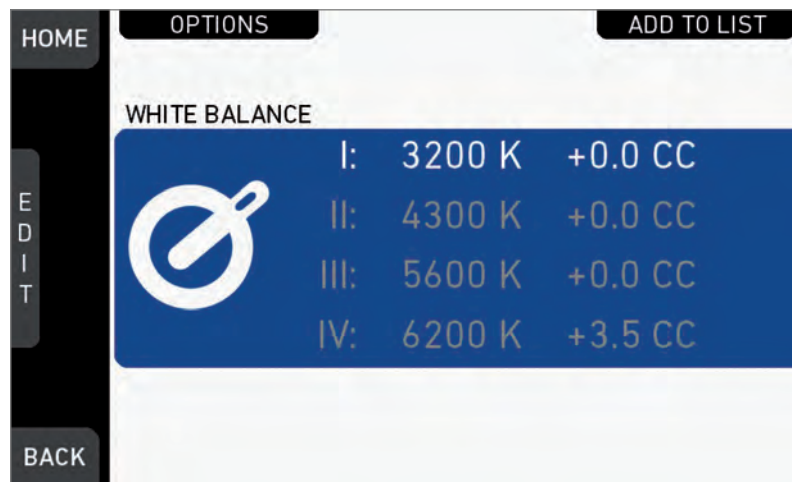
Press *OPTIONS* on the WB switch screen.
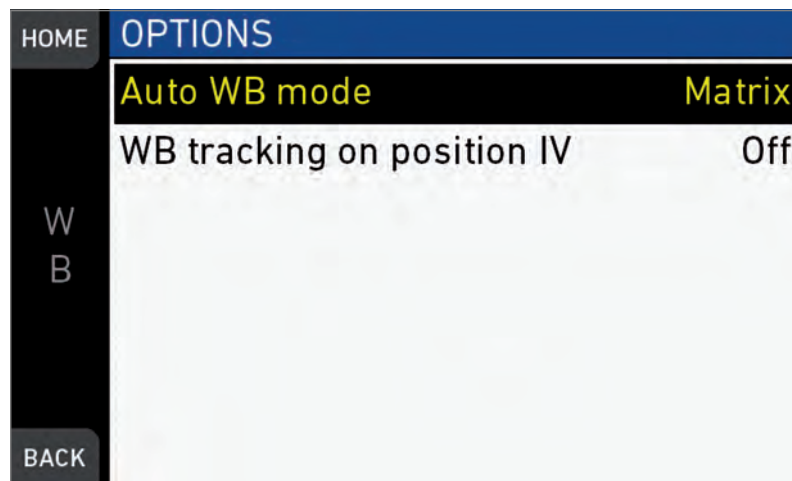
Auto WB mode: Sets the calculation method of auto white balance. See page 151 . Matrix analyzes the full image and uses the image part best suited for WB calculation, while Center uses the image center area only.

WB tracking on position IV: When set to *On*, moving the WB switch to position IV activates automatic white balance tracking, where the white balance value is continuously updatet based on the image scene.
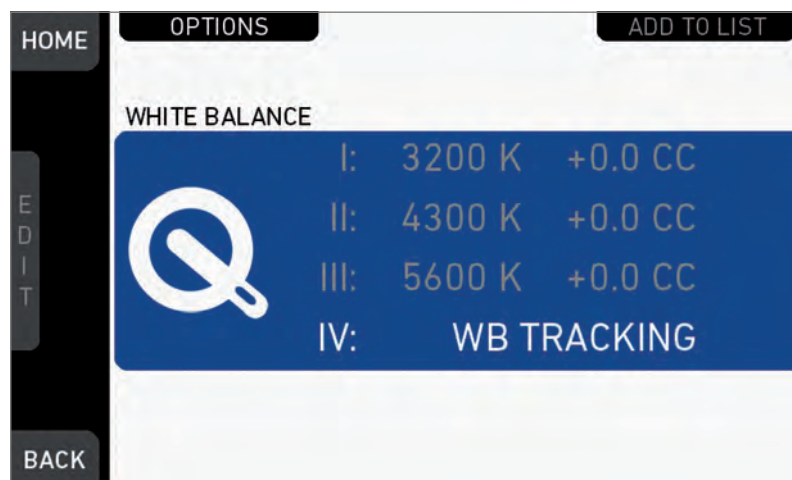
Note: WB tracking always uses Matrix mode for WB calculation.

14.7 *LOOK* and gamma settings

NOTICE
Looks alter the image color in a creative way. Due to a high-quality rendering core, AMIRA applies looks in production quality. Fully in-camera.

REC 709: Renders the video image according to the ITU.R-BT709 standard, for most accurate color reproduction on standard broadcast monitors.

Commercial: Renders the image brighter for smoother skin tones.

Landscape: Applies a steeper contrast curve to the image.

LCC: Low Contrast Curve look that keeps more details in highlights for color correction purposes.

Vibrant (requires advanced license): Boosts color saturation except for red and yellow (skintone protection).

X-2-ALEXA (requires premium license): Matches the color reproduction of AMIRA to the ARRI ALEXA.

14.7.1 Setting the *LOOK* file
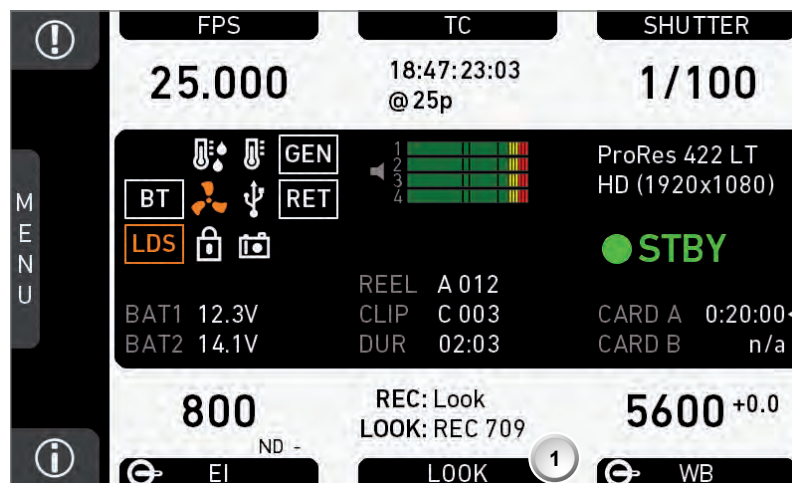
1. **Note:** A switch icon next to *LOOK* (1) means: user switch is set to *LOOK.*

2. Press *LOOK* (1) to set the active look:

    ○ **No** switch icon: A list opens (skip forward to "LOOK list").

    ○ **With** icon, a switch screen opens:
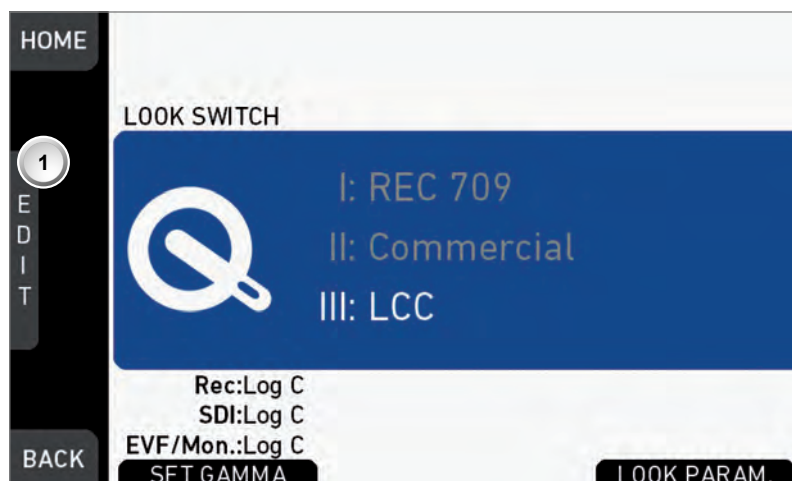
3. **Note:** You can only change the look file for the current switch position.

4. Press the jogwheel (1) to show the active look file:
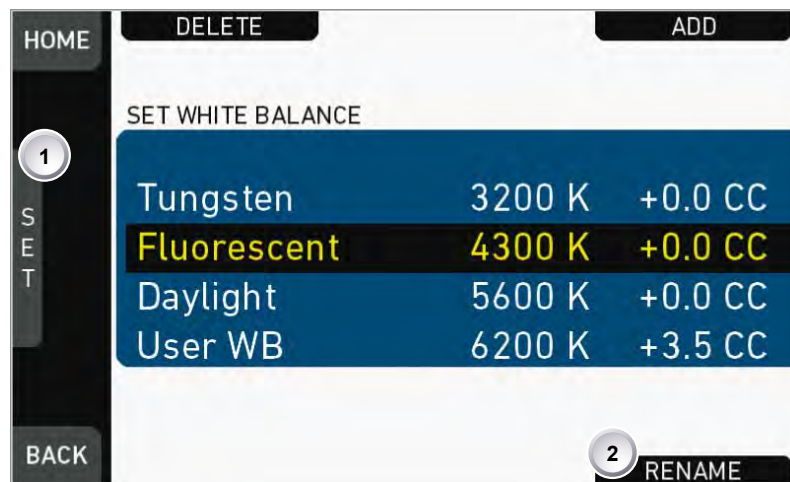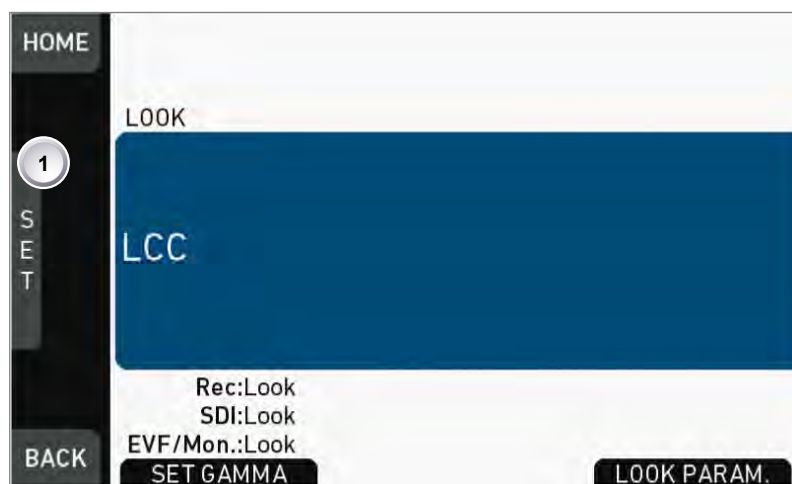

5. Press the jogwheel (1).

LOOK list
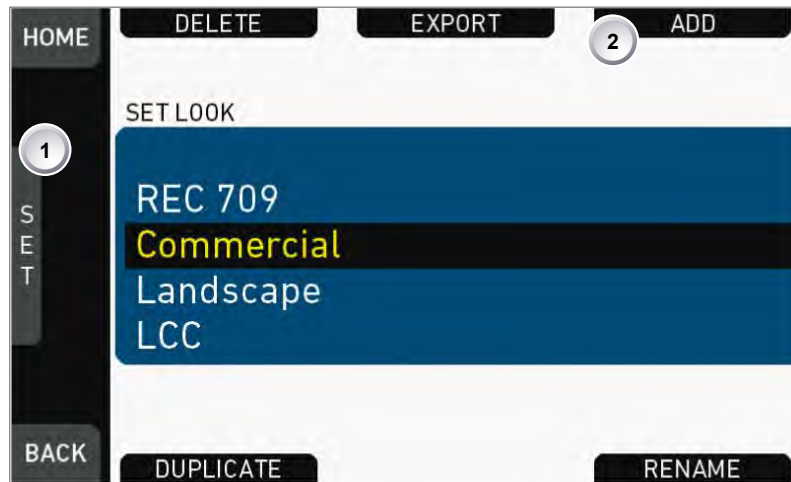
1. Via jogwheel (1), scroll to the required look.

2. Press the jogwheel (1) to activate the look.

    ○   If the look is not listed: Press *ADD* (2). For details, see page 90.

    ○   **Note:** *ADD* is disabled on reaching the maximum number of list entries.

    ○   **Cancel** with *BACK*.

3. The required look is now active.

14.7.2 Setting *Gamma*

NOTICE
Gamma sets the contrast curve of the image and requires an advanced license. By default, the gamma is set through the look file.
Changing the gamma setting to Log C requires an advanced or premium license.
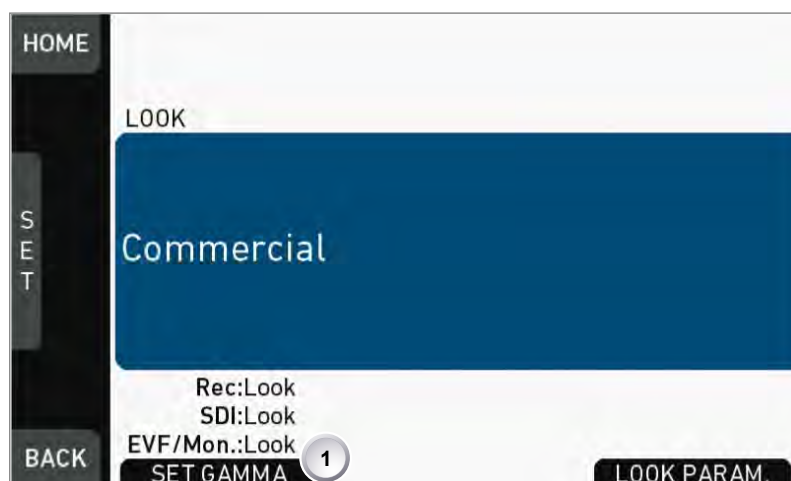
1. Open the active look file.

2. Press *SET GAMMA* (1).
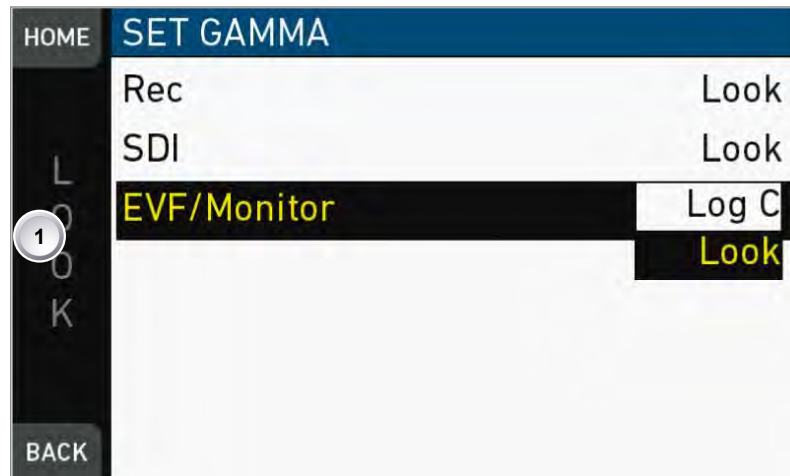
3. The gamma settings for the three different image paths appear.

4. Via jogwheel (1), select and confirm the required gamma for each image path.

Log C

Based on the Cineon format for output to film print or digital intermediate, this logarithmic gamma requires color-grading in postproduction.

On standard broadcast monitors, LOG C images appear flat and desaturated. Proper display, dailies and editing proxies require a conversion look-up table (LUT).

Create preview LUTs with the ARRI LUT Generator at www.arridigital.com.

LOOK

Applies a video display gamma to camera images. The default *REC 709* look complies with the ITU.R-BT709 standard for display on standard broadcast monitors.

14.7.3 Adding a *LOOK* file

NOTICE
You can add look files either from the camera default look folder or via a USB memory stick (depending on license).
Look files are copied from the USB to the camera. If you remove the memory stick, the installed look files remain accessible.

1. Save all look files to be added on a properly prepared USB memory stick, in the folder /ARRI/AMIRA/LOOKFILES.
2. Open the media lid (1).
3. Connect the USB memory (3) to the camera (2).

HOME > LOOK > SET LOOK
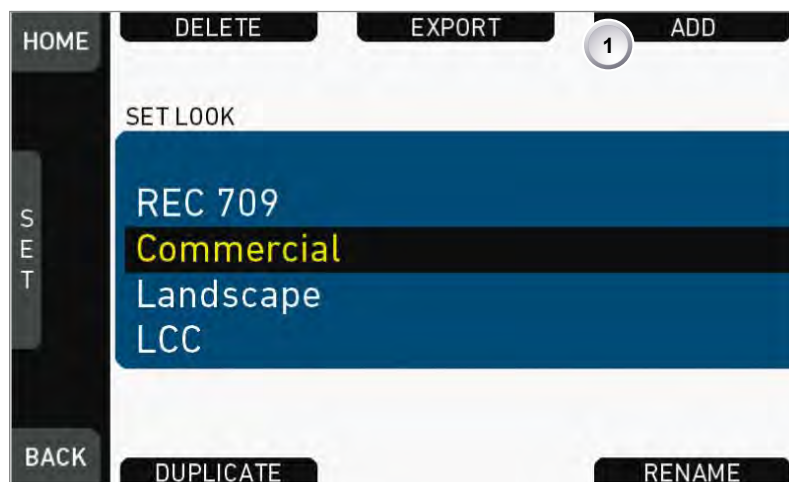
4. Open the list of installed looks.
5. Press *ADD* (1).
6. **Note:** *ADD* is inactive/gray if the maximum number of looks (20) is installed.
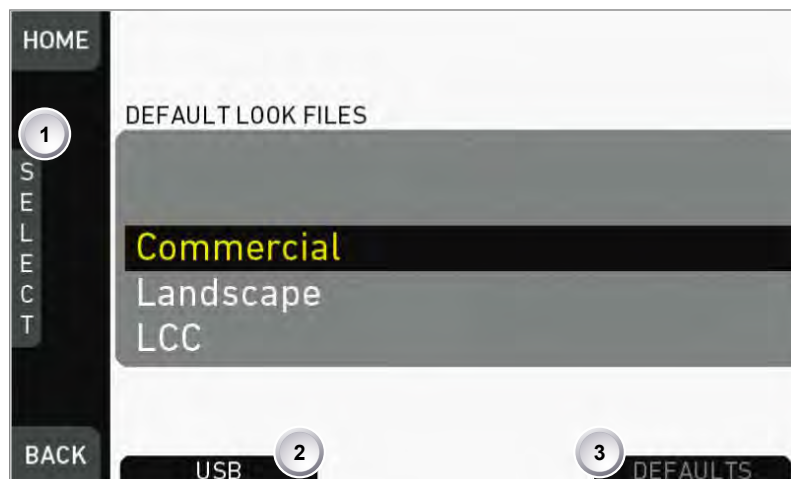
7. A list of default look files appears.

8. If sufficiently licensed: Press *USB* (2) or *DEFAULTS* (3) to select a file source:

   ○ *DEFAULTS:* ARRI default look files delivered with the camera.

   ○ *USB:* User look files on the camera USB stick.

9. Via jogwheel (1), scroll to the required file.

10. Confirm by pressing the jogwheel (1).

11. **Note:** Use unique file names to avoid possible overwritings. For details on file naming, see page 96.

12. Repeat for other look files if required.

14.7.4 Deleting a *LOOK* file

NOTICE
User-defined look files are deleted irreversibly. For loss prevention and future re-installation, always export user-defined look files to a USB memory stick before deletion. Default looks are re-installable without prior export.

HOME > LOOK > SET LOOK
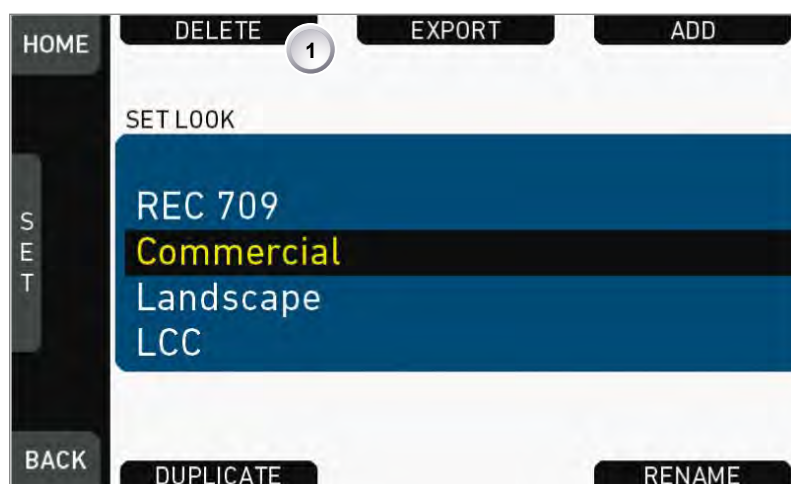
1. Open the list of installed looks.

2. **Note:** REC 709 is pre-installed and non-deletable.

3. Press *DELETE* (1).
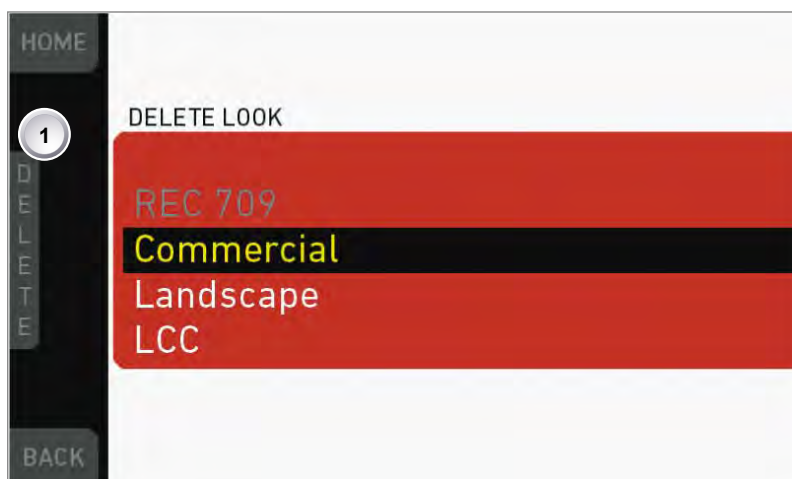
4. The list turns red.

5. Via jogwheel (1), select the obsolete entry.

6. **Note:** You cannot select a currently active value. This may apply to more than one look if the user switch is, or was previously, set to look.

7. Press *DELETE* (2).
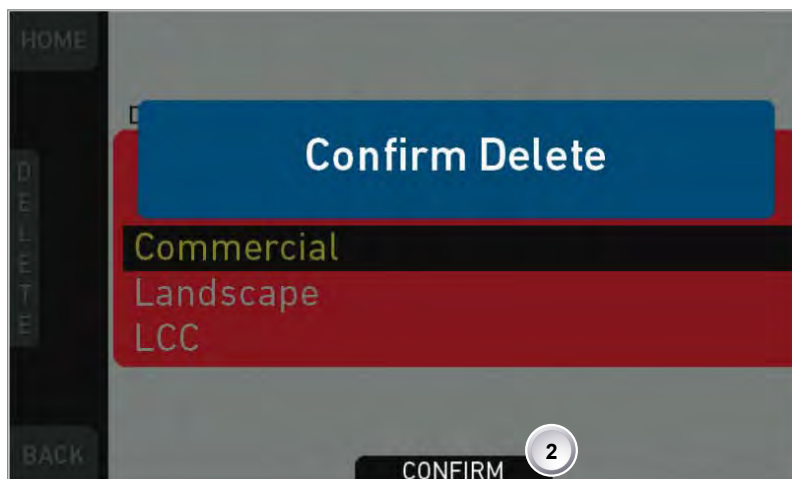
8. Press *CONFIRM* (1). **Cancel** with *BACK.*
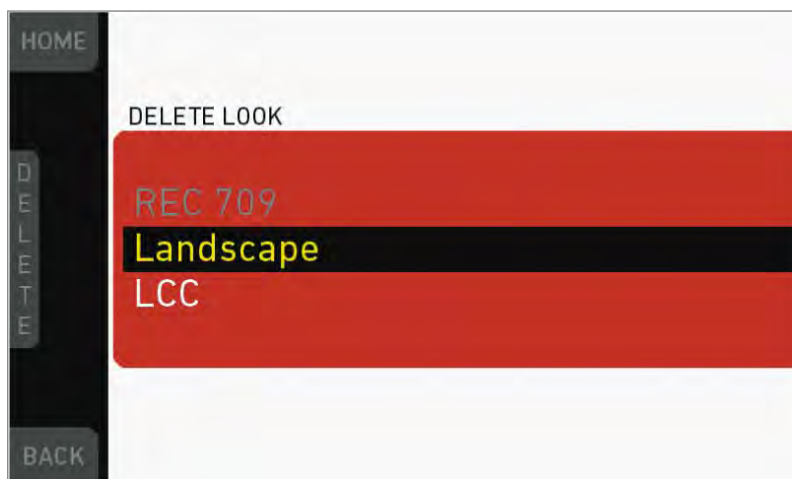
9. The entry is deleted.

14.7.5 Exporting a *LOOK* file
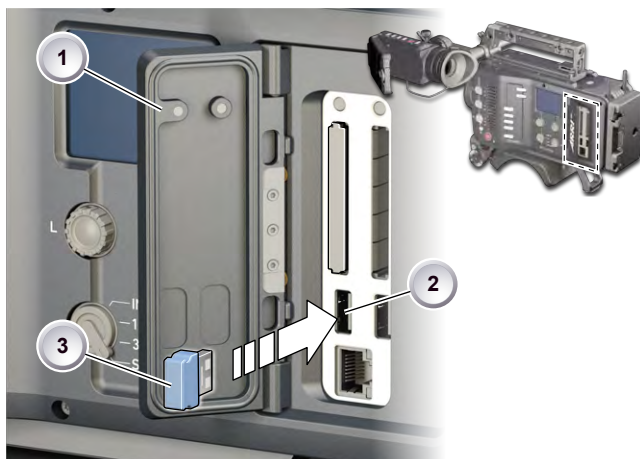
1. Properly prepare a USB memory stick.

2. Open the media lid (1).

3. Connect the USB memory (3) to the camera (2).

HOME > LOOK > SET LOOK
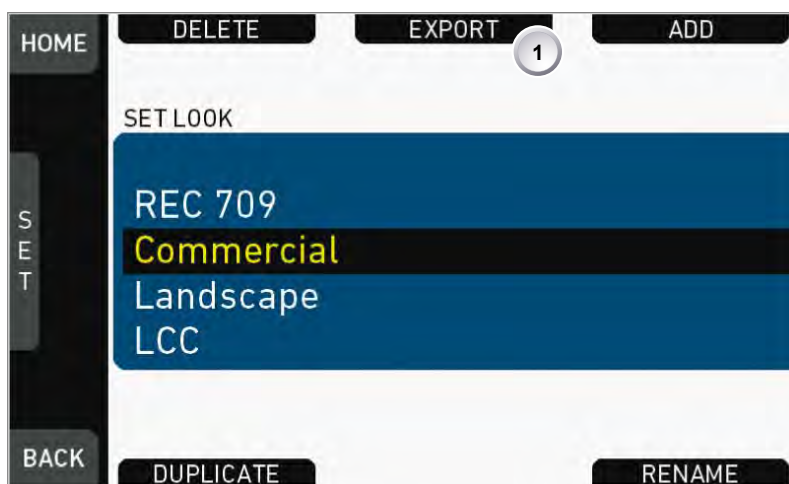
4. Open the list of installed looks.

5. Press *EXPORT* (1).
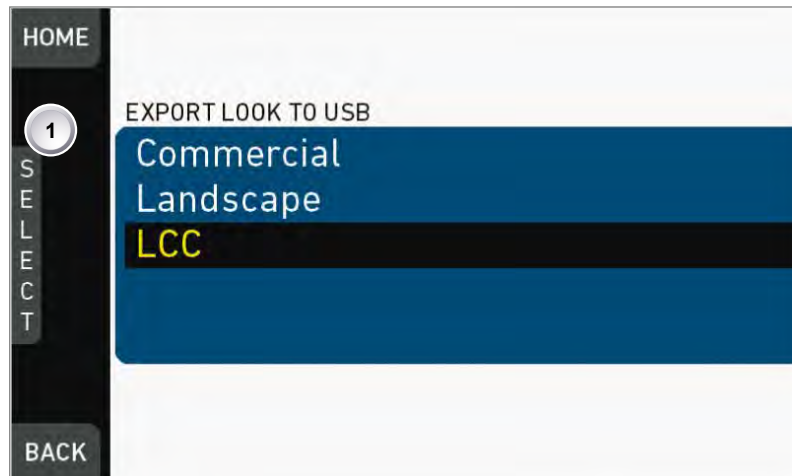
6. An export list appears.

7. Via jogwheel (1), scroll to the file for export.

8. Confirm by pressing the jogwheel (1).

9. **Note:** Rename a file to avoid possible overwritings. For file naming, see page 96.

14.7.6 Duplicating/renaming a *LOOK* file

NOTICE
By duplication you can create a new look based on an existing one. For a new look from scratch, duplicate REC 709 and edit its parameters. Except for REC 709, you can rename all look files.
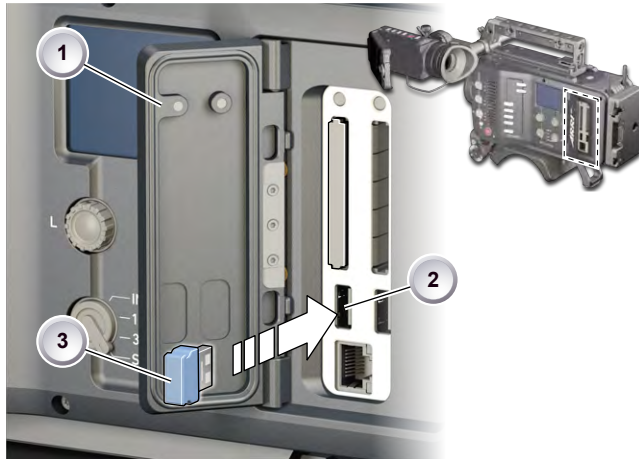
1. Properly prepare a USB memory stick.

2. Open the media lid (1).

3. Connect the USB memory (3) to the camera (2).

HOME > LOOK > SET LOOK
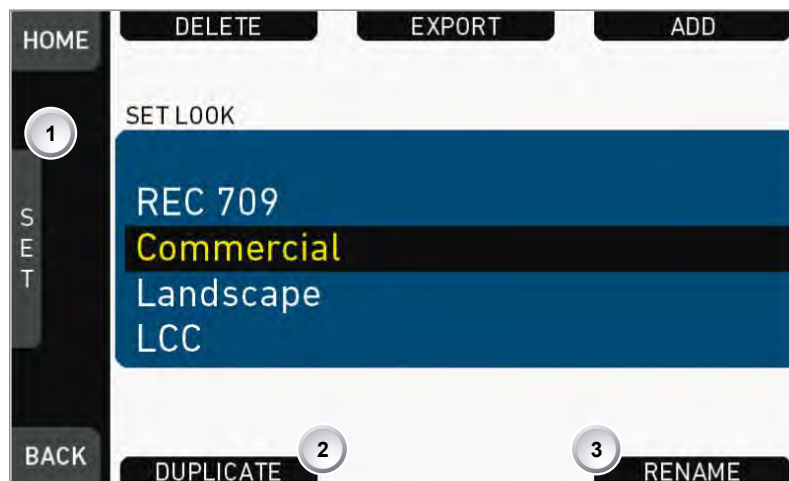
1. Open the list of installed looks.

2. Via jogwheel (1), scroll to the required file.

3. Confirm by pressing the jogwheel.

4. Press *DUPLICATE* (2) and/or *RENAME* (3).
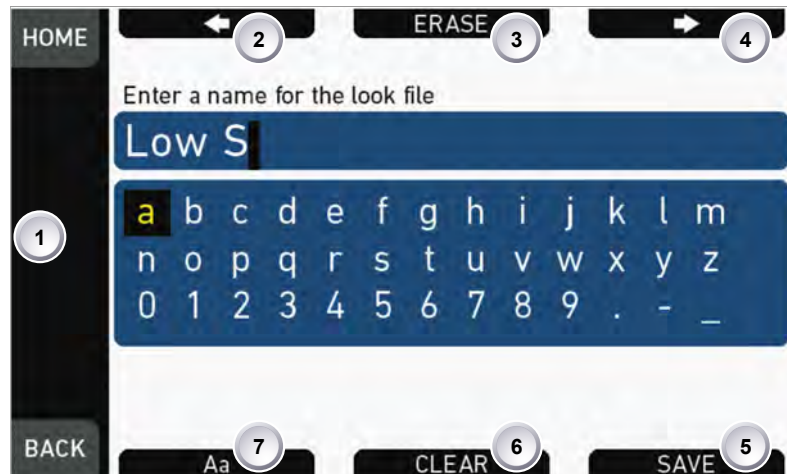
5. An editor opens:

    ○ *Aa* (7) toggles between upper/lower case.

    ○ *ERASE* (3) deletes the selected character.

    ○ *ARROW* buttons move the cursor back (2) and forth (4).

6. Via jogwheel (1), select/confirm characters to form a name.

7. Press *SAVE* (5) when complete.

8. **Note:** Saving a file with an already existing name is not allowed.

9. You can also *CLEAR* (6) an entire string/name.

14.7.7 *LOOK* editing

NOTICE
Editing will overwrite and existing look file and its values. To prevent this, duplicate the look first, and then edit the duplicate. REC 709 cannot be edited.

HOME > LOOK
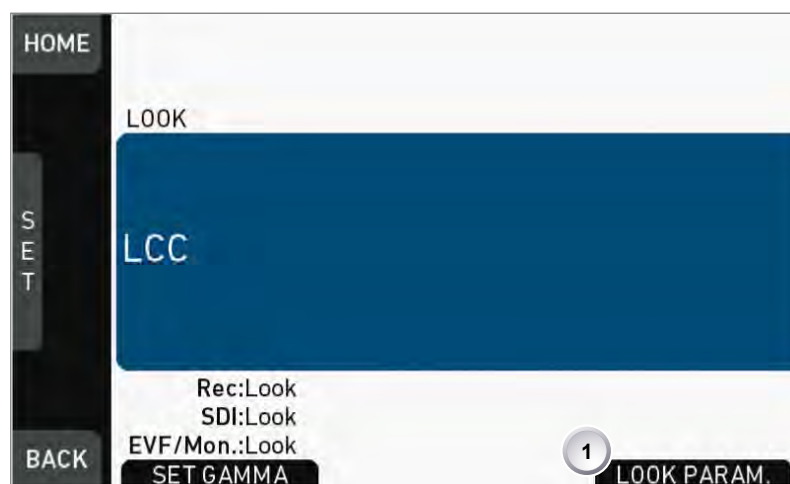
1. Via the home screen, open either the active *LOOK* (see above) ...

2. ... or the current *LOOK SWITCH* position (see below):
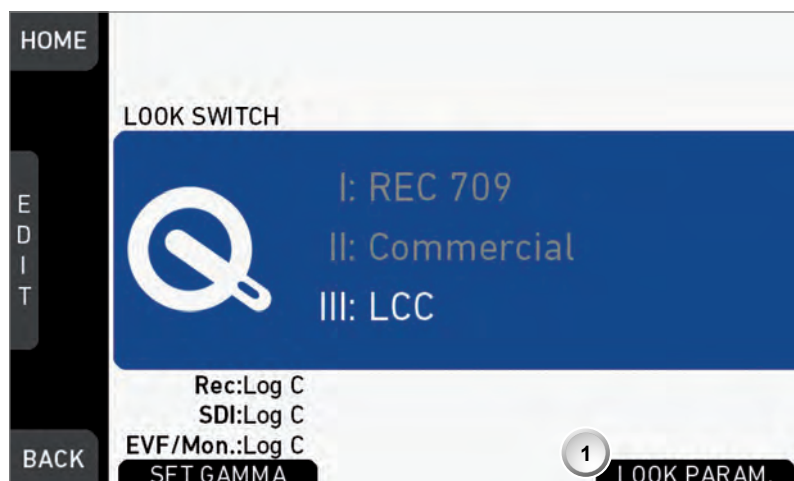
3.   In both cases: Press *LOOK PARAM.* (1).
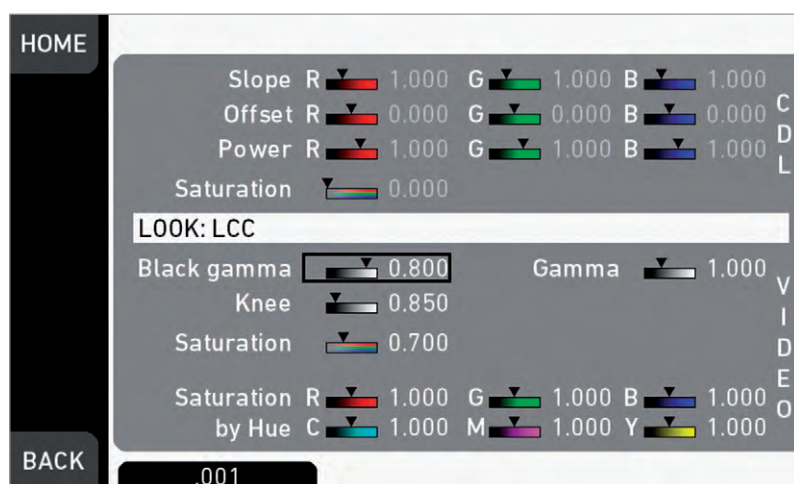
4.   All look parameters appear. Non-licensed ones (here: *CDL*) are grayed out.

5.   For details, see page 99.
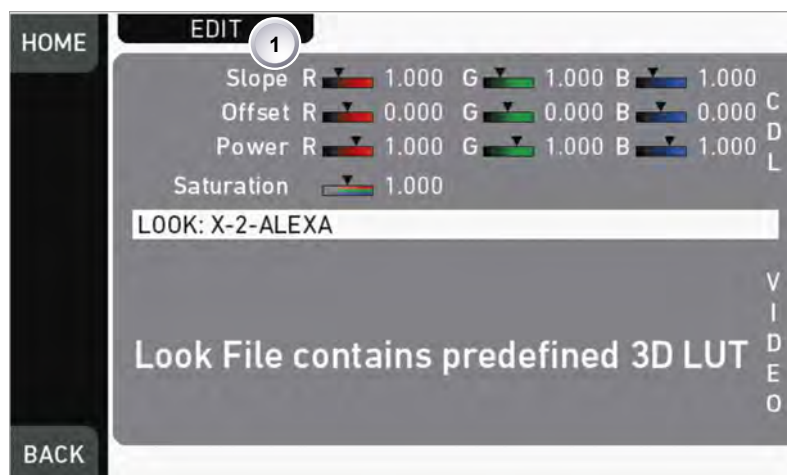
6.   Look files with a 3D-LUT offer no *VIDEO* parameters.

7.   Press *EDIT* (1).
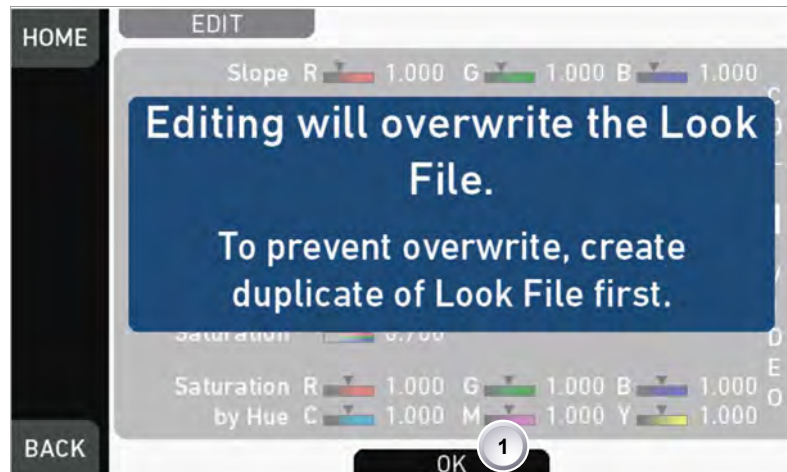
8. A warning on file overwriting appears.

9. Press *OK* (1) to close the warning.
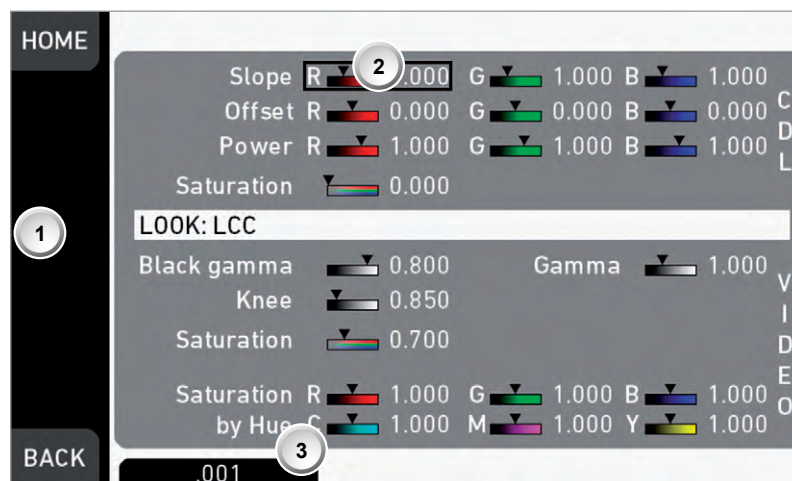
10. An editor opens.

11. Via jogwheel (1), scroll to the required parameter.

12. A black frame (2) marks your selection.

13. Pressing the lower right screen button (3) toggles the edit step size between 0.001, 0.01, and 0.1.

14. Press the jogwheel (1) to start editing the selected value.
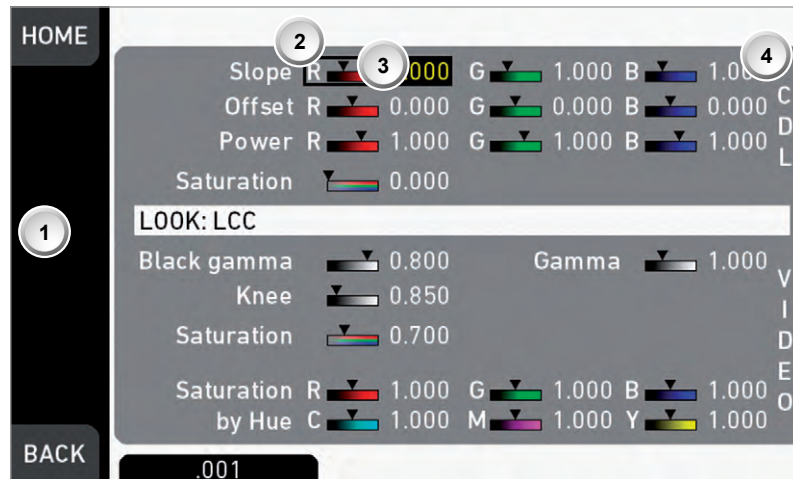
15. A yellow-on-black font (3) marks the edit mode.

16. Confirm the new value by pressing the jogwheel (1).

17. Edit more parameters if required.

18. After editing: Press *SAVE* (2).

19. To revert all changes: Press *UNDO CHANGES* (4).

20. **Note:** Recording while editing will save all changes automatically.

14.7.8 *LOOK* parameters

NOTICE
A look file contains different parameters for image alterings. Editing LOG C parameters requires the advanced license.
User-defined looks may contain a non-editable 3D LUT instead of video parameters. Import of looks with 3D LUTs requires the premium license.

HOME > LOOK > SET LOOK > SET PARAM.
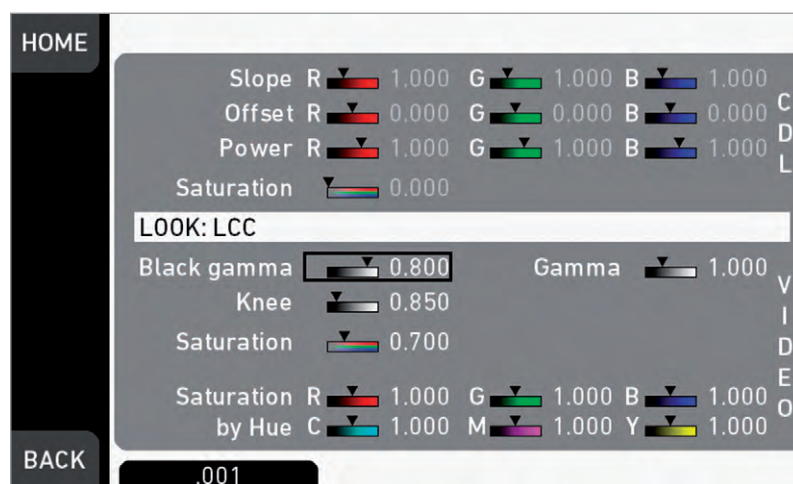
Slope, Offset, Power, Saturation affect *ASC CDL* images under Log C.

Black Gamma, Gamma, Knee, Saturation, Saturation by Hue affect *VIDEO* images.

ASC CDL parameters are applied to the image before *VIDEO* parameters. Please refer to the ARRI white paper on color parameters (for download at www.arri.com).

Note: All look transforms, including ASC CDL, are applied in the conversion from Log C to Video color space. When you choose Log C as gamma for an image path, the clean Log C image is routed to this path.

14.7.8.1 ASC CDL Transforms

The American Society of Cinematographers has specified a set of transforms that have become a standard in postproduction. They are determined by slope, offset, power and saturation (applied in that order).

All these parameters are based on simple color manipulations (multiplying with a factor, adding an offset, raising to an exponent). Noted as "Color Decision List" (ASC CDL), they offer an exchange format for basic look transformations between color correction systems and editing tools by different manufacturers.

The AMIRA image processing applies ASC CDL transforms to the Log C encoded image. This allows manipulations such as exposure correction or bringing down highlights, before the picture is converted to the display color space with its steeper contrast curve.

ASC CDL adjustments are available for AMIRA Advanced and Premium.

Slope

The linear section of the Log C curve is equivalent to the gamma of a negative film stock. The Log C curve has a default gamma of approximately 0.51 (adjustable via slope parameter).

A slope value of 1.2 will have a similar effect as using negative stock with a gamma of 0.6 (= 1.2 * 0.5). A value below 1.0 will lower the gamma accordingly.

Offset

This most intuitive CDL parameter has a similar effect as increasing the exposure index on the camera. If you are familiar with the motion picture print film process, it's the same as printer lights.

Power

Via power you can adjust the mid tones, similar to the Gamma parameter in video color grading. A power value below 1.0 will increase, a value above 1.0 willl decrease the mid tone brightness.

(Log) Saturation

This parameter affects the saturation of all color components in the Log domain. A value of 1.0 represents the default saturation.

14.7.8.2 3D LUT and video look parameters

Via 3D LUT (lookup table), the camera generates a Rec 709 video image from Log C data. Next to the ASC CDL parameters, which apply to the Log C image, the camera also offers a set of video look parameters (VLP) for tone mapping and color transformation of the rendering 3D LUT.

VLPs determine knee, black gamma and the gamma of the tone map curve, which qualify the contrast of the output image. They also include values for saturation and the saturation by hue for six color vectors (green, yellow, red, magenta, blue, cyan). Whatever the adjustments, the underlying 3D LUT always converts Log C to Rec 709 color space.

Video look parameters are available in all AMIRA license bundles.

Knee

The knee parameter controls the transition of mid-tones into highlights. Values below 0.5 (default) produce harder highlights, higher values soften them. Knee is applied to all channels equally (master control). It has no effect on the mid gray level.

Black gamma

The black gamma controls the shadow detail in the image. Values below 0.5 (default) bring down, higher values brighten the blacks. Black gamma is applied as master control. It only affects the mid gray level for very high values.

Gamma

This setting can be used to brighten or darken the mid tones, while leaving the black and white level unchanged. Values below 1.0 (default) will darken; higher values will brighten the image.

(Video) Saturation

The VLP set also includes a saturation control, with a similar effect as the ASC saturation control. A value of 1.0 represents the default saturation.

Saturation by Hue

This parameter set allows you to control the saturation for six color vectors (red, yellow, green, cyan, blue, magenta) independently.

14.7.8.3 Custom 3D LUT

For AMIRA Premium look files, you can create and export custom 3D LUTs from a color grading tool. You must store them in the AMIRA look file format:

- With the free AMIRA Color Tool from www.arri.com
- Or directly in the color correction tool (if it supports the export of AMIRA Look Files).

Using a custom 3D LUT disables the video look parameter controls. The resulting look, however, can still be tuned via ASC CDL parameters.

A grading system usually allows better and finer color adjustments for all these parameters. It also offers additional manipulations not available with the set of CDL and VLP values, such as:

- Ability to pick any key color (not just one color vector)
- Change of chromaticity (not just saturation)

Generating a 3D LUT

1. Load Log C footage into a color grading tool supporting the AMIRA Look File Format.
2. Apply creative color grading.
3. Apply Log C to Rec 709 video rendering (or any other output color space).
4. Show the resulting look on a reference monitor.
5. Export the look as a concatenated 3D LUT (use the transforms from step 2 and 3).

Note: For more details, please read the white paper *AMIRA Color by Numbers* for download on www.arri.com.

14.8 *EI* settings
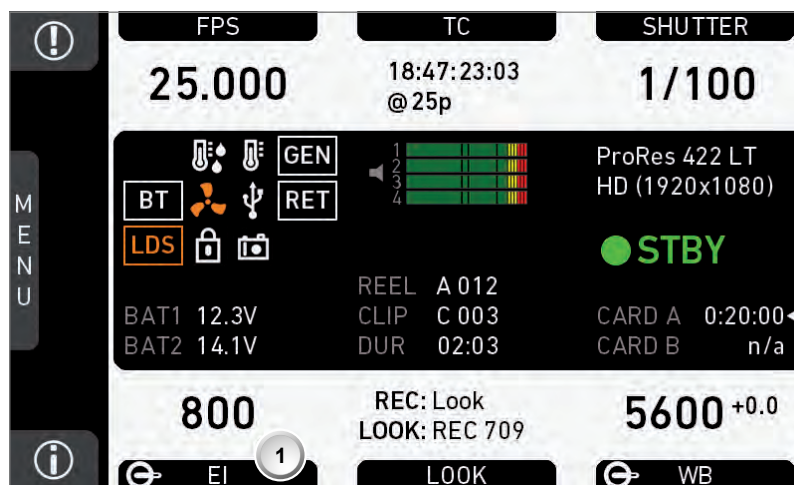
1. Press *EI* (1) on the home screen.
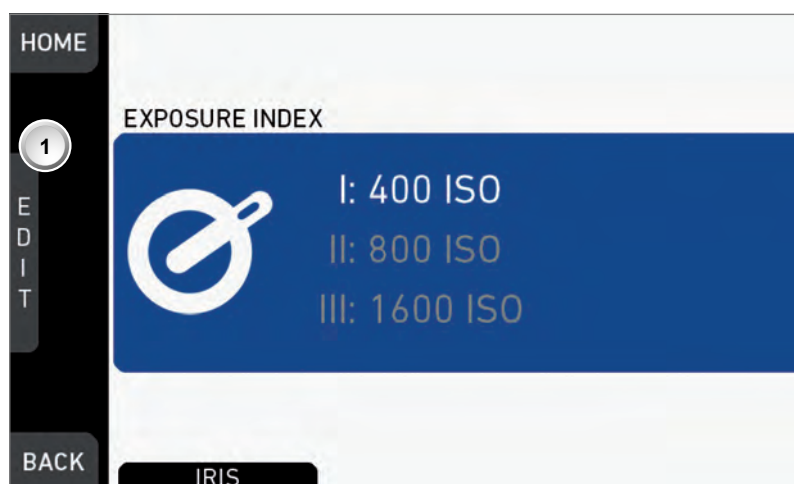
2. A switch screen shows the preset exposure indexes.
3. You can only change the value for the current switch position.
4. Press the jogwheel (1) to open an editor:
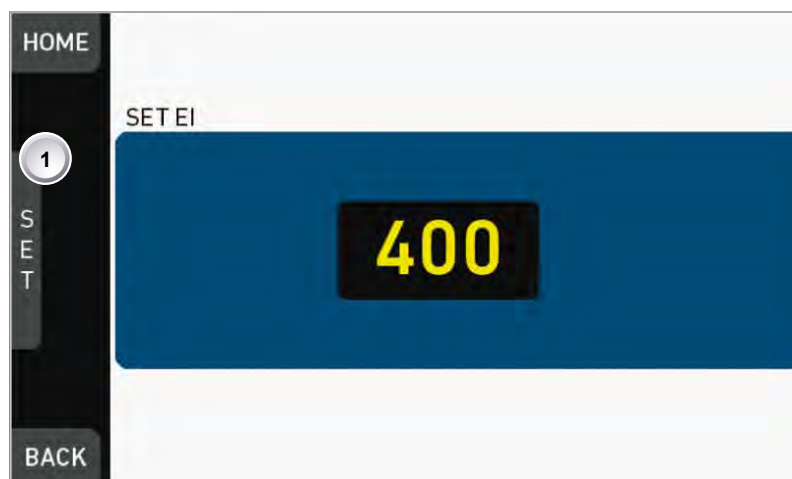
5. Select a value with the jogwheel (1):

    ○   Scroll up or down to increase/decrease.

    ○   Press the jogwheel (1) to confirm. **Cancel** with *BACK.*

14.8.1 *EI* technical details

The Exposure Index (EI) is the applied sensitivity of the camera. The AMIRA 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 AMIRA's sensitivity can be set from 160 to 3200 ASA in steps of 1/3 stops while maintaining high image quality:

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

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 change from almost overexposed to overexposed.

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 there will be even more headroom in the highlights:
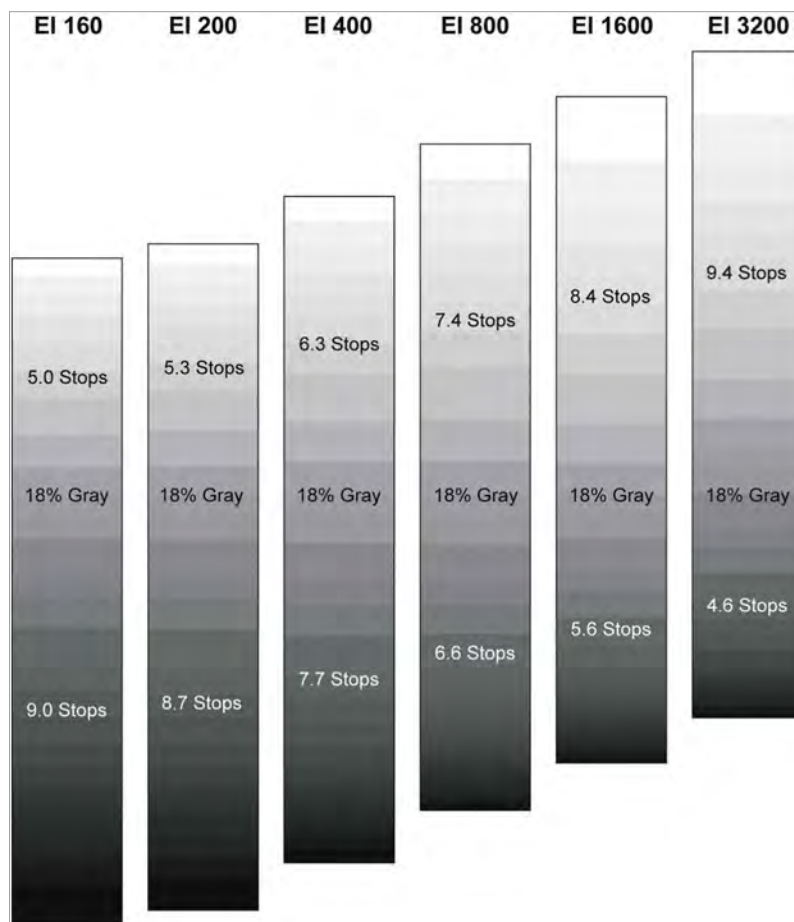
15 Camera menu

The camera menu on the monitor gives access to all camera functionalities not on the home screen.
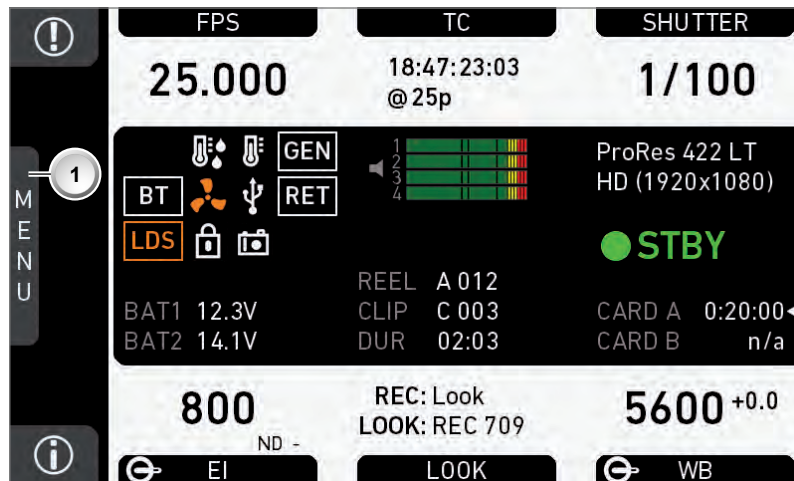
1. To access the menu: Press the jogwheel (1) while on the home screen.
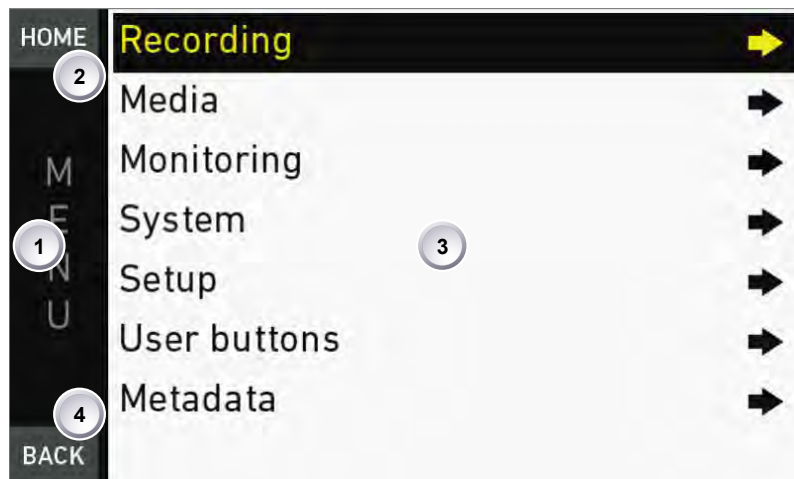
1. Via jogwheel (1), scroll up or down to the required entry (3).

2. To enter: Press the jogwheel (1).

3. Entries with an arrow navigate to a lower menu level.

    ○ To navigate deeper: Press the jogwheel (1).

    ○ To return to a higher menu: Press *BACK* (4).

4. Entries with a value allow direct editing.

    ○ To edit a value: Turn the jogwheel (1).

    ○ To confirm and end editing: Press the jogwheel (1).

    ○ To cancel editing: Press *BACK* (4).

5. To leave the menu: Press *HOME* (2).

16   *MENU > Recording*
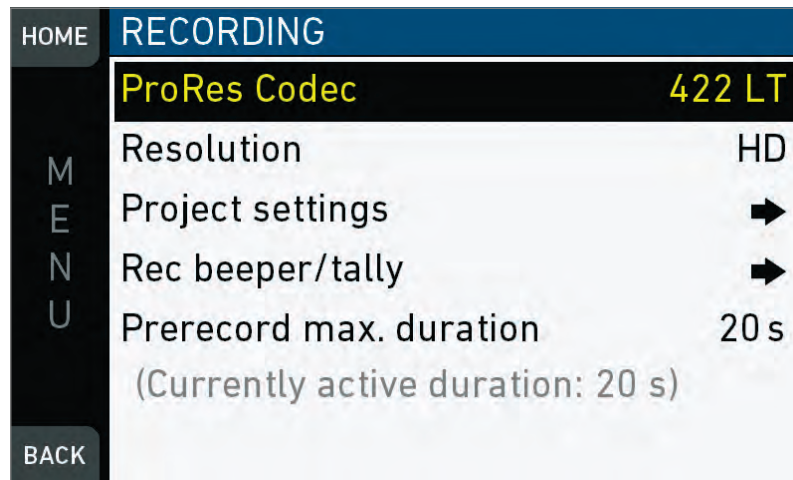
Available menu items (codecs, resolution/frame rates, etc.) depend on the installed camera license.

16.1 *ProRes Codec*

MENU > Recording > ProRes Codec

Allows you to select one of the following recording codecs:

Recording codec	Color coding	Bit rate ***
ProRes 422 LT	10 bit YCbCr	90 Mb/s
ProRes 422	10 bit YCbCr	125 Mb/s
ProRes 422 HQ*	10 bit YCbCr	185 Mb/s
ProRes 4444**	12 bit RGB	280 Mb/s

* Requires advanced license. ** Requires premium license. *** 24 fps, 1920x1080.

16.2 *Resolution* (requires premium license)

MENU > Recording > Resolution.

Toggles between the following recording resolutions:

HD: records images in 1920x1080 resolution.

2K: records images in 2048x1152 resolution.

3.2K:* records images in 3200x1800 resolution.

4K UHD:* records images in 3840x2160 resolution.

Note: Changing between HD/2K and 3.2K/4K UHD or vice versa causes a SW reboot. The monitor shows the homescreen when the reboot is finished.

* requires installed 4K UHD license.

16.3   Project settings

16.3.1 *Project rate*
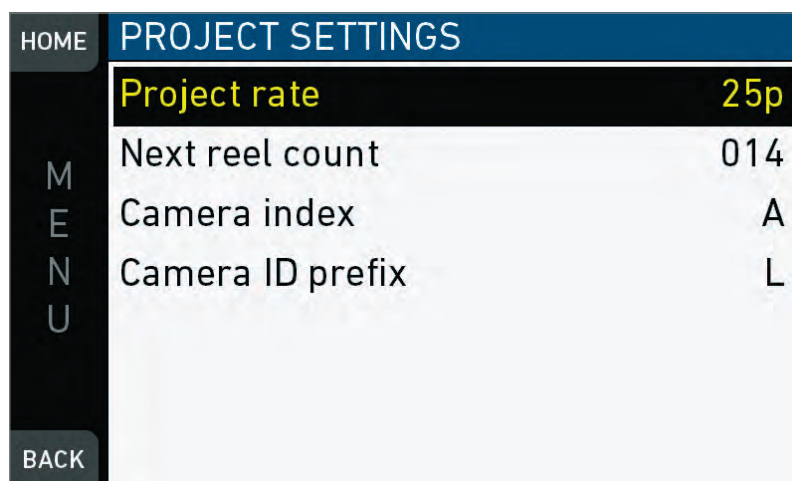
MENU > Recording > Project settings > Project rate

Offers the following options for setting a Timecode time base and playback frame rate:

Project rate	Scan format	Sensor real-time recording
23.976p	Progressive	23.976 fps
24p	Progressive	24 fps
25p	Progressive	25 fps
29.97p	Progressive	29.97 fps
30p	Progressive	30 fps
48p	Progressive	48 fps
50p	Progressive	50 fps
59.94p	Progressive	59.94 fps
60p	Progressive	60 fps
50i	Interlaced	50 fps
59.94i	Interlaced	59.94 fps
60i	Interlaced	60 fps

NOTICE
Changing the project rate will match the sensor fps setting to the project rate, unless the user switch is set to *FPS.* A popup will inform about this. SDI fps should also be checked when setting project rate.

Note: Setting the camera to an interlaced project rate requires the sensor to run at an equal frequency to capture real-time images. Therefore, as an example, project rate 50i requires the sensor to be set to 50 fps.
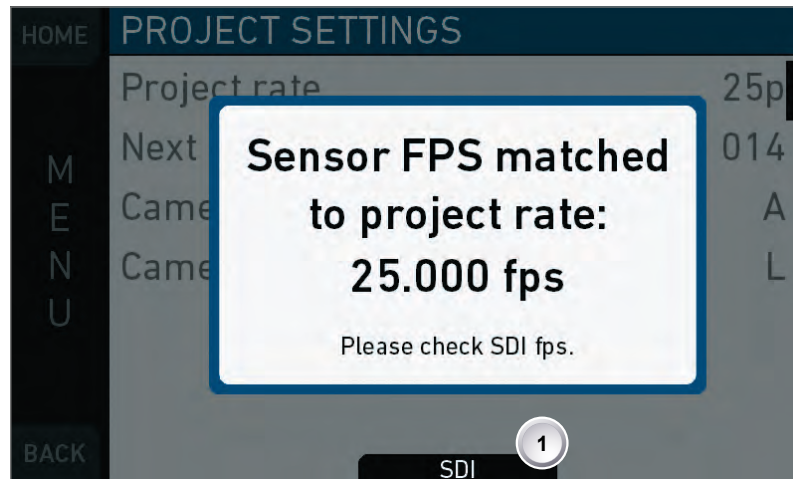
To do so, press *SDI* (1).

16.3.2 *Next reel count*

MENU > Recording > Project settings > Next reel count

Sets the reel number assigned to the next new internal recording medium. A new medium is either a blank card or a card with reels of other AMIRA cameras.

16.3.3 *Camera Index*

MENU > Recording > Project settings > Camera index

Sets the camera identifier. Identifies the individual camera unit (*A, B, C,* etc.) in clip and reel names.

16.3.4 *Camera ID prefix*

MENU > Recording > Project settings > Camera ID prefix

Defines the first character of the Camera ID, currently selectable between L and R. The Camera ID is a Base36 representation of the camera serial number and part of each clip name. It allows you to map each clip to a specific camera.

16.4 *Rec beeper / tally*

MENU > Recording > Rec beeper/tally

Rec beeper: Acoustic indication for start and/or stop of recording.

Tally front: Sets the tally light on the viewfinder front end.

Tally rear: Sets the tally light on the upper end of the IO panel.

Note: On recording, the tally light turns red.

16.5 Pre-recording

NOTICE
Pre-recording requires an advanced license and the assignation of a user button.

Pre-recording buffers images for up to 20 seconds of real-time instead of recording them to the CFast cards.

When pre-recording is activated, pressing REC writes the buffered images to the CFast card. This ensures the capture of unpredictable events without wasting media capacity.

Maximum pre-recording duration is determined by the set combination of sensor fps and recording codec, and can also be limited by the user.

Pressing REC during pre-recording stores all buffered images to the CFast card at maximum write rate. After that, regular recording continues.

Sensor FPS can be changed during prerecording, either via *Home > FPS* or with the user switch set to FPS. This will empty the image buffer at the time of switching, causing the previously buffered images to be lost irreversibly.

16.5.1 How to activate pre-recording

MENU > User buttons > Button VF1 / VF2 > Prerecording

MENU > User buttons > Camera user buttons > Button X > Prerecording
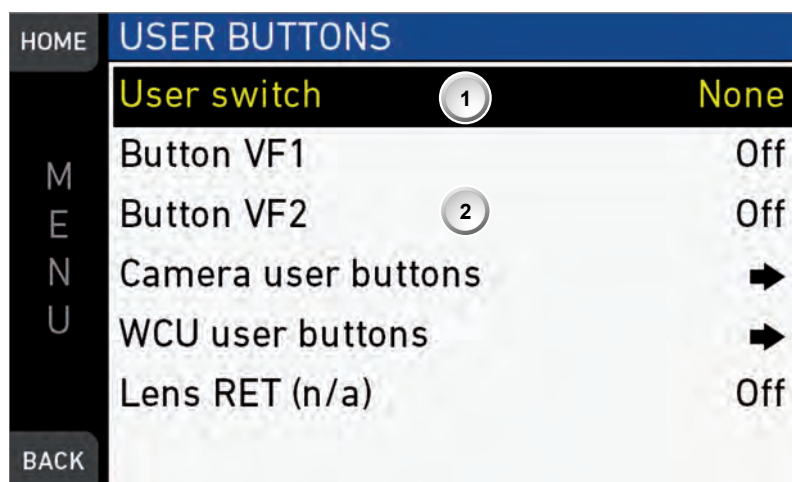
1. Assign a user button (2) with the pre-recording functionality, see page 147.

2. **Note:** Pre-recording is not possible via user switch (1)

3. To activate buffering: Press the assigned user button.

4. **Note:** While pre-recording is active, *TC, Shutter, Look* and *MENU* settings cannot be accessed. Playback is also not possible. FPS can be changed during pre-recording, but this will clear the image buffer.

5. Start/stop recording as usual by pressing a REC button.

6. To end buffering: Press the assigned user button again.

7. **Note:** When ending pre-recording, the image buffer is cleared and lost.

16.5.2 Pre-recording maximum duration

MENU > Recording > Prerecord max. duration

Requires an advanced license. Sets the maximum duration of buffering used for pre-recording, in a range from one to twenty seconds. The actual buffer duration is shown below the menu entry.

Technical limitations may reduce the actual buffer duration below the set value. To activate and de-activate buffering, press the assigned user button.

ProRes 4444 buffer durations

25 fps	13 s
29.97 fps	11 s
100 fps	3.3 s
200 fps	1.6 s

ProRes 422 HQ/422/422 LT buffer durations

25 fps	20 s
29.97 fps	16 s
100 fps	5.0 s
200 fps	2.4 s

17   *MENU > Media*
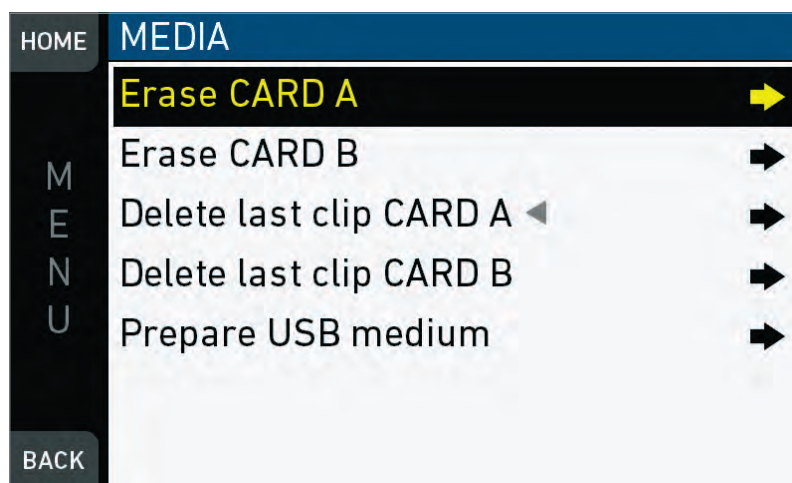
In the media menu, you can erase CFast cards, delete footage, and prepare correct AMIRA folders on USB memory sticks.

Note: A triangle marks the active card.

17.1 *Erase CARD A & B*

NOTICE
Irreversibly erases all data from CFast 2.0 cards in slot A or B. Requires prior confirmation. Card ejection during erasure, or interrupting the camera power supply, may render the card unusable.

MENU > Media > Erase CARD A

MENU > Media > Erase CARD B
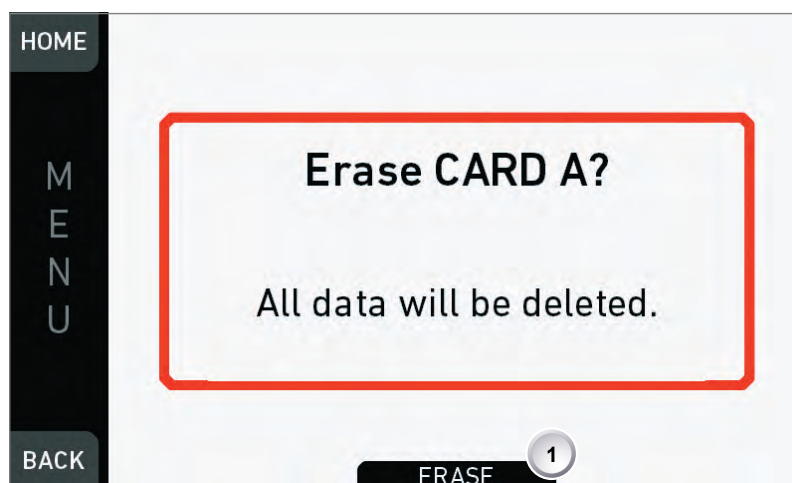
1. Via jogwheel, open *MENU > Erase CARD A/B*.

2. A message asks for your confirmation.

3. Press *ERASE* (1).
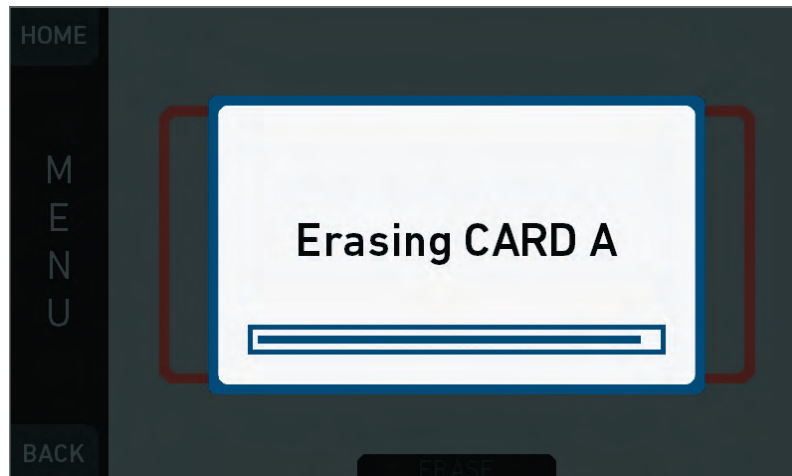
4. Wait for card to erase (here: in slot A).
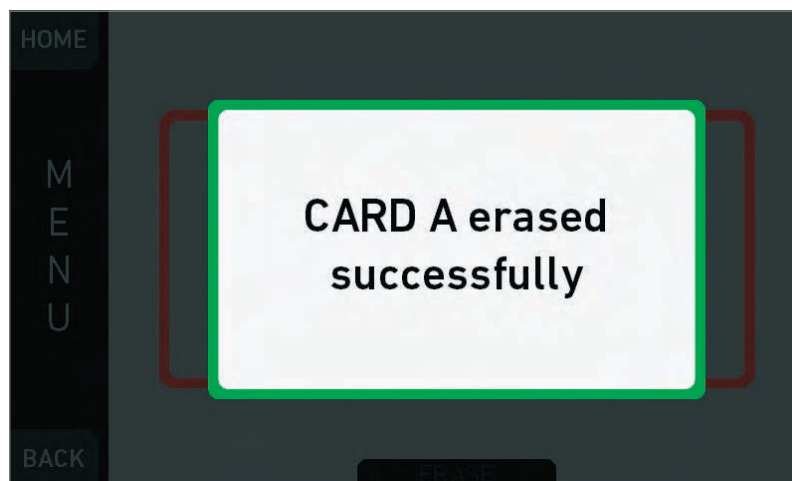
5. Successful erasure creates a green message.
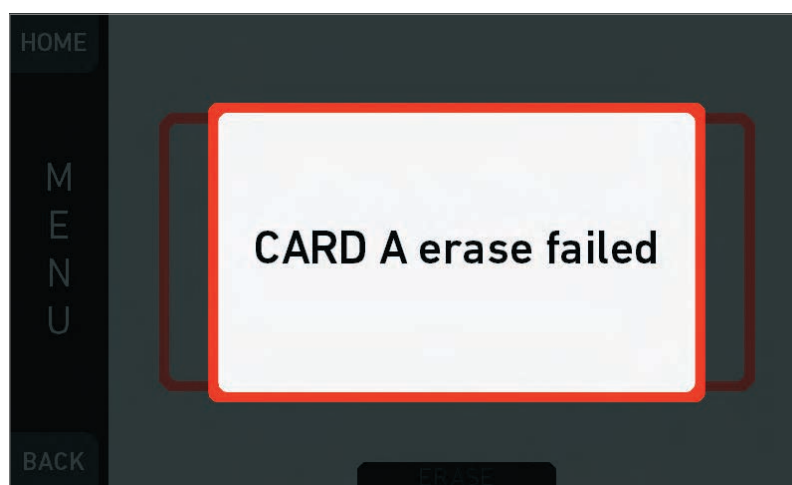
6. Failures create a red message.

17.2 *Delete last clip CARD A & B*

MENU > Media > Delete last clip CARD A

MENU > Media > Delete last clip CARD B

Deletes the last **recorded** (not always the last listed) clip on the CFast 2.0 card in slot A or B. Requires prior confirmation.

Note: On a card recorded with two different cameras, the last recorded clip might be listed in the middle of the clip table.
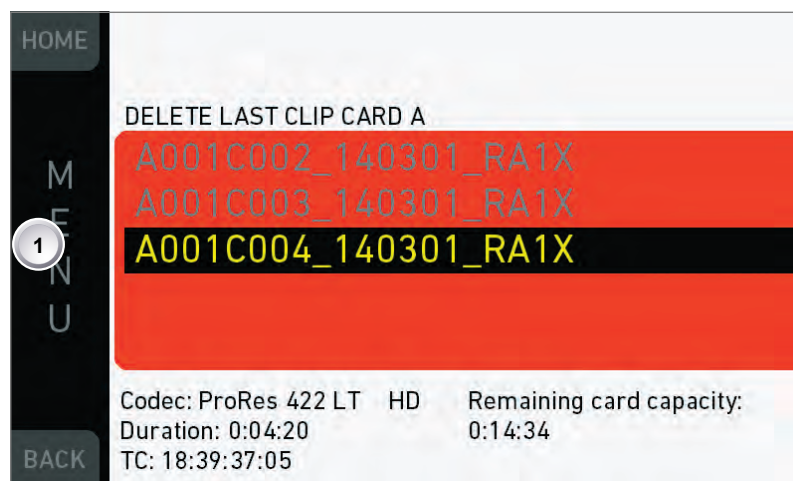
1. Via jogwheel, open *MENU > Delete last clip CARD A/B*.
2. Confirm by pressing the jogwheel (1).
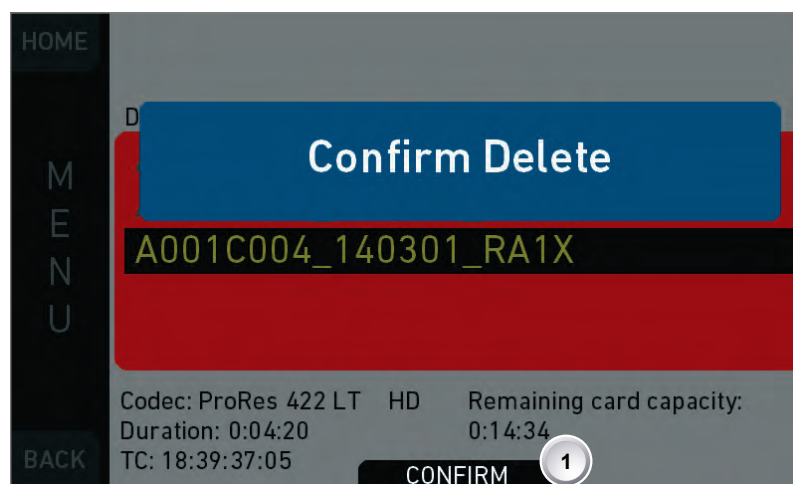
3. A message asks for your confirmation.
4. Press *CONFIRM* (1).

DELETE LAST CLIP CARD A

A001C001_140301_RA1X
A001C002_140301_RA1X
A001C003_140301_RA1X

Codec: ProRes 422 LT   HD   Remaining card capacity:
Duration: 0:04:20   0:18:34
TC: 18:39:37:05
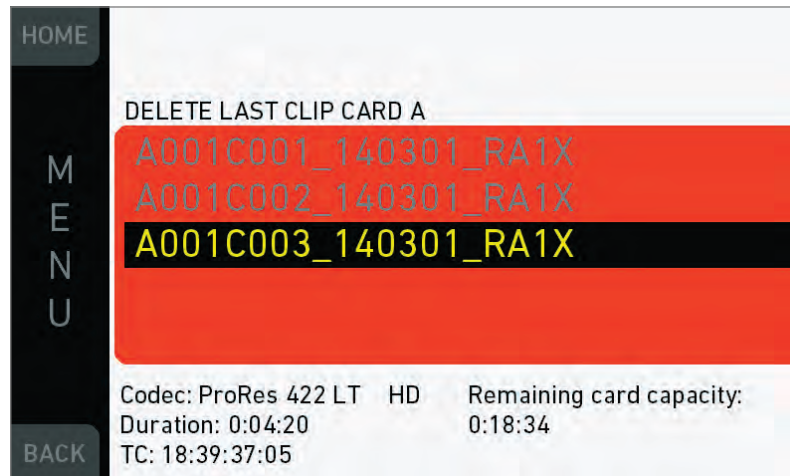
5. If required: Delete another clip.

17.3 *Prepare USB medium*

NOTICE
You can add all user-defined files only from a correctly prepared USB memory stick with a proper folder structure. This action will not alter existing folders and files. Before use with the camera, prepare all USB memory sticks as described in this document.

MENU > Media > Prepare USB medium

1. To prepare a USB memory stick: Open the media lid (1).

2. Connect a FAT-formatted USB stick (3) to the camera (2).

3. **Note:** To avoid file corruption, never remove the USB stick during write access.

4. Via jogwheel, open *MENU > Media > Prepare USB medium*.
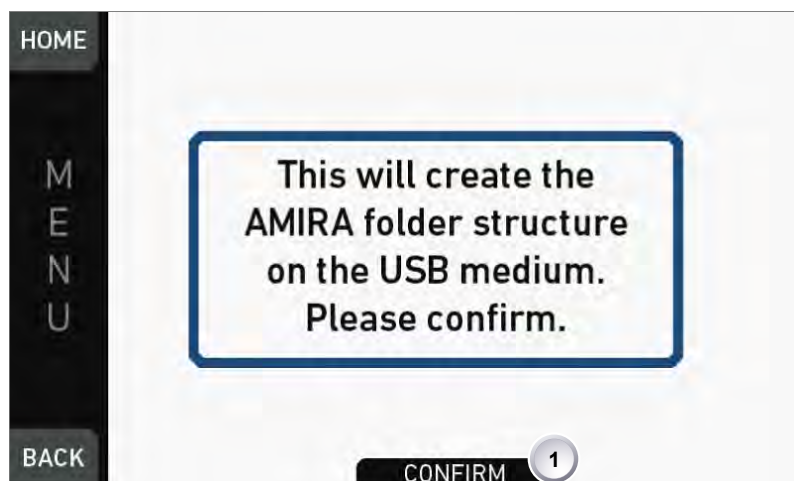
5. A message asks for your confirmation.

6. Press *CONFIRM* (1) to create the required AMIRA folder structure:

ARRI / AMIRA /	FRAMELINES: for frame line imports to camera
	GRABS: for grabbed still frames
	LICENSES: for license file installation
	LOG: for exported camera and update logfiles
	LOOKFILES: for look file imports/exports
	MANUAL: for user manual exports from camera
	SETUPS: for imports/exports of user camera setup files
	SUP: for update file installation

18   *MENU > Monitoring*
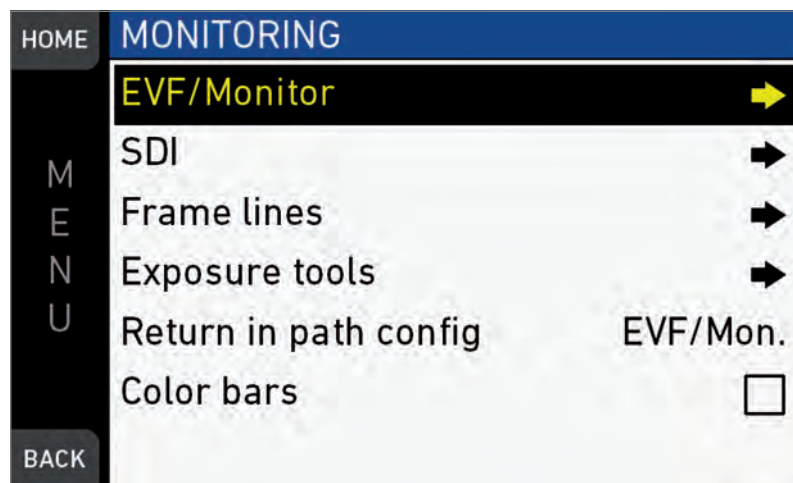
The monitoring menu covers all settings related to EVF, Monitor and SDI, as well as frame lines and other overlays on these outputs.

Return in path config: Sets the image paths on which return in is active between EVF and Monitor, SDI or both. Return in is activated via the user button. Requires a valid signal on SYNC/RET IN BNC connector.

Color bars: Activates a SMPTE color bar on SDI outputs.

18.1 *EVF/Monitor*

MENU > Monitoring > EVF/Monitor
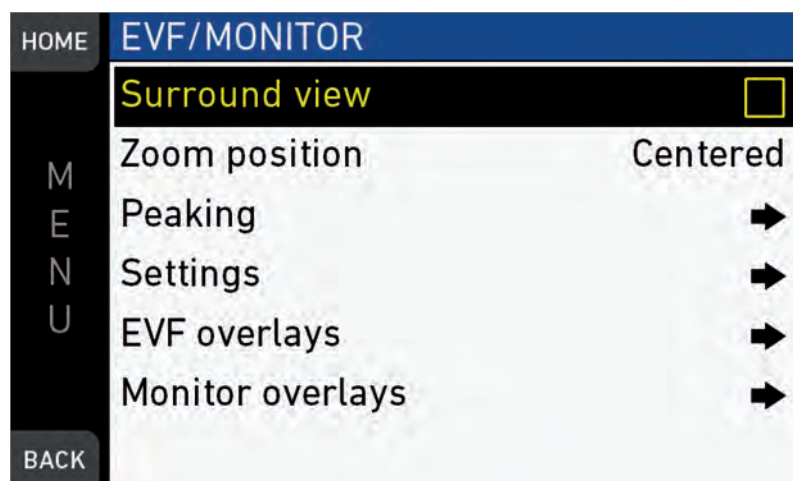
Contains all EVF/monitor tools, settings and overlays: e.g., for exposure/peaking tools, surround masks and zoom positions.

18.1.1 *Surround view*

MENU > Monitoring > EVF/Monitor > Surround view

Sets the EVF/Monitor surround view on or off. The surround view shows the outer edges of the sensor image which are not recorded. It allows you to spot and avoid unwanted objects before they enter the image.

18.1.2 *Zoom position*

MENU > Monitoring > EVF/Monitor > Zoom position

Sets the sensor image area to be magnified by zoom. Activation by user button.

Centered: For zooms into the image center.

Eye level: For zooms into the upper image which, e.g. in a close-up, typically contains a person's eyes.

18.1.3 *Exposure tool*

This tool facilitates the evaluation of image exposure. Activation by user button or by pressing *EXP* on the viewfinder. **Note:** Zebra is only available on image paths with gamma set to *Look.*

MENU > Monitoring > Exposure tools

Allows you to select the exposure tool.

False color lays predefined luminance ranges over the viewfinder image.

In *Zebra* mode, the tool overlays up to two luminance ranges with diagonal stripes. *High zebra* ranges above, *Mid zebra* around the user-defined luminance value.
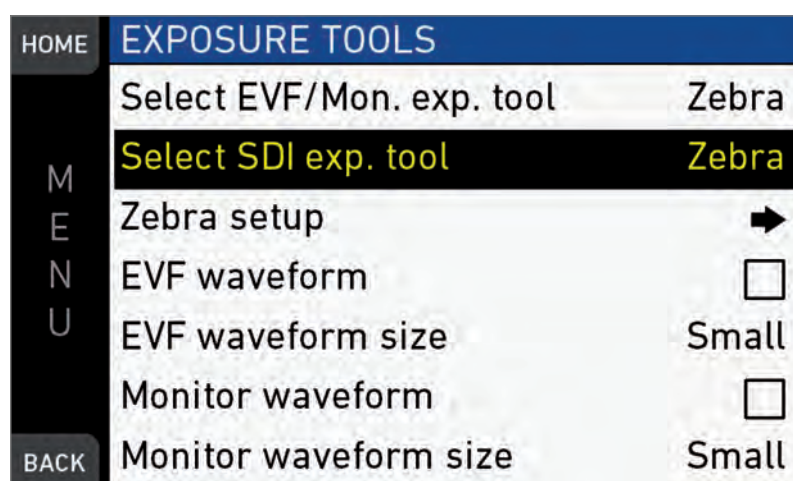
1. *For a tool change*: Scroll to Exp. tool selection.
2. Press the jogwheel to toggle between False color and *Zebra*.
3. *For zebra options*: Open and adjust Zebra setup.
4. *EVF waveform*: Sets waveform overlay on EVF on or off.
5. *EVF waveform size*: Sets size of EVF waveform overlay to small or large.
6. *Monitor waveform*: Sets waveform overlay on monitor on or off.
7. *Monitor waveform size*: Sets size of monitor waveform overlay to small or large.
8. **Note:** Waveform is a luminance waveform from a 0-100% signal level, calculated from the EVF and monitor image signals for each path.

MENU > Monitoring > Exposure tools > Zebra setup

ZEBRA SETUP	
Zebra mode	High
High zebra level	98 %
High zebra color	Red
Mid zebra level	50 %
Mid zebra range	4 %
Mid zebra color	White

Zebra mode: Sets the zebra mode to High, Mid, or both.

High zebra level: Sets the exposure level (in %) above which high zebra is active.

High zebra color: Sets the pattern color.

Mid zebra range: Sets the active range (in %) around a mid zebra level.

Mid zebra color: Sets the pattern color.

Selecting false color converts the image to black-and-white, and replaces luminances by the following colors:

Luminance range	Signal level	Color
White clipping	100 to 99 %	Red
Just below white clipping	99 to 97 %	Yellow
One stop over medium gray (Caucasian skin)	56 to 52 %	Pink
18 % medium gray	42 to 38 %	Green
Just above black clipping	4.0 to 2.5 %	Blue
Black clipping	2.5 to 0.0 %	Purple

18.1.4 *Peaking*

MENU > Monitoring > EVF/Monitor > Peaking

PEAKING	
Peaking mode	Color
Peaking level	5
Peaking offset shift	0
Color	Red

Peaking highlights in-focus image sectors for better focus judgement. Activation by user button or by pressing *PK* on the viewfinder.

Peaking mode: Toggles between color peaking (to overlay in-focus areas with a color), and aperture peaking (to enhance object edges only).

Peaking level: Sets a peaking strength from 1 (= minimum) to 20 (= maximum).

Peaking offset shift: Adjusts the threshold for color peaking to set in, relative to the peaking level.

Note: A negative offset shift (in particular with high ASA ratings) can increase the peaking results.

18.1.5 *Settings*

MENU > Monitoring > EVF/Monitor > Settings
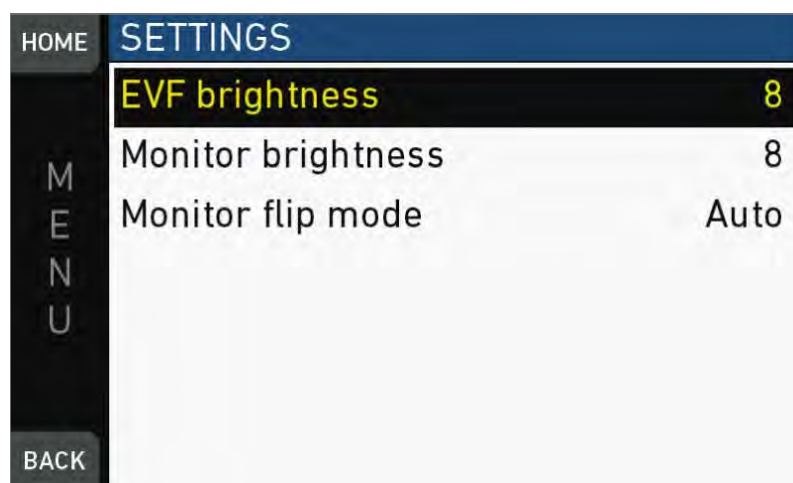
Determines the illumination/orientation of viewfinder and monitor.

EVF brightness: For eyepiece OLED illumination from 1 (= minimum) to 10 (= maximum).

Monitor brightness: For monitor TFT backlight from 1 (= minimum) to 10 (= maximum).

Monitor flip mode: For either *Normal, Flipped*, or *Auto* monitor orientation. *Auto* flips the monitor display automatically via position sensor.

18.1.6 *EVF overlays / Monitor overlays / SDI overlays*

MENU > Monitoring > EVF/Monitor > Monitor overlays

MENU > Monitoring > EVF/Monitor > EVF overlays

MENU > Monitoring > SDI > SDI processing > Overlays
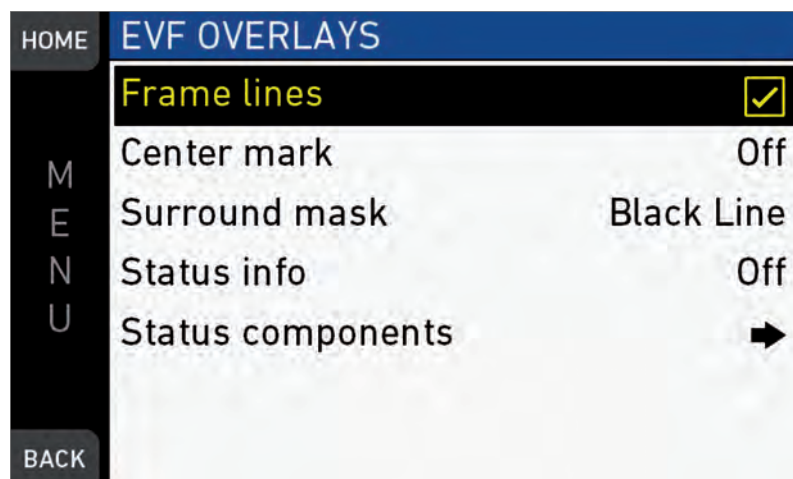
These almost identical menus overlay the monitor, the viewfinder, and the SDI with essential visual tools. **Note:** The illustration shows the menu for the viewfinder.

Frame lines: Sets frame lines *On* or *Off*. Used as a framing reference tool with typically an image frame, a center mark, and aspect ratio.

Center mark: Sets the center mark (for use with frame lines) between *Off, Small Dot, Dot*, or *Cross*.

Surround mask: Sets the type of overlay to mark the surround view area of the active image. Either as *Black line, Colored line*, or semitransparent with 25*, 50 or 75* percent opacity (* only on EVF). The surround view area is used for framing and is not recorded.

Status info: Only for viewfinder and SDI. Sets camera status overlays between *Off, Overlay (status on active image)*, or *Safe (status outside of active image)*.

Note: In *Overlay* mode, frame lines up to aspect ration 1.94:1 are not displayed because they are covered by the status info.

Status components: Only for viewfinder and SDI. Configures the status info overlay components (see below).

MENU > Monitoring > EVF/Monitor > EVF overlays > EVF status components

MENU > Monitoring > SDI > SDI processing > Overlays > Status components
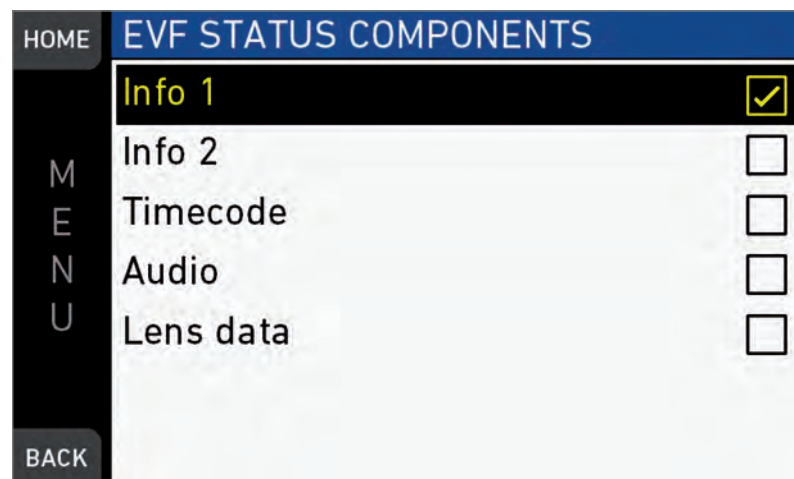
Info 1: Status areas above and below the image.

Info 2: Status areas on left and right side.

Timecode: Current TC in top middle of image.

Audio: Audio levels, located on right side of the image.

Lens data: Focus distance, iris and focal length, if supported by the lens. Also available for monitor (in Monitor overlays menu screen).

18.2 *SDI*

MENU > Monitoring > SDI

HOME	SDI	
	SDI format	422 1.5G
M	SDI frame rate	25p
E	SDI 1 image	Processed
N	SDI 2 image	Clean
U	SDI processing	➡
BACK		
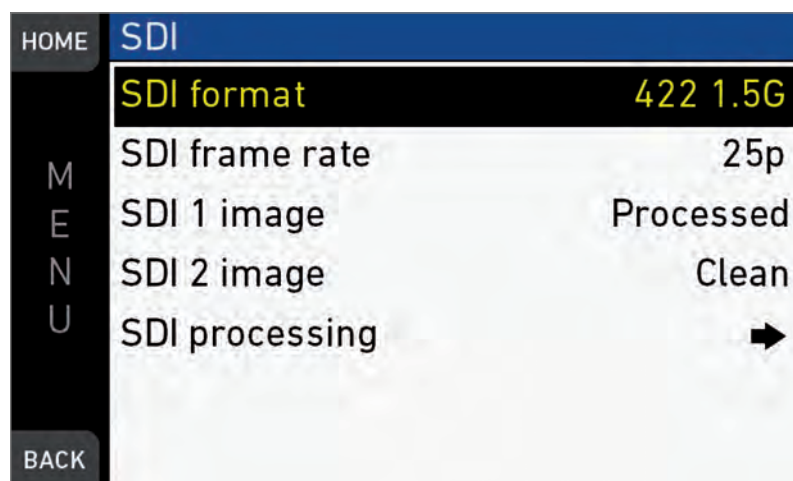
UHD mode: *MENU > Monitoring > SDI* *

HOME	SDI	
	SDI 1 format	422 1.5G
M	SDI 1 frame rate	25p
E	SDI 2 format	422 6G
N	SDI 2 frame rate	25p
U	SDI 1 image	Processed
	SDI 2 image	Clean
BACK	SDI processing	➡
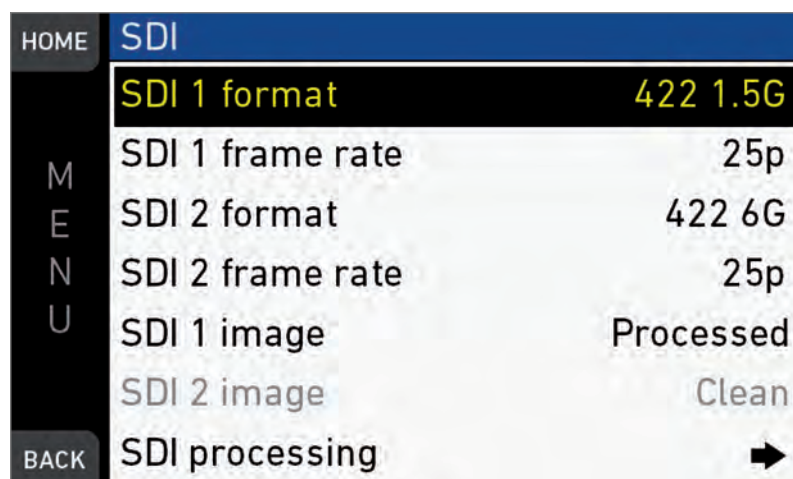
Configures the *SDI* outputs (based on 1920x1080 image raster).

In 4K UHD and 3.2K modes, SDI 1 and 2 can be configured independently.

SDI format: Toggles the SDI signal between different formats, sampling structures and color modes:

- *422 1.5G:* 4:2:2, YCbCR, 1920x1080
- *422 3G:* 4:2:2, YCbCR, 1920x1080
- *444 3G:* 4:4:4, RGB, 1920x1080
- *422 6G:* 4:2:2, YCbCr, 3840x2160*

*only in 4K UHD mode on SDI 2. Requires installed 4K UHD license.

SDI frame rate: Sets the fps output on the SDI. If below sensor fps, frames will drop. If above, frames will duplicate.

SDI scan format: Sets the type of scan:

- *Progressive (p):* Transmits images line by line starting at the top-left pixel
- *Progessive segmented frame (psf):* Splits progressive images into fields (odd lines and even lines). Transmits these (all odd before all even) line by line
- *Interlaced (i):* Creates two fields from two adjacent progressive frames (odd lines from the first; even lines from the second frame)

The following combinations of formats and frame rate are available:

HD/2K

Format	SDI
422 1.5G	23.976p, 24p, 25p, 29.97p, 30p, 50i, 59.94i, 60i, 23.976 psf, 24 pfs, 25psf, 29.97psf, 30psf
422 3G	48p, 50p, 59.94p, 60p
444 3G	24p, 25p, 29.97p, 30p

3.2K/4K UHD

Format	SDI 1	SDI 2
422 1.5G	24p, 25p, 30p, 50i, 60i, 24 psf, 25 psf, 30 psf	-
422 3G	48p, 50p, 60p	48p, 50p, 59.94p, 60p
444 3G	24p, 25p, 30p	23.976p, 24p, 25p, 29.97p, 30p
422 6G *	-	23.976p, 24p, 25p, 29.97p, 30p

* SDI 2 is always clean in 3.2K/4K UHD modes.

* * 422 6G is not available in 3.2K mode.

SDI 1/2 image: Sets SDI 1/2 image to clean or processed. Clean image is the recorded image area without further processing. Processed image is enhanced according to the settings of submenu SDI processing.

MENU > Monitoring > SDI > SDI processing
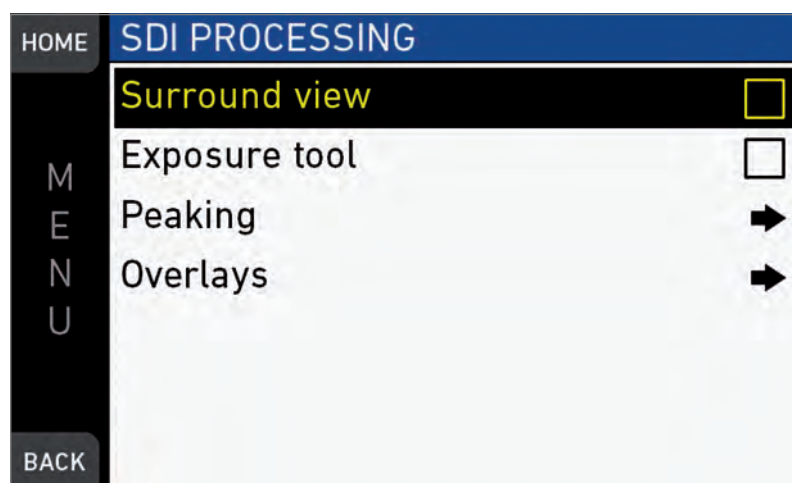
SDI processing: Configures the SDI processing elements.

- *Surround view:* Sets SDI surround view on or off.
- *Exposure tool:* Allows you to select the exposure tool. For more information, see "Exposure tool", page 117.

- *Peaking:* Peaking highlights in-focus image sectors for better focus judgement. For more information, see "Peaking", page 118.

- *Overlays:* Configures graphical overlays of processed SDI out. Almost identical to EVF overlay configuration. For more information, see "EVF overlays / Monitor overlays / SDI overlays", page 119.

18.3 *Frame lines*

NOTICE
The camera contains a set of default frame lines with standard aspect ratios. You can also create import external frame lines in XML format.
Try the frame line composer on the ARRI website.

MENU > Monitoring > Frame lines
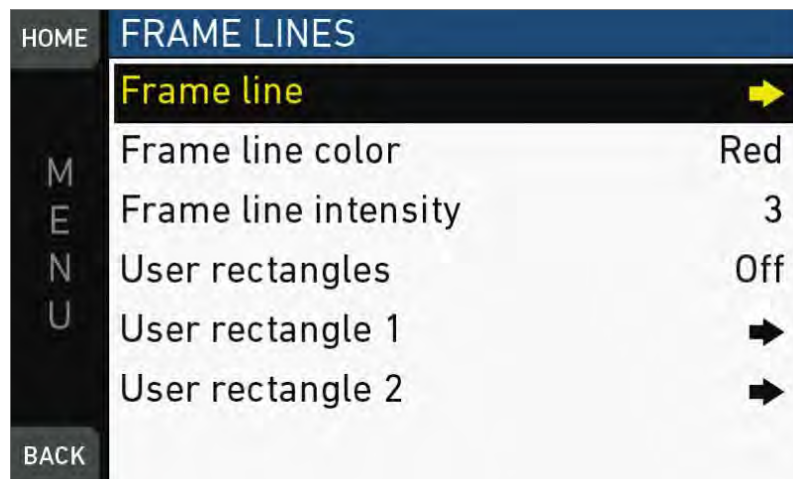
Frame line: Sets the aspect ratio of a frame line.

Frame line color: Sets the color of frame, center mark, user rectangle, surround mask (if mask is set to *Colored line*).

Frame line intensity: Sets the brightness of frame line components.

User rectangles: Allows you to add two user-defined frame line rectangles.

User rectangle 1 & 2: Configures user rectangle sizes and positions.

18.3.1 Setting/adding a frame line

MENU > Monitoring > Frame lines > Frame line
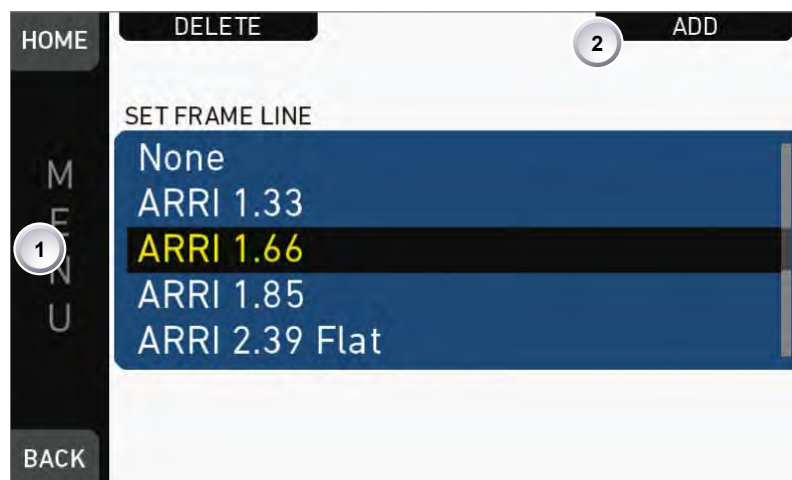
1. Via jogwheel, open *MENU > Monitoring > Frame lines > Frame line*.
2. A list of installed frame lines appears.
3. Scroll to the required entry (here: *ARRI 1.66*).
4. Confirm by pressing the jogwheel (1).
5. If a required entry is not listed: Press *ADD* (2).
6. **Note**: *ADD* is inactive/gray if the maximum number of 20 frame lines is installed.

7. **For internal frame files:** Press DEFAULTS (3) to open the default list.
8. Via jogwheel (1), scroll to the required file: Press wheel to confirm.
9. Repeat for all required files.
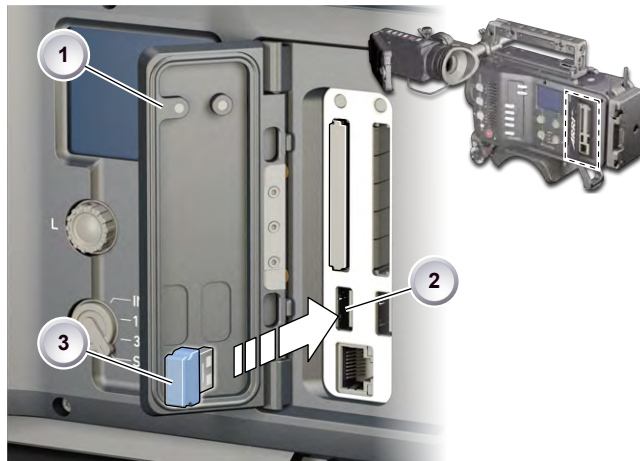
10. **For external frame files:** Store the required file(s) into ARRI/AMIRA/
    FRAMELINES on a properly prepared USB memory stick. See page 115.

11. Open the media lid (1).

12. Connect the memory stick (3) to the camera (2).

13. Only then, press USB (2).

14. Via jogwheel (1), select and install all required frame lines.

18.3.2 Deleting a frame line

MENU > Monitoring > Frame lines > Frame line
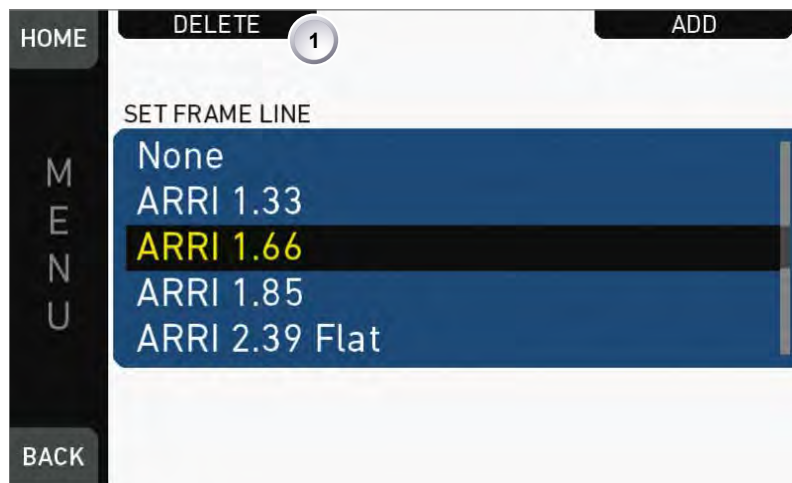
1. Via jogwheel, open *MENU > Monitoring > Frame lines > Frame line.*
2. Press *DELETE* (1).
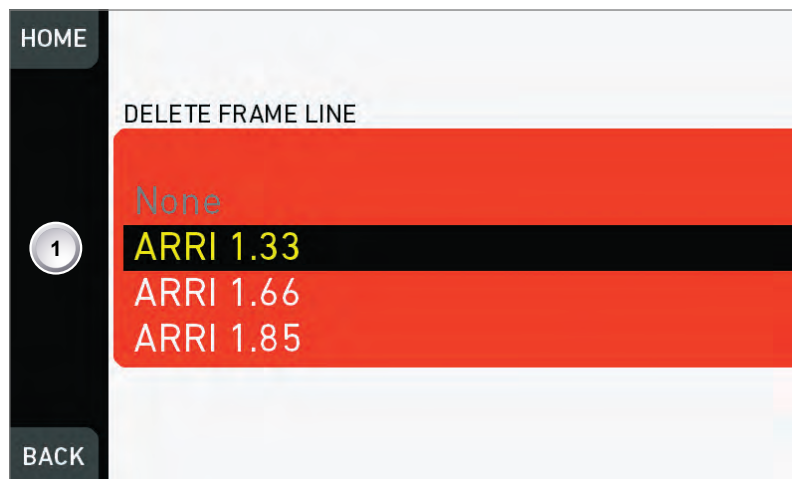
3. The list turns red.
4. Via jogwheel (1), select the obsolete entry.
5. Press the wheel (1).
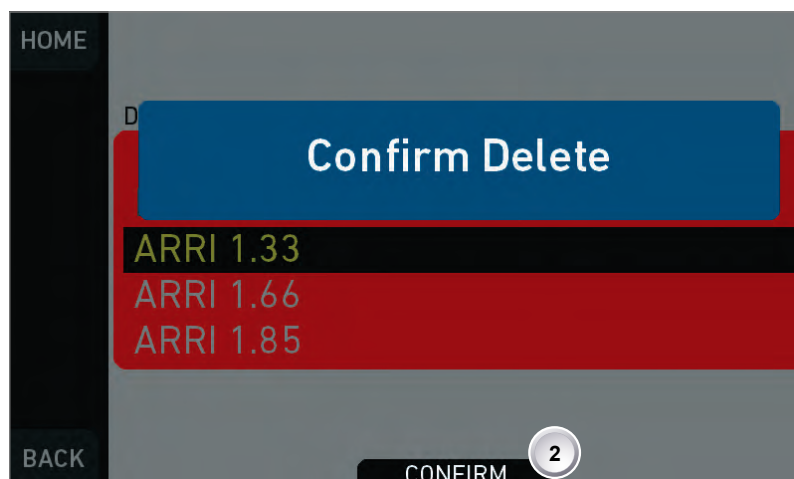
6. Press *CONFIRM* (1). **Cancel** with *BACK.*
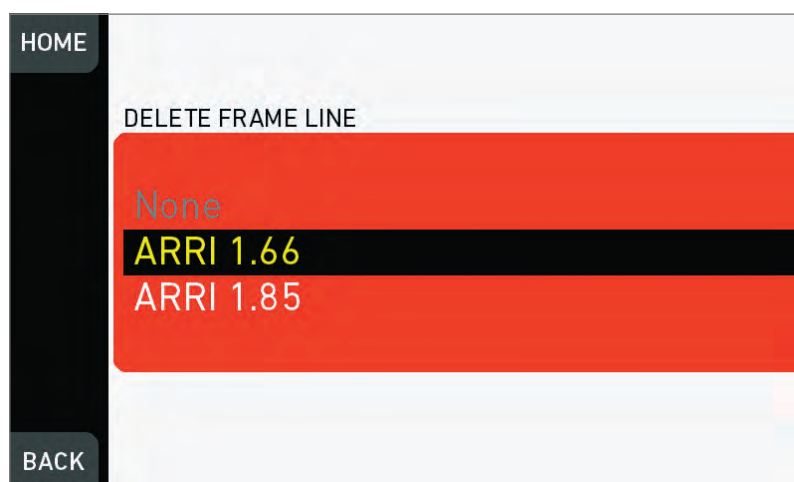
7. The entry is deleted.

18.3.3 User rectangle 1 & 2

MENU > Monitoring > Frame lines > User Rectangle 1 & 2
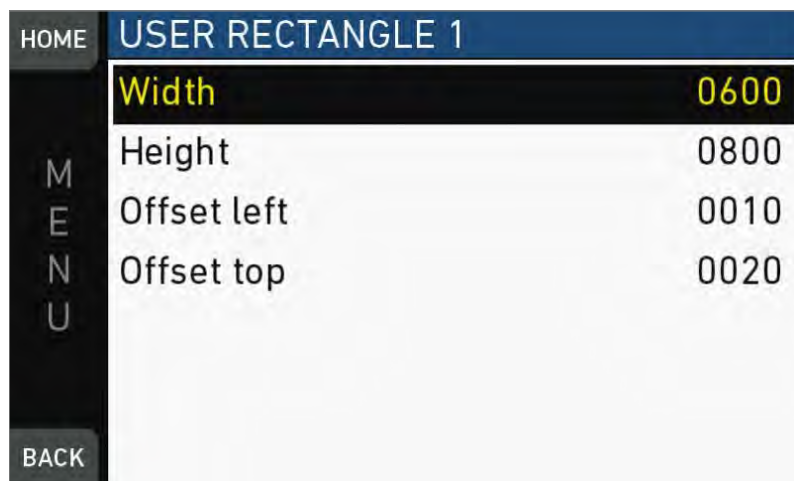
Configures *Width, Height* and *Offset* (= position from left/right screen edge) in per mille.

18.4   Return in path config

Selects the paths for return in routing. Return In is activated via user buttons.

Return In requires a valid HD-SDI signal on the RET/SYNC IN BNC Connector. Works only in HD/2K modes. Supports progressive 422 1.5G HD-SDI signals in 1920x1080 resolution.

18.5   Color bars

Activates a SMPTE color bar on SDI outs.

Note: Recording deactivates the color bar.

19   *MENU > System*
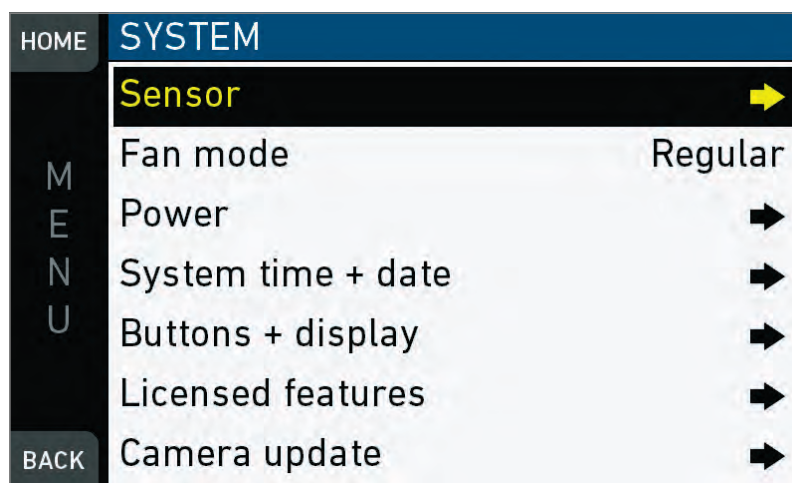
The system menu organizes the general camera setup.

Sensor: Sets sensor related parameters.

Fan mode: Adapts the camera cooling to several shooting situations.

Power: Edits the thresholds for critical voltage levels and other warnings.

System time + date: For synchronizing the system to timezones etc.

Buttons + display: Modifies the button/display illumination and style.

Licensed features: Manages the camera licensing.

Camera update: Installs SUP software update packages

19.1 Sensor

MENU > System > Sensor

SENSOR

HOME		
	Image sharpness	0
M	Image detail	0
E	Genlock	Off
N	Mirror image	Off
U	Sensor temperature	Normal
BACK		
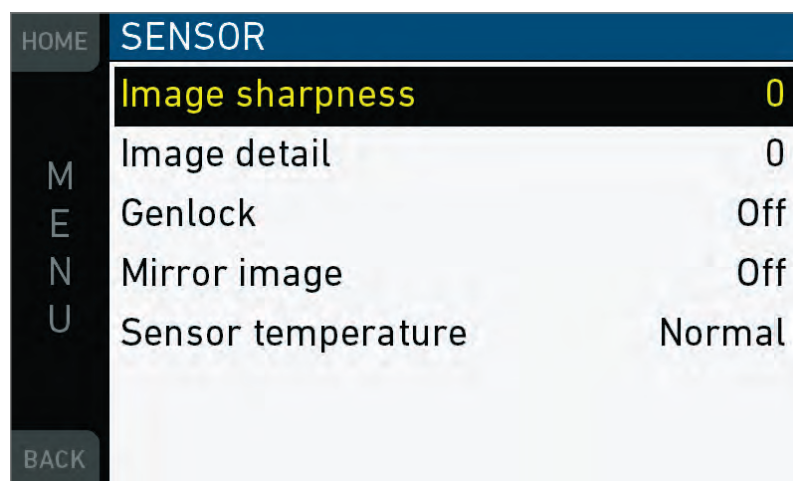
UHD mode: *MENU > System > Sensor* *

SENSOR

HOME		
	4K UHD image sharpness	0
	4K UHD image detail	0
M	Image denoising	Off
E	Genlock	Off
N	Mirror image	Off
U	Sensor temperature	Normal
BACK		
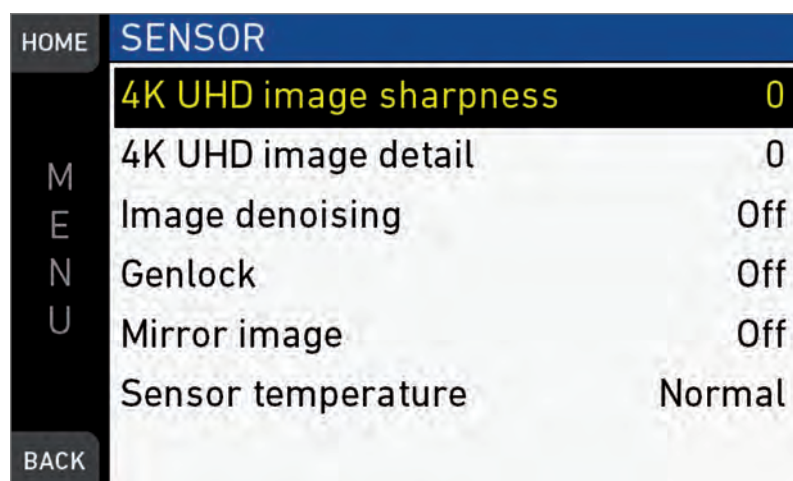
Image sharpness: Adjusts the image sharpness between -5 and +5 (default = 0).

4K UHD image sharpness:* Adjusts the image sharpness for 3.2K and 4K UHD between -5 and +5 (default = 0).

Image detail: Adjusts the detail level where the image sharpness adjustment kicks in between -5 and +5 (default = 0).

4K UHD image detail:* Adjusts the image detail for 3.2K and 4K UHD between 0 and +5 (default = 0).

Image denoising: Sets the image denoising for 4K UHD to *Off*, *Normal* or *Strong*.

Genlock: Sets external sync to *Off, Master* or *Slave*:

- Select *Master* when AMIRA is used to sync other AMIRAs via HD-SDI.

- When set to *Slave,* the camera requires a Black Burst, Tri-Level sync or 422 1.5G HD-SDI signal with sensor fps for the RET/SYNC IN BNC connector.

- When daisy-chaining several AMIRAs via HD-SDI, set the first camera to *Master* and all others to *Slave.*

Mirror image: Mirrors the sensor image on all image paths vertically (V), horizontally (H), or both (V+H).

Sensor temperature: Toggles the sensor temperature between normal and high humidity:

- Setting to *High humidity* increases the sensor temperature to reduce the risk of condensation on the sensor cover glass.

- **Note:** Recommended only in environments > 40 °C (104 °F) and 80 % r.H. Entry is greyed out if camera is not calibrated for high humidity.

* These settings are only available for 3.2K and 4K UHD modes. Requires installed 4K UHD license.

19.2   *Fan mode*

MENU > System > Fan mode

Optimizes the camera cooling for different shooting situations.

Regular: Creates a balance between fan noise and camera temperature.

Rec low: Increases fan speed during standby to pre-cool the camera. Minimizes fan speed/noise during recording.

Note: Ideal in an environment warmer than 25 °C (77 °F).

Low Noise: Minimizes fan noise during both standby and recording.

Note: With data rates above 100 MB/s (due to fps/codec setting), the fan speed automatically increases to prevent CFast 2.0 cards from overheating.

19.3 *Power*

MENU > System > Power

Bat onboard (BAT1) warning: Sets the voltage/percentage level that triggers a power warning for onboard batteries. **Note:** Percentage setting is only used if *Bat unit preference* is set to *Percent* and battery transmits capacity in percent.

BAT in (BAT2) warning: Sets the voltage level that triggers a power warning for external batteries on the BAT connector.

Bat unit preference: Sets the preferred unit for **onboard** batteries. **Note:** If battery does not transmit capacity in percent, voltage levels are used.

19.4 *System time + date*

MENU > System > System time + date

Note: *Timezone* and *Daylight savings time* do not change time and date settings. They are only stored as metadata in the recorded clips.

19.5 *Buttons + display*

MENU > System > Buttons + display

Display style: Changes the display style between *Day* and *Night* mode.

Button brightness: Sets the brightness of the button illumination in a range of *0* to *3*.

MENU > System > Buttons + display > Lock config
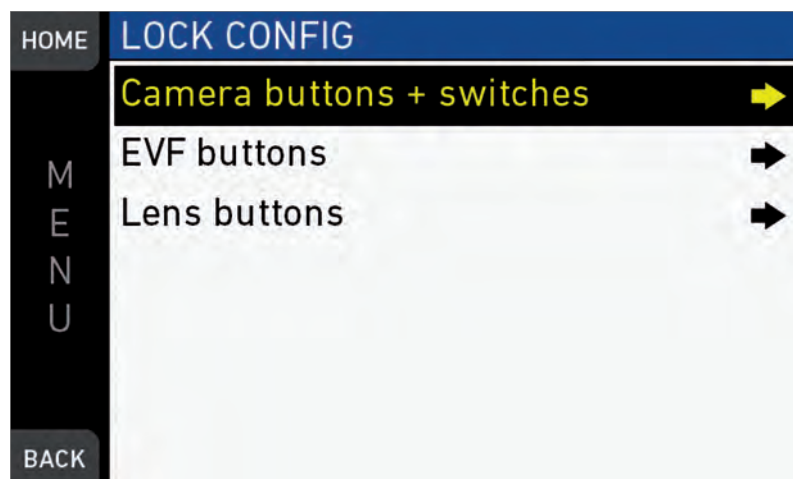
Lock config: Sets which switches and buttons are affected by the camera lock. Cannot be changed while lock is active. Default lock config locks all buttons except REC and [M] buttons as well as lens buttons. Audio module buttons & switches and camera LOCK and power buttons cannot be locked. Lens buttons are only available on certain types of lenses. For operation of camera lock. See "Locking/unlocking", page 146.

MENU > System > Buttons + display > Lock config > Camera buttons + switches
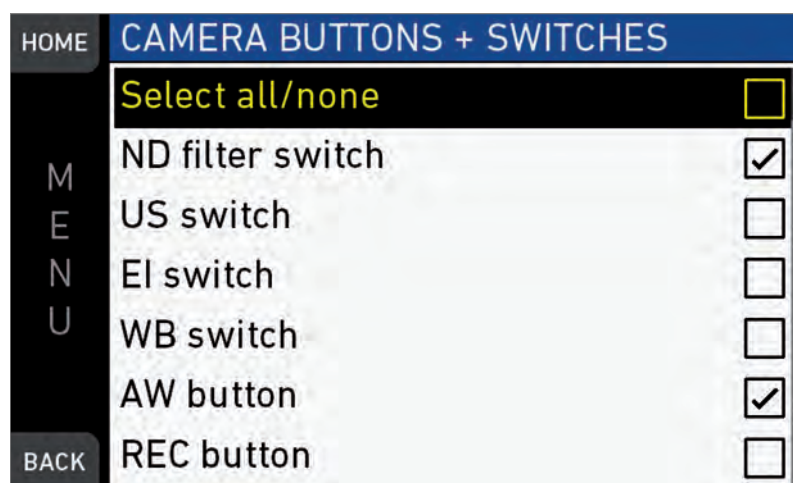
MENU > System > Buttons + display > Lock config > EVF buttons
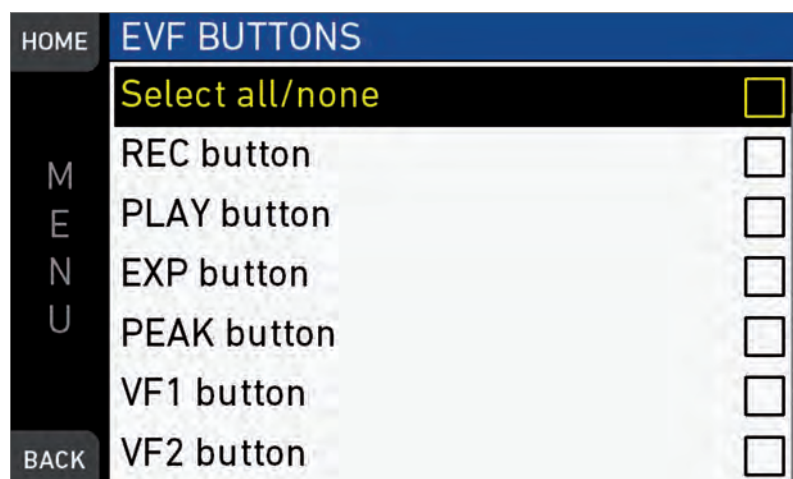
MENU > System > Buttons + display > Lock config > Lens buttons
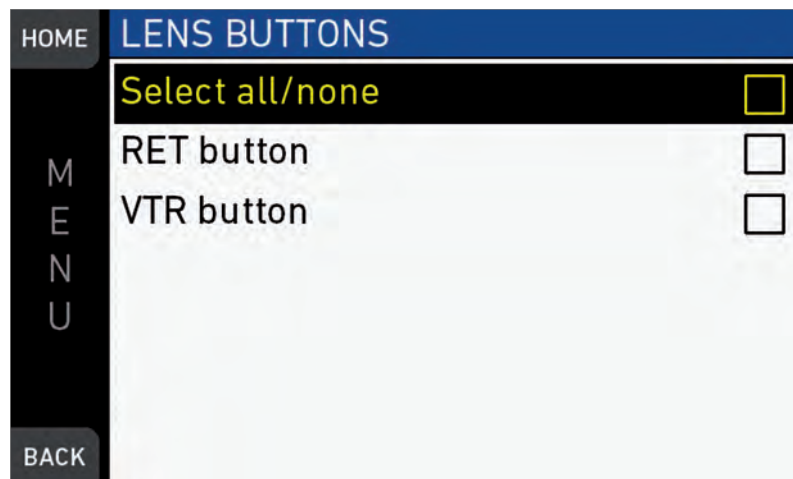
19.6 *Licensed features*

MENU > System > Licensed features

Licensed features require the installation of a license to enable their use. Licenses are installed and removed as bundles. Two bundles are available:

Advanced license bundle

- Frame rates 100-200 fps
- ProRes 422 HQ recording format
- Pre-record function
- Gamma: Log C
- Import of external look files
- In-Camera CDL look parameter adjustment
- Dynamic Auto-Tracking white balance
- WiFi Remote Control*
- Bluetooth Audio Monitoring

* Feature pending availability.

Premium license bundle

- All advanced license features
- ProRes 4444 recording format
- 2K (2048 x 1152) recording
- Import of looks containing 3D LUTs

To view the features contained in the active license bundle, press *FEATURES* screen button (1).

Temporary licenses

Licenses are also available as temporary real-time licenses. After installation, the license is valid for a defined period past the installation time. After this period, the license becomes invalid.

A temporary license shows *Valid until: YY-MM-DD HH:MM:SS* (1) in the licensed features screen and in the *FEATURES* subscreen.

Note: For licensing instructions, see page 172.

19.7   *Camera update*

MENU > System > Camera update
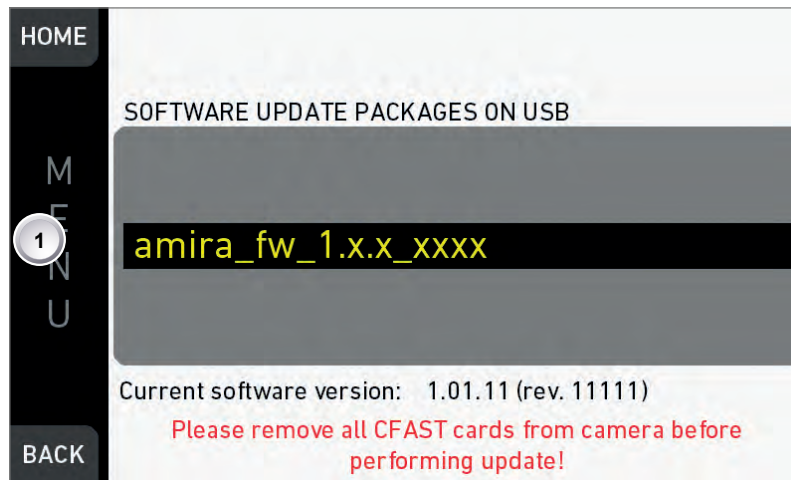
Allows the installation of SUP software update packages.

Note: For update instructions, see page 169.

20   *MENU > Setup*
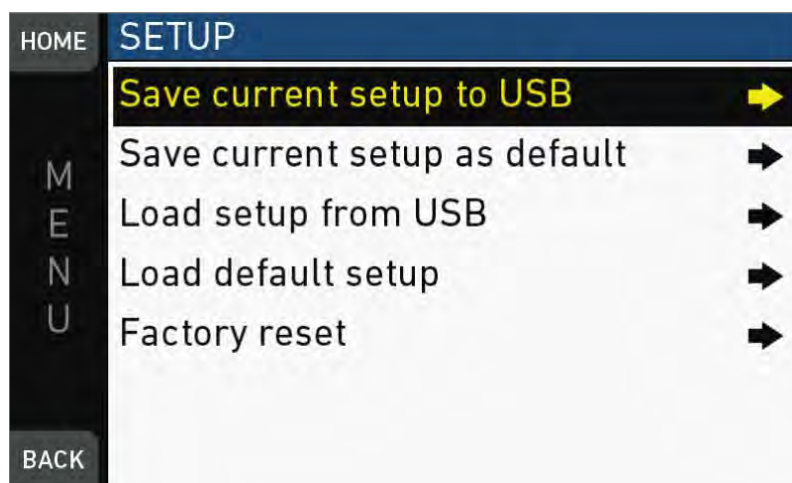
Setups allow you to store/load full camera configurations.

Save current setup to USB: Stores the configuration on the USB stick (ARRi/AMIRA/ SETUPS). You can rename this user setup file beforehand.

Save current setup as default: Stores the current configuration on the camera. Survives a factory reset. Serves as an alternative to a factory reset if other settings are required as default.

Load setup from USB: Loads a setup from the USB stick.

Load default setup: Loads the default setup from the camera.

Factory reset: Sets the camera to ARRI factory default values.

21   *MENU > User buttons*
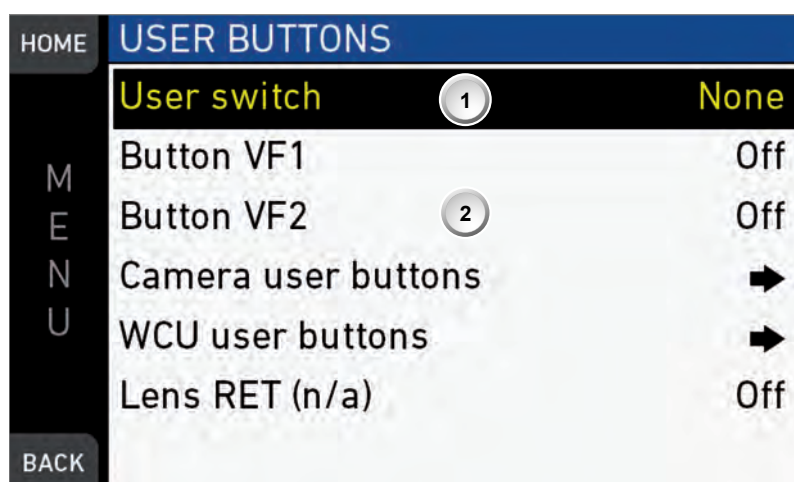
User switch: Sets the function of the user switch (US). Can be set to *None, Fps, Shutter/Exp Time* or *Look* (1).

Button VF1 / VF2: Set the function of the *VF1* and *VF2* button on the viewfinder (2).

Camera user buttons: Submenu with camera user buttons 1-8.

WCU user buttons: Submenu with user buttons of WCU-4*.

Lens RET: RET button of ENG lens. Requires special lens. If not supported by lens, "(n/a)" is shown benhind menu entry.

* Configuration valid for WCU-4 connected to AMIRA via UMC-4. WCU-4 with sw version 2.0 does not support smart behavior of buttons.

MENU > User buttons > Camera user buttons
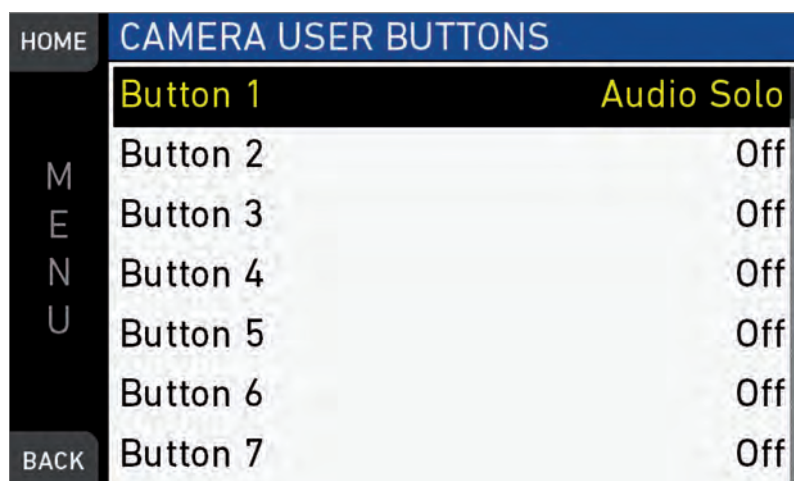
Button 1-8: Set the functions of user buttons 1-8 on the left camera side.

MENU > User buttons > WCU user buttons
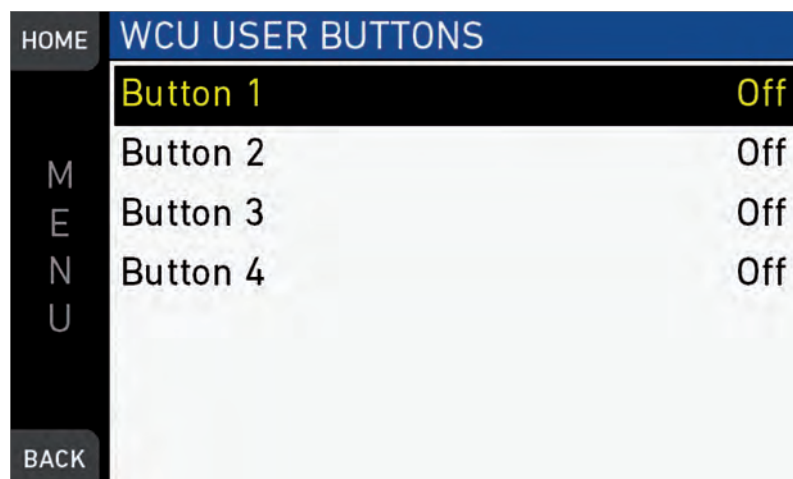
User/*VF* button functions

The following user and *VF* button functions are available:

- *Off:* Disables the user button.

- *EVF Zoom:* Switches the viewfinder zoom function on or off*. Supports smart behavior.
  Note: Zoom image is monochrome.

- *EVF Frame Lines:* Switches viewfinder frame lines on or off*. Supports smart behavior.

- *EVF Zebra/FC:* Toggles the exposure tool between Zebra and False Color*

- *EVF Gamma:* Toggles the viewfinder gamma between Look and Log C* **. Supports smart behavior.

- *EVF Surround:* Switches the surround view on or off*. Supports smart behavior.

- *EVF Peaking:* Switches peaking on or off*. Supports smart behavior.

- *EVF Exp. Tool:* Switches the exposure tool on or off*. Supports smart behavior.

- *EVF waveform:* Switches the EVF waveform overlay on or off. Supports smart behavior.

- *Monitor waveform:* Switches the Monitor waveform overlay on or off. Supports smart behavior.

- *SDI Frame Lines:* Switches viewfinder frame lines on or off*. Supports smart behavior.

- *SDI Zebra/FC:* Toggles the exposure tool between Zebra and False Color*

- *SDI Gamma:* Toggles the viewfinder gamma between Look and Log C* **. Supports smart behavior.

- *SDI Surround:* Switches the surround view on or off*. Supports smart behavior.

- *SDI Peaking:* Switches peaking on or off*. Supports smart behavior.

- *SDI Exp. Tool:* Switches the exposure tool on or off*. Supports smart behavior.

- *Select card:* Changes between card slots A and B for recording.

- *Frame line color:* Changes the frame line color.

- *Framegrab:* Grabs a still frame from the image stream to the USB stick (during *Standby* only).
  Note: Framegrab inherits SDI image settings.

- *Check last clip:* Plays the last five seconds of the last recorded clip.

- *Flip monitor:* Switches the monitor flip function on or off.
- *Prerecording:* Switches pre-recording on or off.
- *Auto Iris:* Triggers automatic iris compensation***.
- *Open iris:* Opens the iris of a lens. Short press opens by 1/x stop (step size depending on lens), long press opens by 1 stop per 0.5 seconds***.
- *Close iris:* Closes the iris of a lens. Short press closes by 1/x stop (step size depending on lens), long press closes by 1 stop per 0.5 seconds***.
- *Return In:* Activates return signal connected to RET/SYNC IN BNC connector on SDI and/or EVF/Monitor image paths, depending on preconfiguration via *MENU > Monitoring > Return in path config*. Supports smart behavior.
- *BT talkback:* Switches the talk-back channel via Bluetooth to *Open* (signal is recorded) or *Muted* (signal is not recorded).
- *Audio solo:* Mutes all audio recording channels except one. Toggles through Off, Ch1, Ch2, Ch3, Ch4, selecting the next channel with every button press. Channels that are not assigned to an audio input are skipped. Does not work when audio is disabled or switched off. Works in playback for all channels and on all clips, as information on clip audio is not available. This may result in a selection of an unassigned channel when playback is exited. In this case, press button once to select the next assigned channel. When solo is active, the selected channel is marked as SOLO in the audio bars of EVF, monitor and SDI, on the homescreen and the audio display.

* Affects both viewfinder and monitor settings. ** Requires advanced license.

*** Requires both an EF lens mount and a suitable EF lens.

User button smart behavior: For these user button functions, a short press toggles the function, while a longpress activates the function only temporarily.

Example: Press EVF zoom long > EVF zoom function is activated, release of button deactivates zoom. Press EVF zoom short > EVF zoom is activated. Press again to deactivate.

22   *MENU > Metadata*
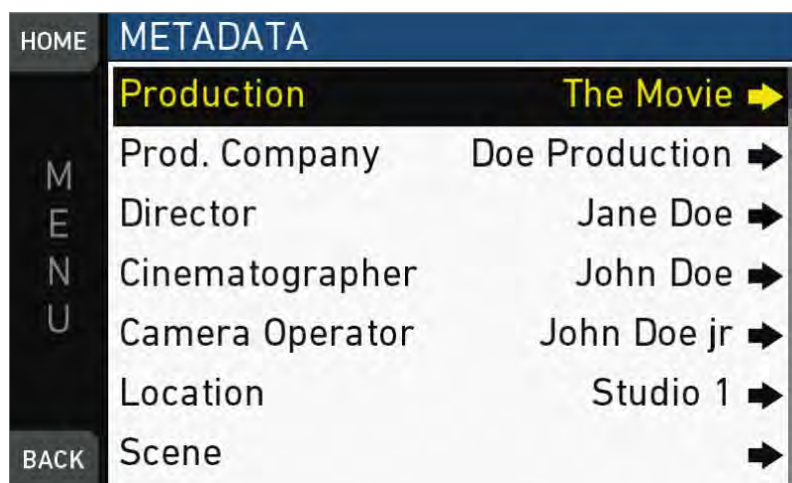
Allows you to enter static production metadata to the recorded Quicktime files.

- *Production:* Field for the name of the production
- *Prod. Company:* Field for the name of the production company
- *Director:* Field for the director's name
- *Cinematographer:* Field for the cinematographer's name
- *Camera operator:* Field for the camera operator's name
- *Location:* Field for the location name
- *Scene:* Field for the scene number
- *Take:* Field for the take number
- *User info 1 & 2:* Fields for additional info.

For editing, see page 96.

23   Web remote

AMIRA has a web remote function for full remote control of the camera with a web browser*. It requires a connection to the camera with a RJ-45 LAN cable.

Note: Web remote requires an advanced or premium license.

Open a web browser* and enter the URL: http:\\amira-xxxxx.local (replace xxxxx with the 5-digit serial number of your camera).
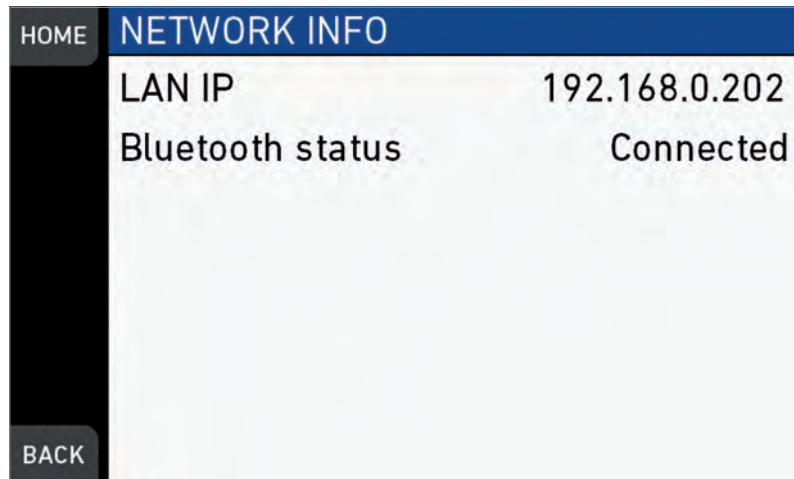
MAIN, *REC INFO* and *USER*

Web remote is divided into the followig three sections:

MAIN: Contains the same UI as the camera monitor (no live screen). Click/tap the screen button tabs to enter a screen/trigger a function. Menu items can be clicked/tapped directly.
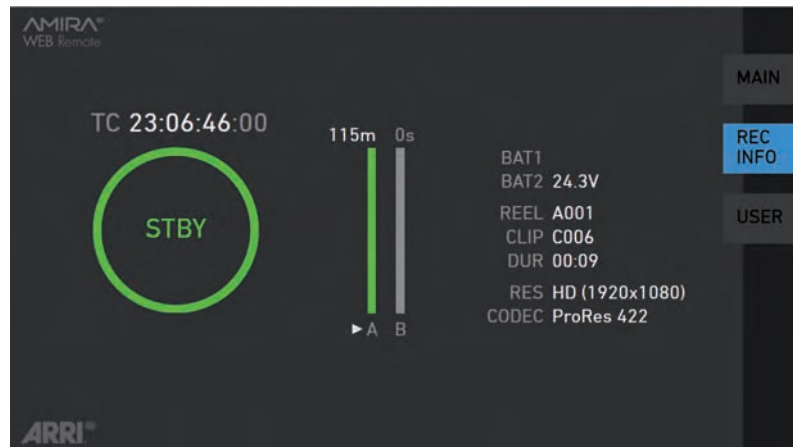
REC INFO: Contains info on the main recording relevant parameters, plus a *REC* button. Click the big circle icon to start/stop recording.

Note: Rec status may respond with a little delay depending on network speed.
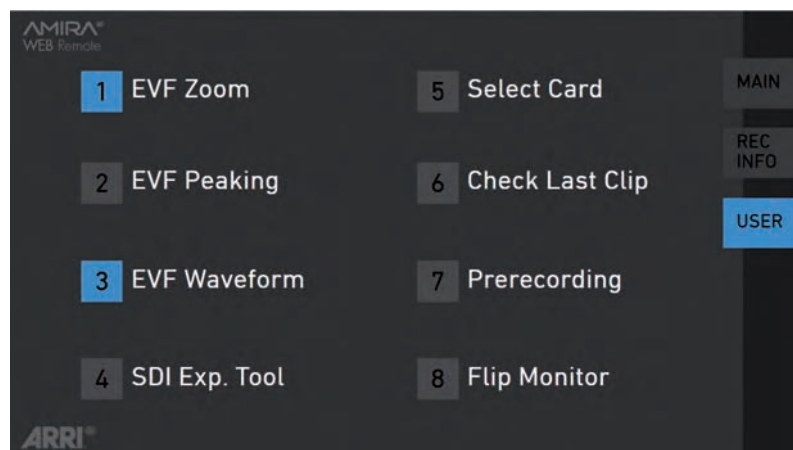
USER: Shows configuration of user buttons and allows to trigger them. Press number icons to trigger user buttons.

* tested with: Google Chrome 39 and Mozilla Firefox 34.

24   User preset panel

1	Power button
2	Camera lock
3	User buttons
4	SHIFT button
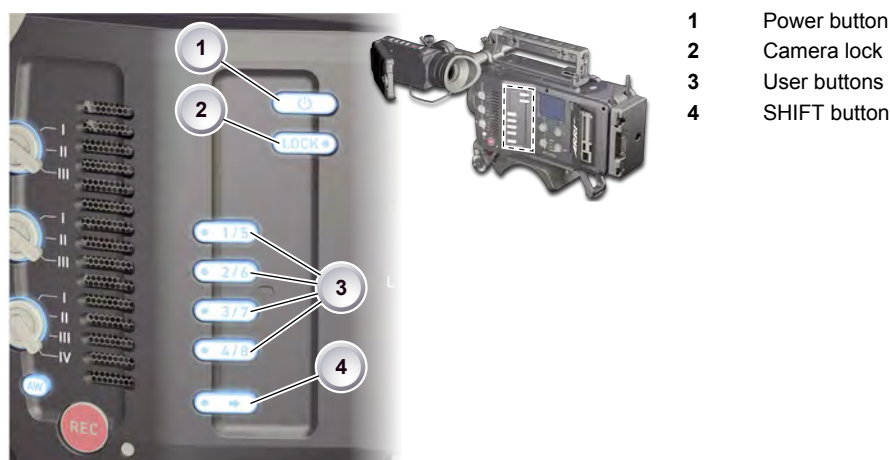
24.1   Locking/unlocking

NOTICE
Locking the camera disables, unlocking re-enables all camera controls configured for locking except audio controls.
Changing the position of the *US, EI, WB*, or *ND* switch on a locked camera will result in parameter changes when unlocking.

1. Press and hold *LOCK* (2).

2. A countdown appears in both the monitor and viewfinder. Once the countdown reaches zero, the camera is locked.

3. **To unlock:** Press and hold *LOCK* (2) again.

24.2 User buttons

In the camera menu (*MENU > User buttons*) you can assign individual functions to each user button.

1. Press a button (1) to trigger its function.

2. For buttons five to eight: Press and hold *SHIFT* (2); then press a button (1).

3. An LED on each button reflects the functional status.

4. To check the functional status of buttons five to eight (1): Press *SHIFT* (2).

Presetting user (and VF) buttons

1. Toggle from live monitor to home screen. See page 54.

2. Press wheel (1) for *MENU*.

3. Wheel-navigate (2) to *User buttons* (4) and enter (2).

4. Enter the desired sub-menu for EVF, camera or WCU user buttons.

5. Wheel-navigate to the desired button and press the jogwheel (2).

6. Select the desired function with the jogwheel (2).

7. To cancel: Press *BACK* (5).

8. To confirm: Press the wheel (2).

9. To conclude: Press *HOME* (3).

10. If applicable: Repeat for all other buttons, including *VF1* and *VF2*.

25   Operator panel

> ### *NOTICE*
>
> The operator panel consists of switches that offer quick changes of important camera functions, such as exposure index or white balance.
>
> For all switch positions (except *ND* positions), you can assign an individual presetting. See the chapter on operator switches.
>
> The *EI* and *WB* switches are dedicated to exposure index and/or white balance. Permanent *EI* and *WB* switch icons on the home screen underline this dedication.
>
> To the *US* switch, however, you can assign a third function (*FPS, SHUTTER,* or *LOOK*). A symbol appears on the home screen only for this assigned function.
>
> For all switch positions (except *ND* positions), you can assign an individual presetting.
>
> You can change or edit the value of an active switch position only.

1	User switch & settings
2	Exposure switch & settings
3	White balance switch & settings
4	Auto-white balance button
5	Recording button & LED
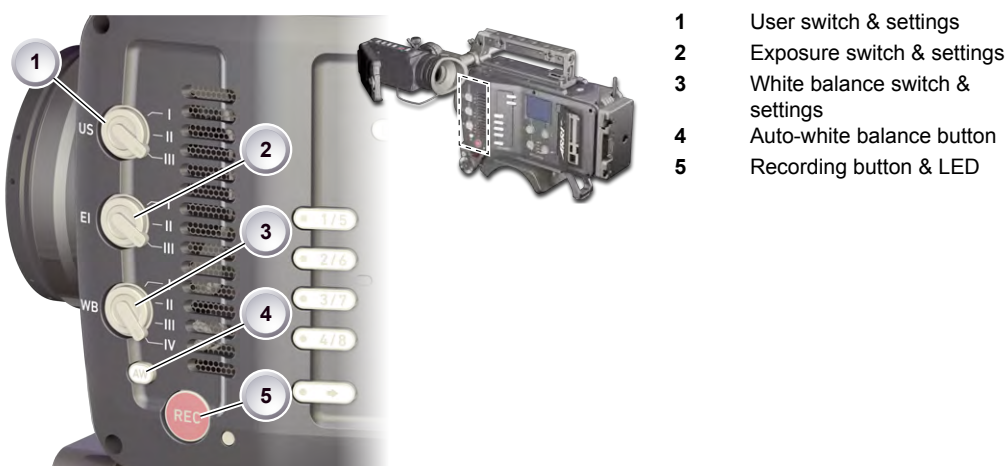
25.1   Operator switches

The *EI* switch (2) is dedicated to exposure index. *WB* (3) is dedicated to white balance and *ND* (4) to filtering.

To the *US* switch (1) you can assign either an *FPS* frame rate, a *SHUTTER* rate/ angle, or a *LOOK* processing.

All switches offer up to four positions. Except for *ND* (4), you can modify each by preset lists. Some lists are editable (depending on license).

25.2 Setting the *US* switch function

1. Switch *US* (1) to the desired position.

2. From the home screen, navigate (1) to *MENU > User buttons* (4).

3. Via jogwheel (2), select the entry *User switch* and change it according to your needs:

   ○ *None:* User switch is disabled

   ○ *FPS:* Switch changes the sensor frame rate

   ○ *SHUTTER:* Switch changes the shutter angle

   ○ *EXP Time:* Switch changes the exposure time

   ○ *Look:* Switch changes the look file

4. Leave the menu by pressing *HOME* (3).

5. **Note:** Recording disables the *US* switch.

25.3   Presetting the *US / EI / WB* switches

1. On the home screen, select a switch function (here: *FPS*) by pressing the button (1).

2. **Note:** Active functions show a switch icon in the button label.

3. You can only change the preset of the active switch position.

4. Change the switch to the desired position.

5. Press the jogwheel (2).

6. Via jogwheel (2), select the desired preset.

7. Confirm by pressing the jogwheel (2).

8. Repeat for other switch positions if desired.

9. For *FPS, SHUTTER, LOOK*, and *WB*, you can configure preset lists for each switch position.

25.4 *AW* auto white balance button

The *AW* button triggers the auto white balance functionality: Based on the camera's live image, *AW* calculates an automatic white balance and overwrites the active *WB* settings. The *AW* result is stored as the preset value of the active *WB* position.

AW triggering

1. **Note:** Under- or overexposed images may cause the auto white balance to fail. Always trigger auto white balance with properly exposed images.
2. To trigger an automatic white balance: Press *AW* twice within one second (1).
3. Two *AW* modes, Matrix and Center, are available.

AW matrix mode

Full-image-based, the algorithm determines the image content best suited for wihite balance calculation.

Use *AW matrix* to calculate *AW* from regular image content.

AW center mode

Press AW again to trigger Auto White.

FPS 25.000   SHTR   1/50 WB   5600K +0.0   ISO 160
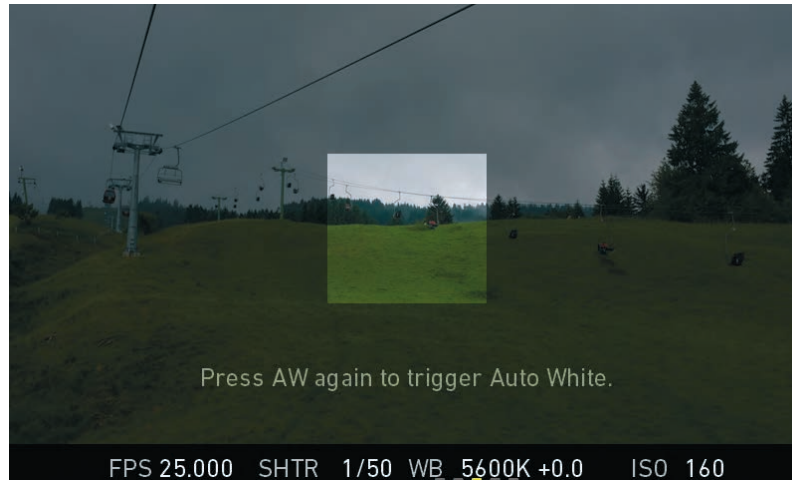
Center: Calculates the white balance based on the center area of the image.

Use *Center* with a gray card placed in the image center. For accurate results: Fill the entire area with the gray card.

The camera displays an image overlay showing the center area used for calculation.

To change the AW mode, go to *WB > OPTIONS*.

26   Camera preparation

26.1   Adjusting the viewfinder
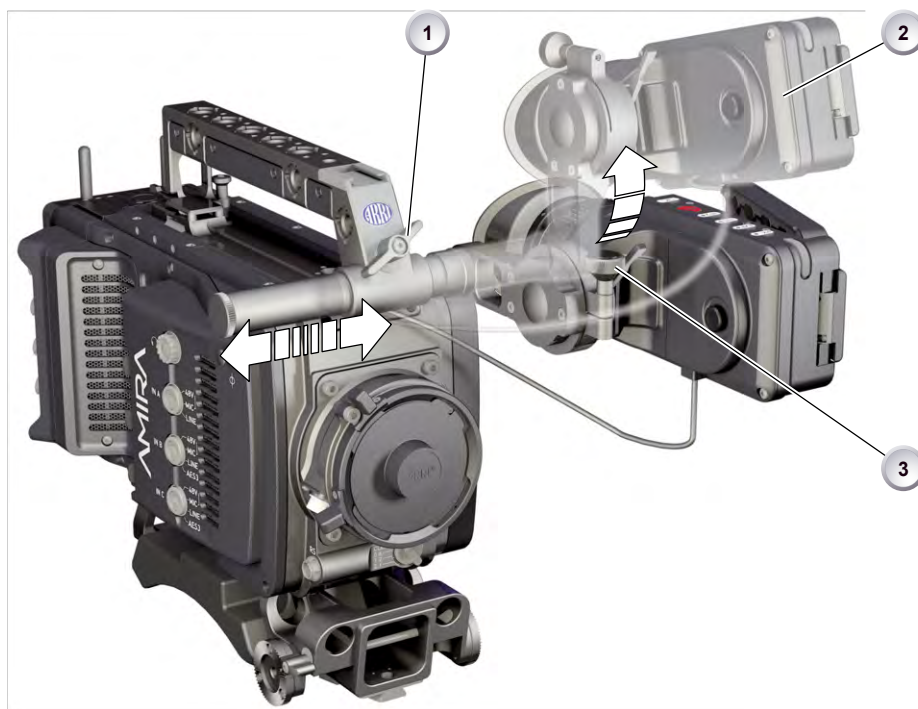
1. Slightly loosen the clamp (1) to move the viewfinder (2) left/right and up/down.
2. Unclamp the hinge (3) to swivel the viewfinder horizontally.
3. Close all clamps (1, 3) when the viewfinder is in the desired position (2).

26.2   Balancing the camera weight
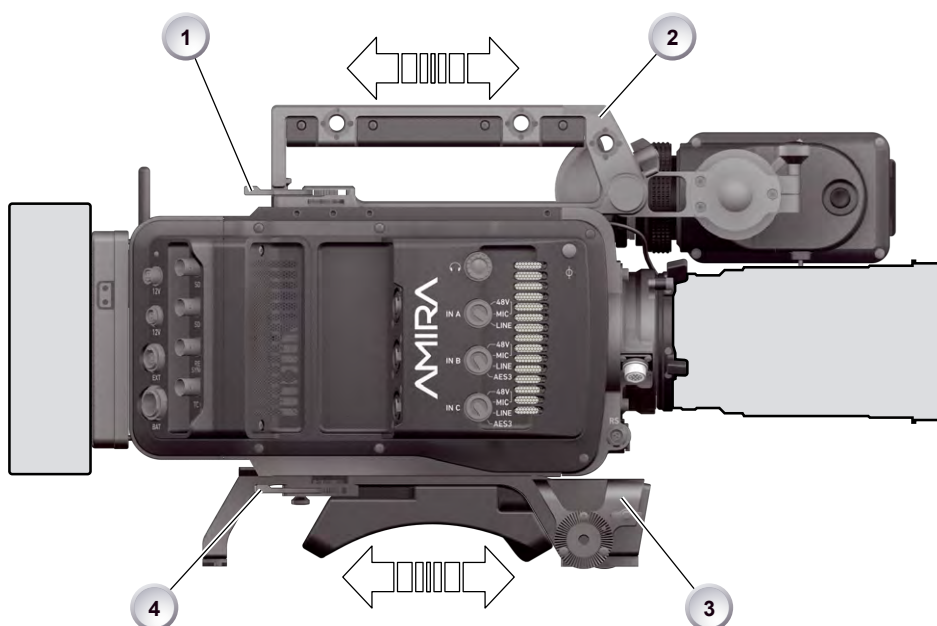
1. Unlock (4) and slide the base adapter (3) until the camera is balanced.
2. Close the clamp (4).
3. Unclock (1) and slide the handle (2) until the camera is balanced.
4. Close the clamp (1).

26.3   Mounting to a wedge plate
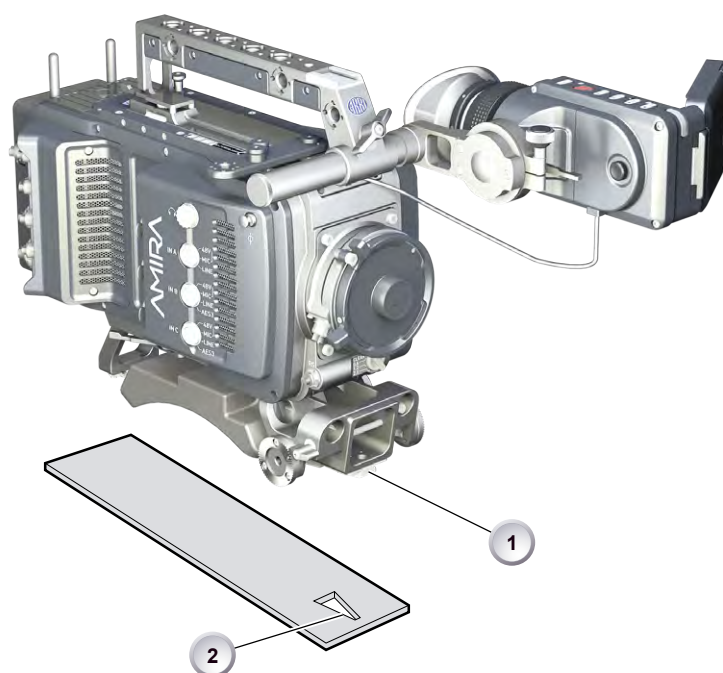
1. For mounting to a wedge plate, use the WPA-1 wedge plate adapter.
2. Open the quick-release base plate.
3. Place the adapter (1) into the quick-lock plate slighty behind the connection points.
4. Slide the camera forward until the quick-lock audibly locks (2).
5. **Note:** The lock must be closed.

26.4   Mounting to a bridge plate

<table>
<tr><td>NOTICE</td></tr>
<tr><td>Always use a flat screwdriver to connect the BPA-3 to a bridge plate. Never use a coin. A coin does not deliver enough force to ensure a proper lock.</td></tr>
</table>
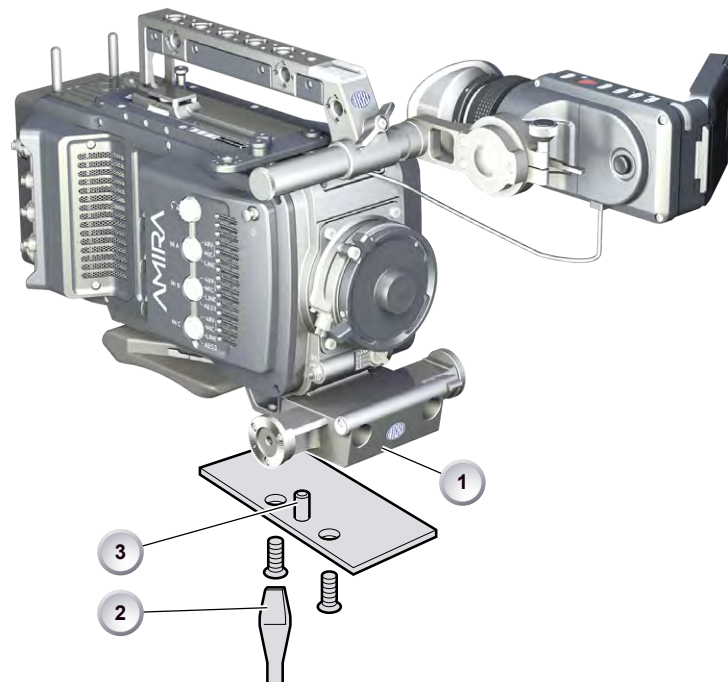
1. For mounting to a bridge plate, use the BPA-3 bridge plate adapter.

2. Place the bridge plate unter the adapter (1).

3. Adjust the bridge plate's nose (3) to the adapter's aperture.

4. With a flat screwdriver (**no** coin!), attach the screws to the adapter and tighten (2).

5. **Note:** Always ensure a proper lock.

27   Assembly and retrofits

NOTICE

To avoid damage while assembling and retrofitting, always place the camera on a padded, firm, flat and level surface.

Work on an unpowered camera only.

27.1 Battery adapter

Tools needed

- 2.5 mm Allen key

Mounting
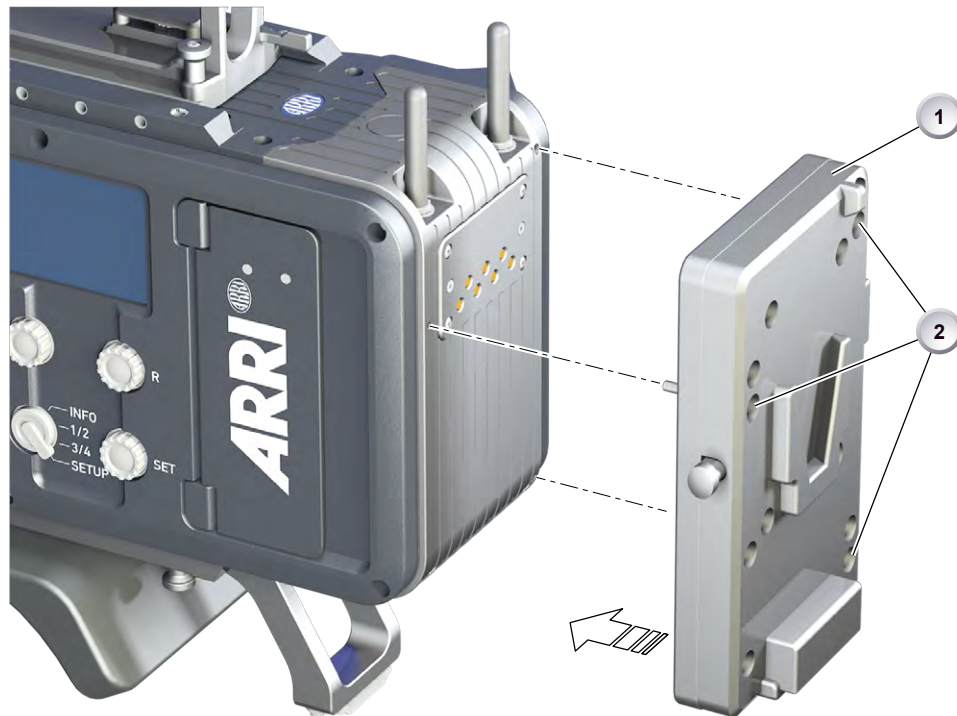
1. **Note:** The illustration shows a V-Lock adapter.
2. Switch off; interrupt the power supply.
3. Pin the battery adapter (1) to the camera.
4. With a 2.5 mm Allen key, fasten all three screws (2) until the adapter fits tightly.

Unmounting
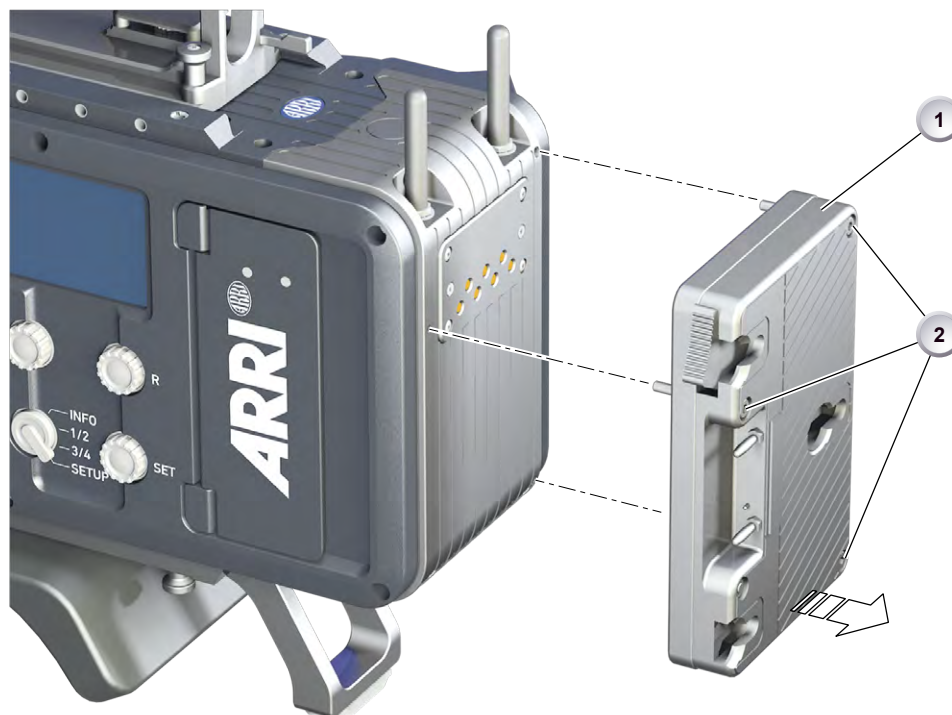
1. **Note:** The illustration shows a Gold Mount adapter.
2. Switch off; interrupt the power supply.
3. With a 2.5 mm Allen key, unfasten all three screws (2).
4. Remove the battery adapter (1).

27.2 Base adapter

Mounting
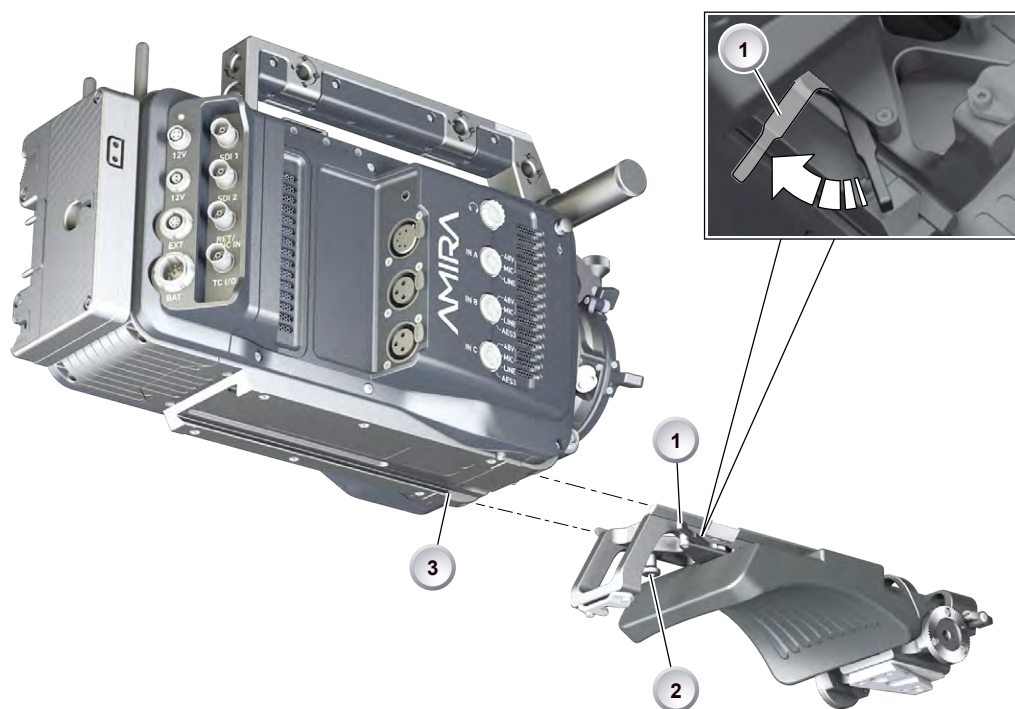
1. **Note:** The illustration shows a WPA-1.
2. Open the clamp (1).
3. Slide the adapter under the camera (3).
4. **Note:** The safety pin (2) must audibly lock.
5. Close the clamp (1).

Unmounting
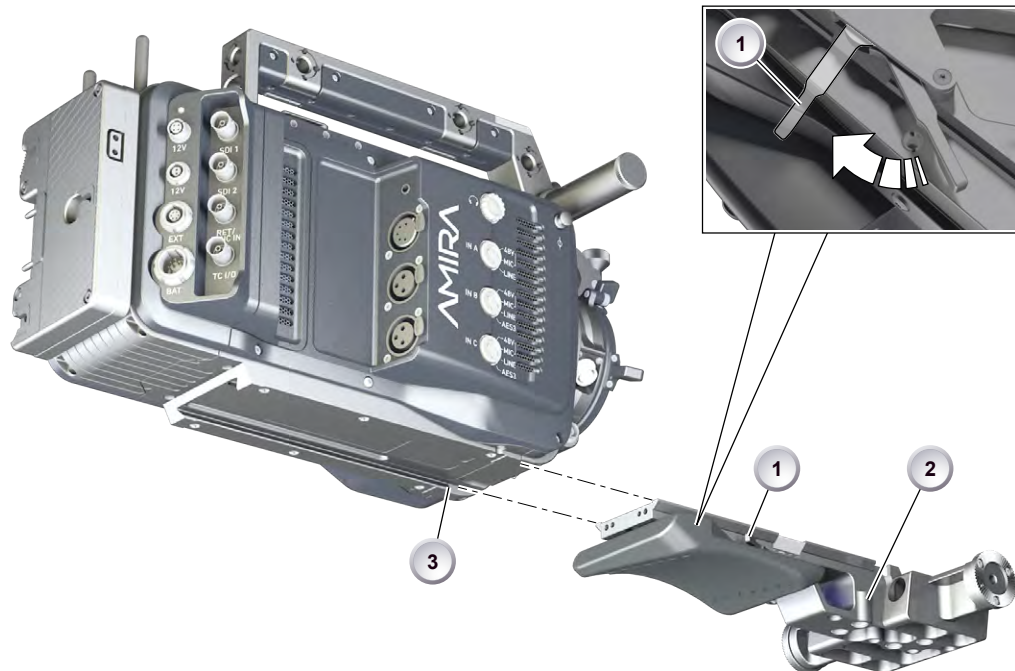
1. **Note:** The illustration shows a BPA-3.
2. Open the clamp (1).
3. With the safety pin pulled (2), slide the adapter off the camera (3).

27.3   Camera handle
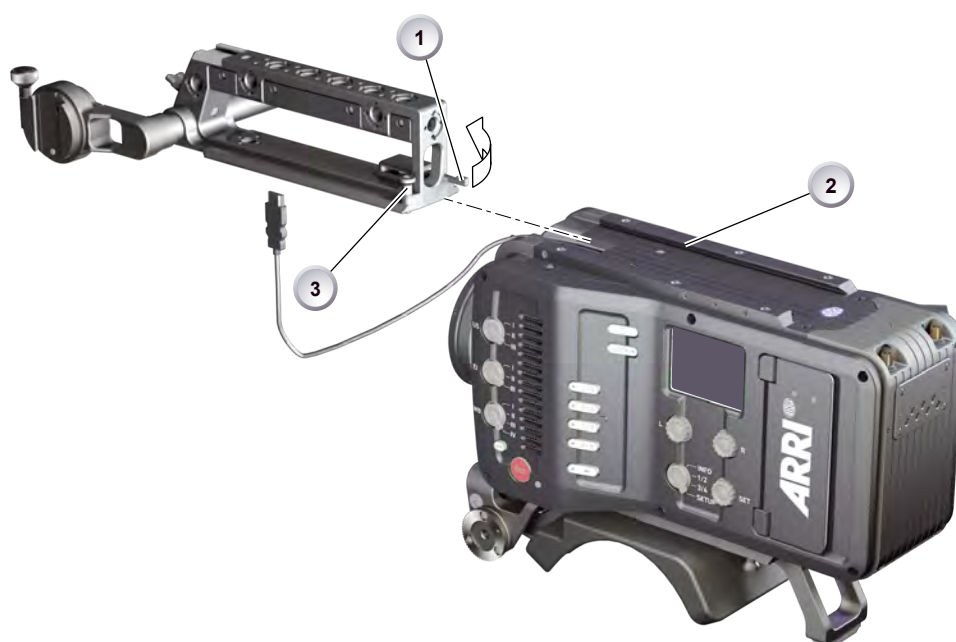
1. Open the clamp (1).
2. Slide the handle onto the camera (2).
3. **Note:** The safety pin (3) must audibly lock.
4. Close the clamp (1).
5. **To unmount:** Open the clamp (1).
6. With the safety pin pulled (3), slide the handle off the camera (2).

27.4 Viewfinder and EVF cable

Tools needed

- 2 mm Allen key

EVF port

Via original AMIRA EVF cable, this port connects the camera to the multi-viewfinder.

Changing the EVF cable

1. **Note:** Use original AMIRA EVF cables only.
2. Place the camera bottom-down.
3. Unmount the camera handle. See page 161.
4. With a 2 mm Allen key, unscrew and remove the lid (1).
5. Either: Connect the cable (2) to the EVF port.
6. Or: Disconnect the cable (2).
7. Reattach lid (1) and camera handle.

Changing the viewfinder

1. Switch off; interrupt the power supply.
2. **Note:** Use original AMIRA EVF cables only.
3. Connect a EVF cable to the camera. See page 162.
4. With your fingers, unscrew and remove the viewfinder's lid (1).
5. Either: Connect the cable (2) to the EVF port.
6. Or: Disconnect the cable (2).
7. Reattach the lid (1).

8. Open the clamp (1).

9. Either: Dovetail the viewfinder to the bracket (2).

10. Or: Unbracket (2) and remove the viewfinder.

11. Close the clamp (1).

27.5   Antennas

1. With your fingers, thread the antennas for WiFi (1) and Bluetooth (2) onto the camera.
2. **To unmount:** Unthread the antennas (1, 2) with your fingers.

WiFi

Antenna for WiFi signal according 802.11g. Used for remote camera access.**

** Feature not yet available.

Bluetooth

Antenna for Bluetooth signal. Used for wireless audio monitoring and comment channel return with Bluetooth headset. Supports Handsfree and A2DP protocols.

27.6   Microphone bracket

Tools needed

- 3 mm Allen key
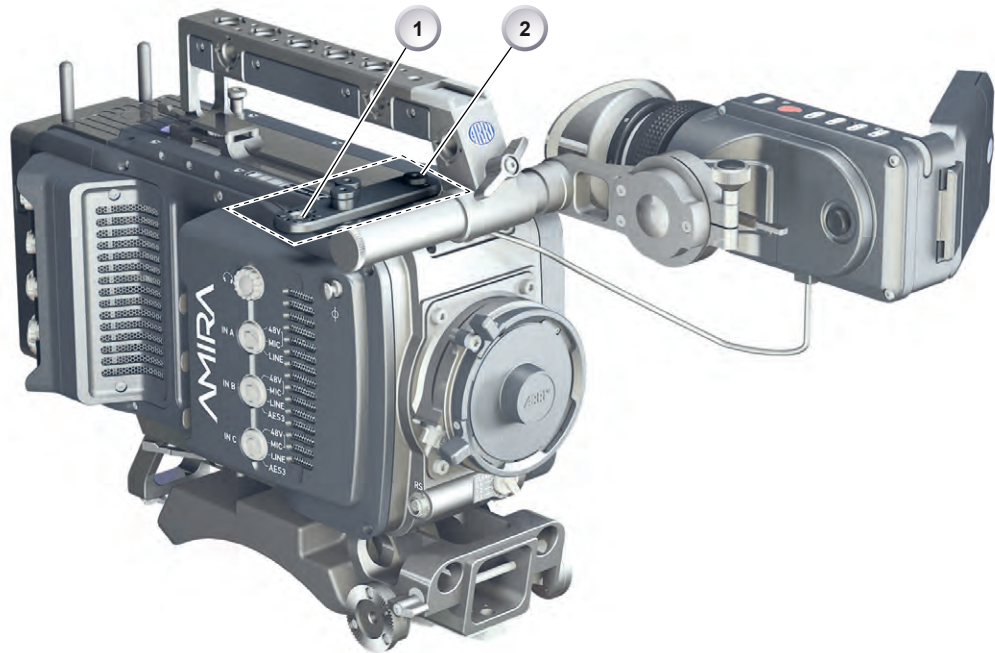
1. With a 3 mm Allen key, attach the microphone bracket (1) to the handle (2).
2. **To unmount:** Loosen the screw (2); remove the bracket (1).

27.7   Changing a lens mount

⚠ DANGER!
High voltage! Risk of electric shock and fire!
Short circuits may entail lethal injury and damage!
Use original AMIRA lens mounts only.
Before each lens mount change, always switch the camera off and disconnect all power sources.
Changing the lens mount while the camera is powered may permanently damage the camera and lens mount.
Protect sensor and electrical system: Always store the camera with a lens mount properly installed and capped.
Immediately replace each lens mount after removal.
Change lens mounts in dust-free environment only.

NOTICE

After each lens mount change, always check the back focus of the camera.

Have the back focus always corrected by properly skilled personnel.

Back focus correction requires special tools and training that meet ARRI guidelines.

For all back focus issues, contact a qualified ARRI Service Center.

Tools and provisions needed

- 3 mm Allen key
- Fresh rubber gloves
- Switch the camera off
- Disconnect all power sources
- Properly cap, disconnect, and store the lens

Deinstallation (here: a PL mount)

1. Perform task with care to protect optical surfaces.
2. Crosswise, loosen all four screws (2) with an Allen key.
3. Carefully remove the mount (1).
4. Store the mount in a case for dust protection.
5. **Note:** To protect the sensor (3), immediately install another original AMIRA lens mount.

Installation (here: a PL mount)

⚠ WARNING!

Condensation! Risk of electric shock and damage!

Humidity may ingress due to misinstalled lens mounts!

When installing a lens mount, always align and attach properly; never apply force.

Hand-tighten all screws crosswise before final tightening.

Always tighten crosswise with the prescribed tool.

---
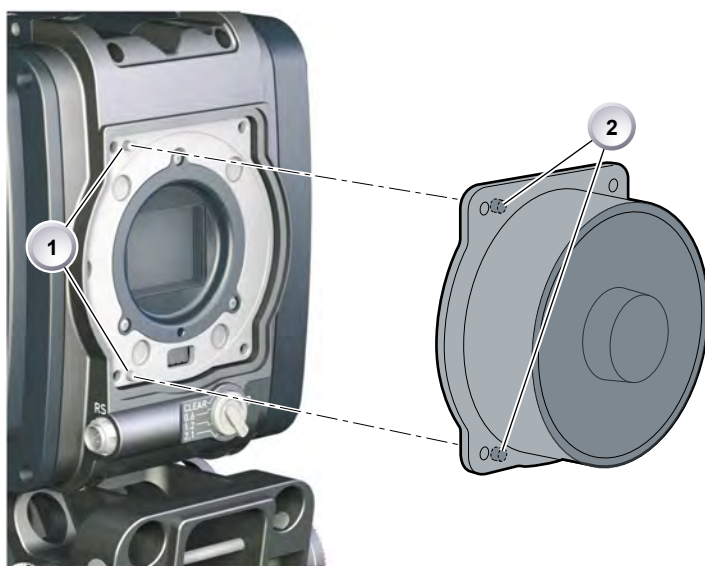
1. Properly align the two guiding pins (1) for correct lens mount fit (2).
2. **Note:** Never apply force, align the guiding pins instead.
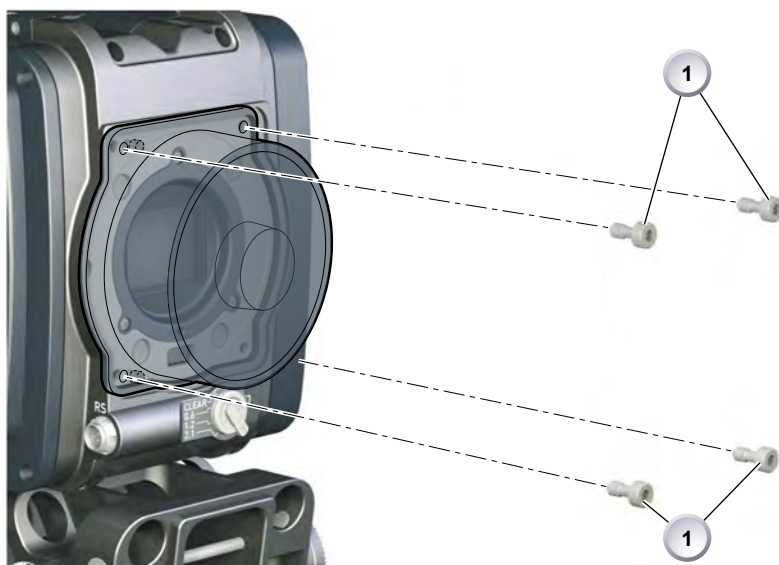
3. Crosswise, hand-tighten all four screws (1).
4. Only then, tighten all screws crosswise with an Allen key.
5. **Note:** Always store the camera with a lens mount properly installed and capped.

28 Licensing and updating

Tools needed

- Sufficient power supply
- Product key
- Internet access
- FAT-formatted USB memory stick with a camera-compatible folder structure. See page 29

28.1 Camera update

NOTICE
Power the camera with a fully charged battery to avoid power loss during the update. The update procedure takes about ten minutes. Before update, create the AMIRA folder structure on a FAT 32 USB stick: 1. Connect the USB stick to the camera. 2. Navigate to *MENU > Media > Prepare USB medium.* 3. Press *CONFIRM.* 4. AMIRA creates the folder structure (will not alter existing folders). After each update, the camera reboots. Never shut down or unpower the camera during reboot. Check the audio screen for update status.

Tools needed

- AMIRA with connected MVF-1
- Fully charged camera battery
- Computer with internet access and USB interface
- USB stick (FAT 32 file format), prepared for use with AMIRA

Update procedure

The camera supports the installation of SUP software update packages. Check www.arri.com for the latest available SUP version.

1. Via computer, download the software update package (SUP) from www.arri.com.
2. Doube-click on the downloaded file (*.zip) to unpack it:
    - Update file (*.SUP)
    - Update key (*.lic)
    - Release notes
3. Read the release notes carefully.
4. Copy the update file (*.SUP) to the ARRI/AMIRA/SUP folder on the USB stick.
5. Copy the update key (*.lic) to ARRI/AMIRA/LICENSES on the USB stick.
6. Safely remove the USB stick from the computer.
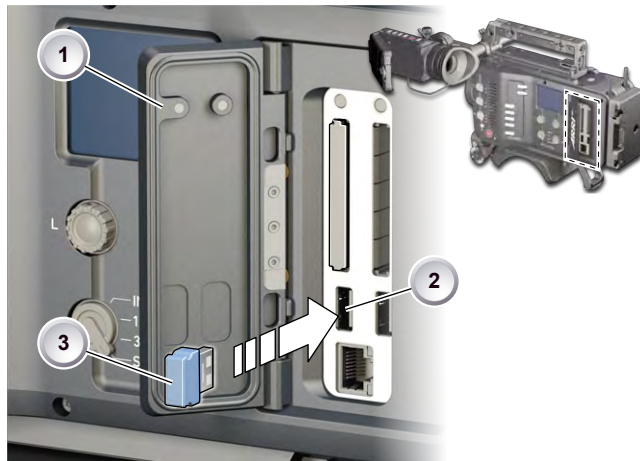
7.   Open the media lid (1) and connect the USB stick (3) to the camera (2).

8.   Remove all CFast cards from the camera.

9.   Switch on the camera with a full battery.

10. From the home screen, navigate to *MENU > System > Camera update:*

MENU > System > Camera update

Note: Update only possible with all CFast cards removed from the camera.
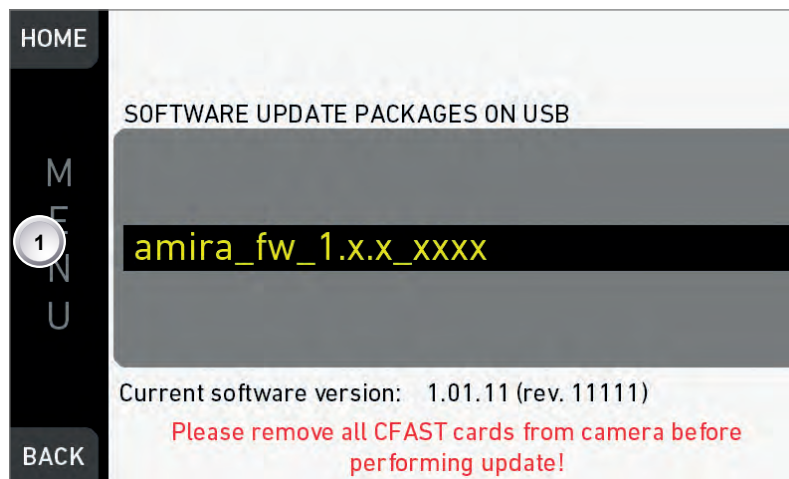
1.   Scroll to the required update file and press the jogwheel (1).
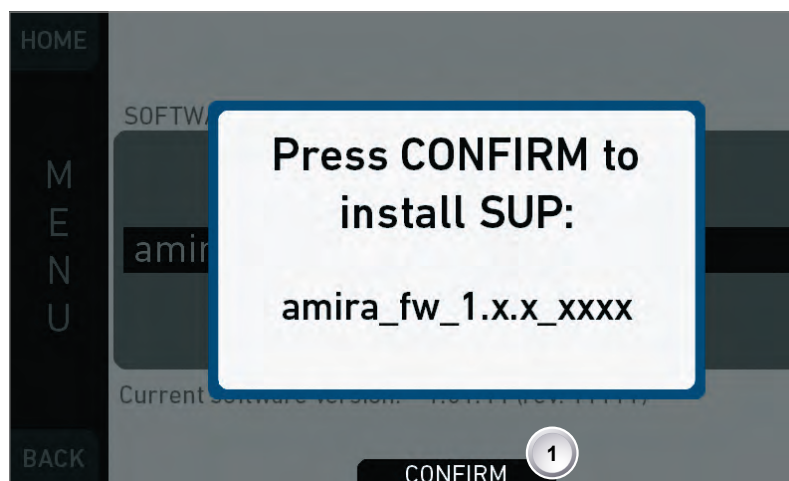
2.   Press *CONFIRM* (1) to start the update. **Cancel** with *BACK.*
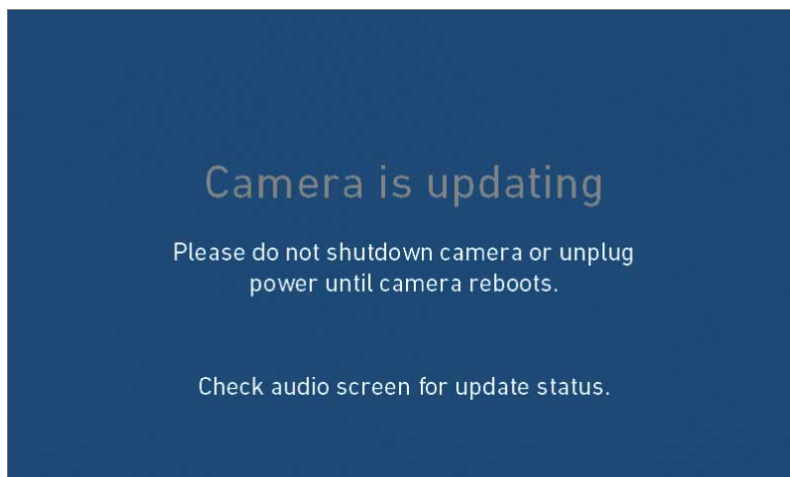
3. **NEVER** shut down the camera or unplug power during the update.
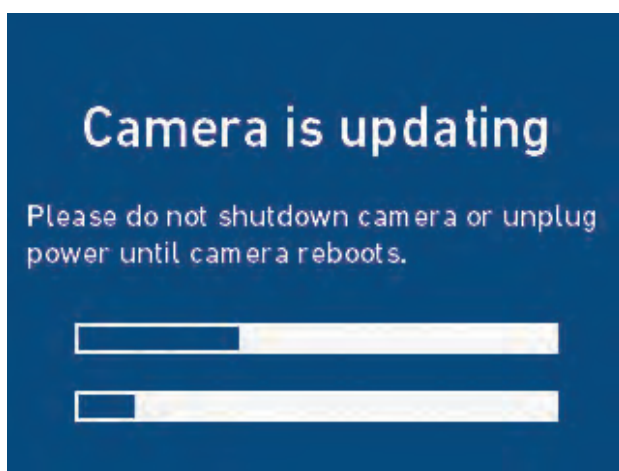
4. Check the audio screen for the update progress.

5. Wait for the update process to finish and the camera to reboot.
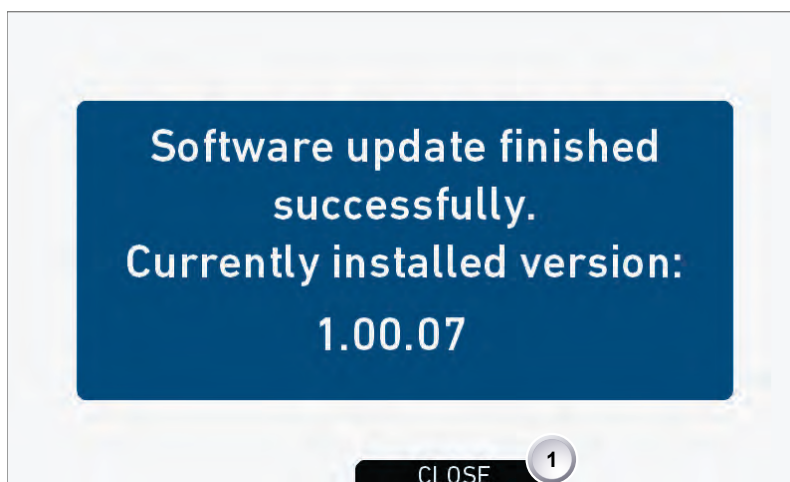
6. After a sucessful update and reboot, the camera monitor displays a blue success message.
   - If so: Press close (1) to start using your updated camera.
   - A failed update produces a red warning message (see below):
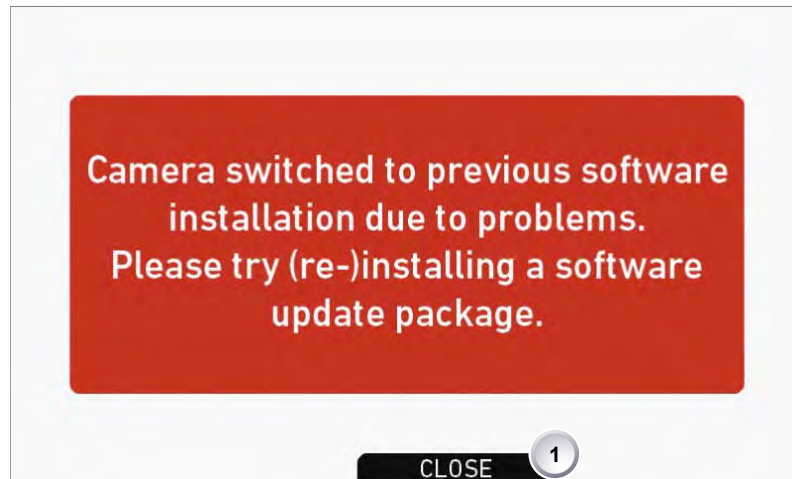
7. On update failure, previous camera software remains intact.

8. Press close (1) and update your camera again.

28.2 Licensing

You can further enhance the camera capabilities through licensed features available from the ARRI license shop at http://alshop.arri.de.

License keys are linked to each camera's serial number and cannot be transferred from one camera to another.

The ARRI license webshop requires a hardware info file (*.json) to identify the individual camera.

Before ordering a license key, you must export the *HW INFO* file from the camera to a USB memory stick for upload during purchase.

The active camera license model (incl. contained features) is available under: *Menu > System > Licensed feature* (1) and (2).

28.2.1 License bundles

Licensed features require the installation of a license to enable their use. Licenses are installed and removed as bundles. Two bundles are available:

Advanced license bundle

- Frame rates 100-200 fps
- ProRes 422 HQ recording format
- Pre-record function
- Gamma: Log C
- Import of external look files
- In-Camera CDL look parameter adjustment
- Dynamic Auto-Tracking white balance
- WiFi Remote Control*
- Bluetooth Audio Monitoring

* Feature pending availability.

Premium license bundle

- All advanced license features
- ProRes 4444 recording format
- 2K (2048 x 1152) recording
- Import of looks containing 3D LUTs

To view the features contained in the active license bundle, press *FEATURES* screen button (1).

Temporary licenses

Licenses are also available as temporary real-time licenses. After installation, the license is valid for a defined period past the installation time. After this period, the license becomes invalid.

A temporary license shows *Valid until: YY-MM-DD HH:MM:SS* (1) in the licensed features screen and in the *FEATURES* subscreen.

28.2.2 Extracting *HW INFO* from the camera
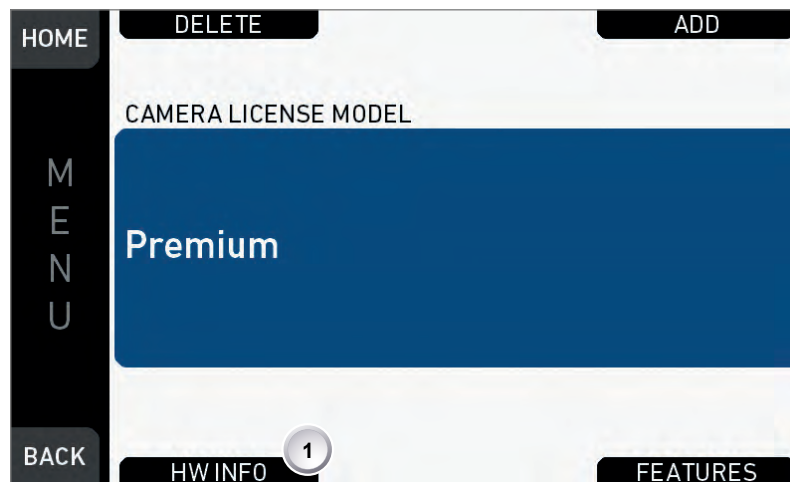
1. Prepare a USB memory stick. See page 29.
2. Connect the memory stick to the camera.
3. Navigate to *Menu > System > Licensed features.*
4. Press *HW INFO* (1).

1. Press *CONFIRM* (1) to generate the hardware info file.
2. The file is saved in the USB folder *ARRI/AMIRA/LICENSES*.
3. File name is *AMIRA-HW-#####-YYMMDD-HHMM.json**
4. Copy the file from USB to a computer, easily accessible when ordering licenses.

* *#####* = camera serial number. *YYMMDD-HHMM* = date/time stamp.

28.2.3 Installing a license file

NOTICE
Keep backup copies of all license files in case a license deleted from the camera must be re-installed.
Installed licenses remain on the camera, independent of USB memory stick, and across the installation of SUP software update packages.
All installed licenses are displayed at *MENU >System > Licensed features > FEATURES*.

Menu > System > Licensed features
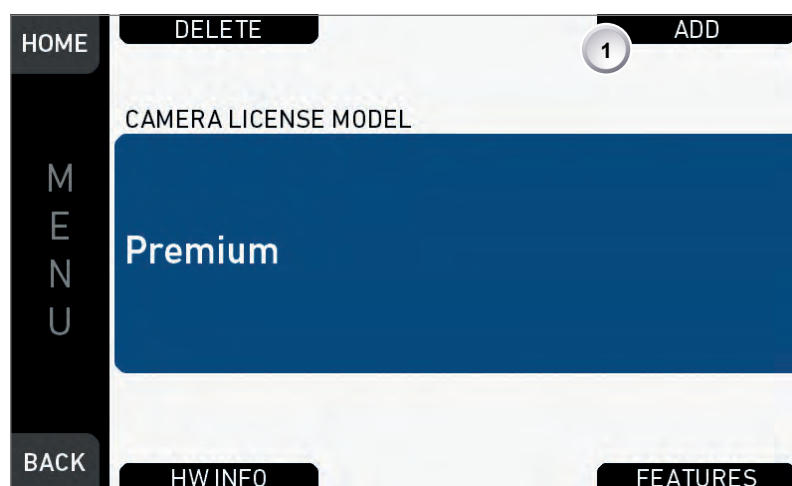
1. Copy the license file into the *ARRI/AMIRA/LICENSES* folder on a correctly prepared USB stick. See page 29.
2. Connect the USB stick to the camera.
3. Via jogwheel, open *Menu > System > Licensed features*.
4. Press *ADD* (1).
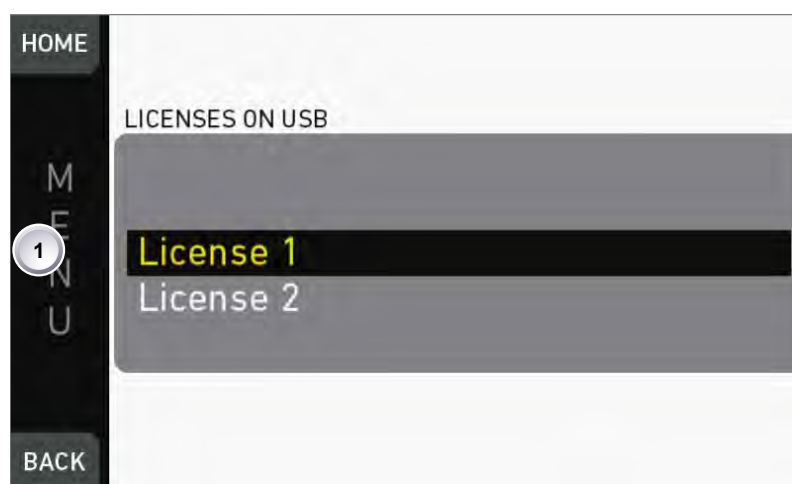
5. A list appears.
6. Via jogwheel (1) scroll to the required file.
7. Confirm by pressing the wheel (1).
8. Wait for the file to install.

9. Reboot the camera afterwards.

10. If required: Repeate for other files.

28.2.4 Downgrading to another license model/Deleting UHD license

NOTICE
After a downgrade, you must reboot the camera for the new license model to become active.

Menu > System > Licensed features
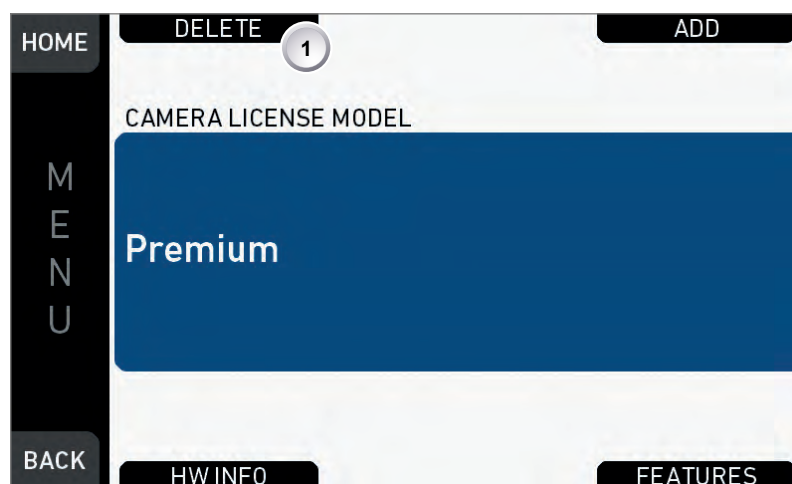
1. Via jogwheel, open *Menu > System > Licensed features.*

2. Press *DELETE* (1).
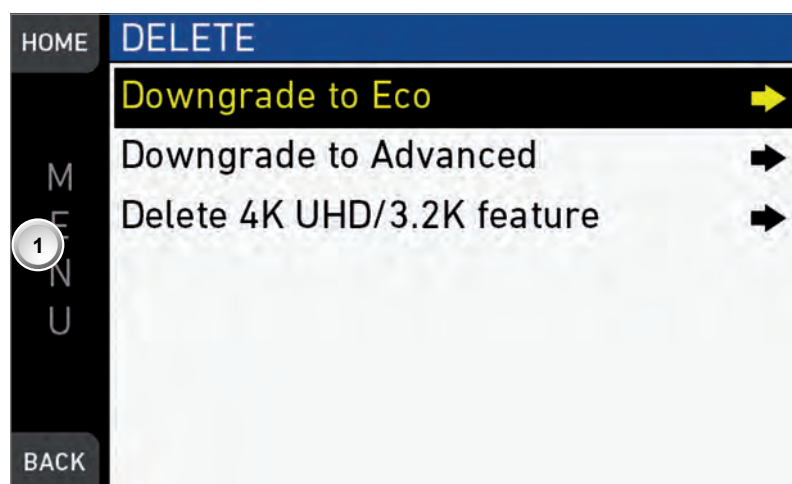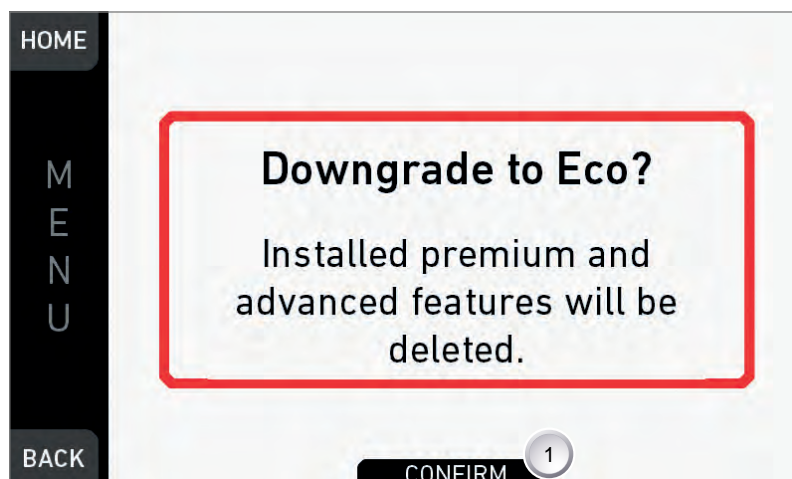
3. Confirm (1) the downgrade (here: to Eco). Cancel with *BACK.*

4. After completion, reboot the camera for the downgrade to take effect.

29   Appendix

29.1 Dimensions and weight (with PL mount)

Length	309 mm
Height	149 mm
Width	139 mm
Weight	4.1 kg/9 lbs

29.2 Electrical data

DC power input	10.5 to 34 V
DC power output	10.5 to 12 V (RS: 24 V) / 2.0 A
Operation temperature	-20 to +50 °C (-4 to +122 °F)

29.3 Pin-outs

Note: All pin-outs for camera interfaces appear as seen by the user.
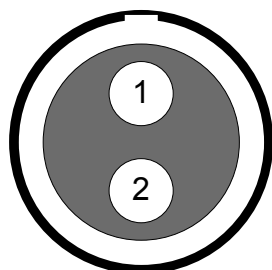
12 V

1	Gnd
2	12 V Aux
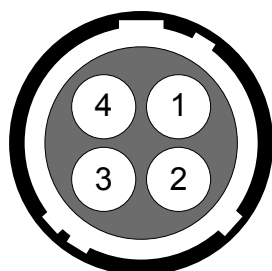
12 V Hirose

1	Gnd
2	GP Out
3	GP In
4	12 V Aux
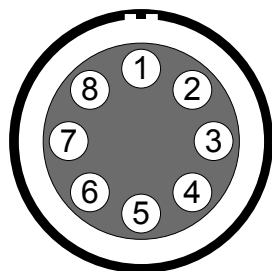
BAT

1	Batcom
2	Powergnd
3	Powergnd
4	Powergnd
5	Batcom Gnd
6	Batplus
7	Batplus
8	Batplus
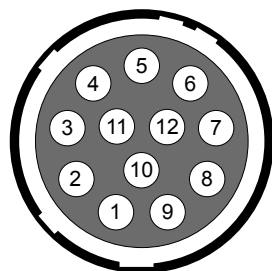
ENG

1	-/-
2	-/-
3	Gnd
4	-/-
5	-/-
6	12 V
7	-/-
8	-/-
9	-/-
10	-/-
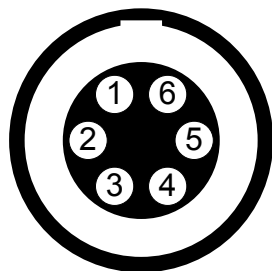
EXT

1	Can1 H
2	Can1 L
3	Can2 H
4	Can2 L
5	VBat (1A max)
6	Gnd
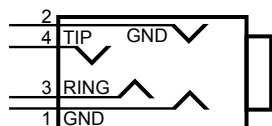
Headphones

1	Gnd
2	Gnd
3	R Out
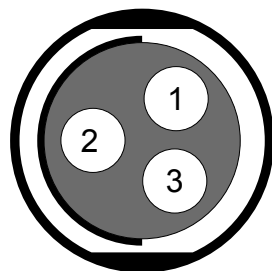
4   L Out

R/S

1   Gnd
2   24 V Aux
3   R/S
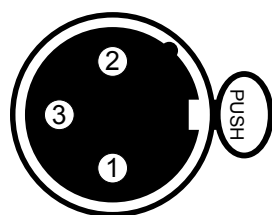
XLR 3-pin

1   Gnd
2   In (+)
3   In (-)
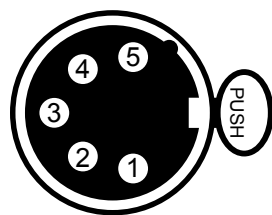
XLR 5-pin

1   Gnd
2   L In (+)
3   L In (-)
4   R In (+)
5   R In (-)

29.4 Declarations of conformity

EC Declaration of Conformity

The product AMIRA 1 conforms with the specifications of following European directives:

- Directive 2014/30/EU Community directive for the adaptation of legal regulations of member countries regarding electromagnetic compatibility
- Directive 1999/5/EC Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity
- Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment
-

The compliance with the requirements of the European Directive was proved by the application of the following harmonized standards:

- EN 55103-1:2009 / EN 55022:2010
- EN 55103-2: 2009
- EN 301 489-1:2011
- EN 301 489-17:2012
- EN 62479:2010
- DIN EN 50581:2013-02

FCC Compliance Statement

Class A Statement: 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.

Note: 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.

- **WLAN:** FCC ID: PD962205ANH
- **Bluetooth:** FCC ID: QOQWT32AE

Industry Canada Compliance Statement

Complies with the Canadian ICES-003 Class A specifications.

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

This device complies with RSS-210 of Industry Canada.

Cet appareil est conforme à CNR-210 d' Industrie Canada.

This Class A device meets all the requirements of the Canadian interference-causing equipment regulations

Cet appareil numérique de la Classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

- **WLAN:** IC ID: 1000M-62205ANH
- **Bluetooth:** IC ID: 5123A-BGTWT32AE

AMIRA
Look File *.aml

Date: 10th October 2014

Introduction

ARRI introduces a wide variety of in-camera color manipulation possibilities with the AMIRA camera. This document exposes the possibilities with and around the AMIRA look file and offers background information on the available parameters.

Who is who? – Terms and technics

To get to know all the options you have, let's begin with some vocabulary to find your way around the terms used later on.

Video - Rec 709

"Rec 709" is short for the International Telecommunication Union's ITU-R Recommendation BT.709 - the output format for a traditional television workflow. Since the Video - Rec 709 encoding from an AMIRA follows this standard for displaying images on video monitors, AMIRA's Rec 709 images can be displayed directly on monitors or used for editing and dailies review. Without the need for color space conversion, AMIRA Rec 709 images can be processed by HD video postproduction gear in real time. While providing somewhat reduced choices in color grading, Rec 709 maintains AMIRA's wide exposure latitude, cinematic look and natural color rendition, and offers the fastest workflow for any HD video-based infrastructure.

Due to improvements in color rendition from ALEXA to AMIRA, we've brought ALEXA's look to AMIRA as a selectable AMIRA look file with the Rec 709 LUT implemented. Users will benefit from the exact match when using this look in AMIRA in projects that are shooting AMIRA and ALEXA side by side.

Log C

The "C" in Log C derives from "Cineon", which was the digital film scanning, processing and recording system developed by Kodak in the 90s. It is also the name of a file format that contains density data from scanned negative film. Density is a logarithmic measure of the opacity of the film. The relation of the density to the film's exposure is called the characteristic curve of the film. Each stock has its own characteristic curve, but the overall shape is always the same.

ARRI introduced scene-based encoding for their camera data, which, because of the similarity to the Cineon standard, was named 'Log C'. With Log C encoding, the signal level increases by a fixed amount with each increase of exposure, measured in stops. This encoding gradually advanced, with an initial implementation for the ARRIFLEX D-21, a few upgrades for the ALEXA and its newest version in the AMIRA camera. Log C images offer the original AMIRA/ALEXA-specific wide gamut color space and are ideal for carrying the complete image information.

Color comparison: split image Rec 709/Log C

AMIRA Look File (file extension: *.aml) – look file format for use in AMIRA camera.

The AMIRA Look File contains:

- **Video Look Parameters** (short: VLP) – a set of adjustment parameters designed for television and video application. You can alter gamma, black gamma, knee, overall saturation and saturation for red, yellow, green, cyan, blue and magenta.
- **Color Decision List** (short: CDL) – color alternation parameters for feature film and cinema applications (defined by the American Society of Cinematographers; contains Slope, Offset, Power and Saturation controls).
- **3D Look Up Table** (short: 3D LUT) – a descriptive table for color changes or color-space mappings usually generated by colorists and post facilities for on-set use.

AMIRA Color Tool – a free application created by ARRI to accompany the AMIRA camera.

AMIRA Look File

The AMIRA Look File combines information on all edits done to achieve the desired look.
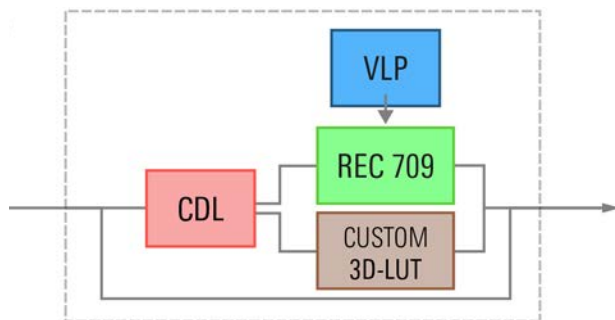
The look file itself can be created by alternating a look present in the AMIRA camera or by using the AMIRA Color Tool on your computer. When you're planning to use a 3D-LUT in your look file, you have to import it in the AMIRA Color Tool in order to marry it to a look file. The camera itself cannot handle 3D-LUTs natively.

Let's assume you have created a look in the AMIRA Color Tool, what's the next step? Besides copying the file to an USB flash drive: utilization – which presents us the following options:

1. **Utilization in-camera**

   Each look can be altered in camera (preferably you use a copy of the look): Video Look Parameters or CDL values can be altered freely, the Custom 3D-LUT itself cannot be changed in-camera

   a. **Destructive use of a look ("burn-in")**

      The look file has to be imported to the camera's internal memory. Once loaded it can be activated. If you choose "Look" for the gamma setting of the recording path the image manipulations will be applied to the image in a non-reversible way. Additionally the look file you used will be embedded in each clip's file header.
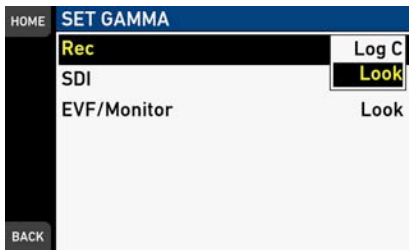
   b. **Non-destructive use ("just metadata")**

      If you are not on a tight schedule or the color grading will be done in post-production, set the gamma to "Log C". The look will not be used to alter the recorded image but travel with its metadata and can be applied the downstream pipeline.

2. **Utilization off-camera**

   a. **Extract embedded looks from the clips by using ARRI's Color Tool**

      Each clip that comes with an embedded look file can be viewed in the AMIRA Color Tool with the look applied. The look file can be exported as a separate *.aml file or be converted to 3D LUT.

   b. **Import clips to an AMIRA Look File aware 3rd party application**

      Just like in the Color Tool 3rd party applications are offering "AMIRA Look File awareness" which means the application will recognize the embedded look file and apply the alternations automatically. If you've opted for a destructive path or do not want to use the look at all there's no limitation: the clip can be handled like an ordinary QuickTime-wrapped ProRes clip.

Overview on the available parameters

For a good overview of the AMIRA color controls, we just follow the image path of the camera. As a first step the sensor data is balanced for the color temperature of the light source. This ensures neutral representation of the R, G, and B values of objects - it is not part of the look settings. As second step, a Log C image is created. The Log C transform is controlled by the exposure index (EI), which is also not part of the look.
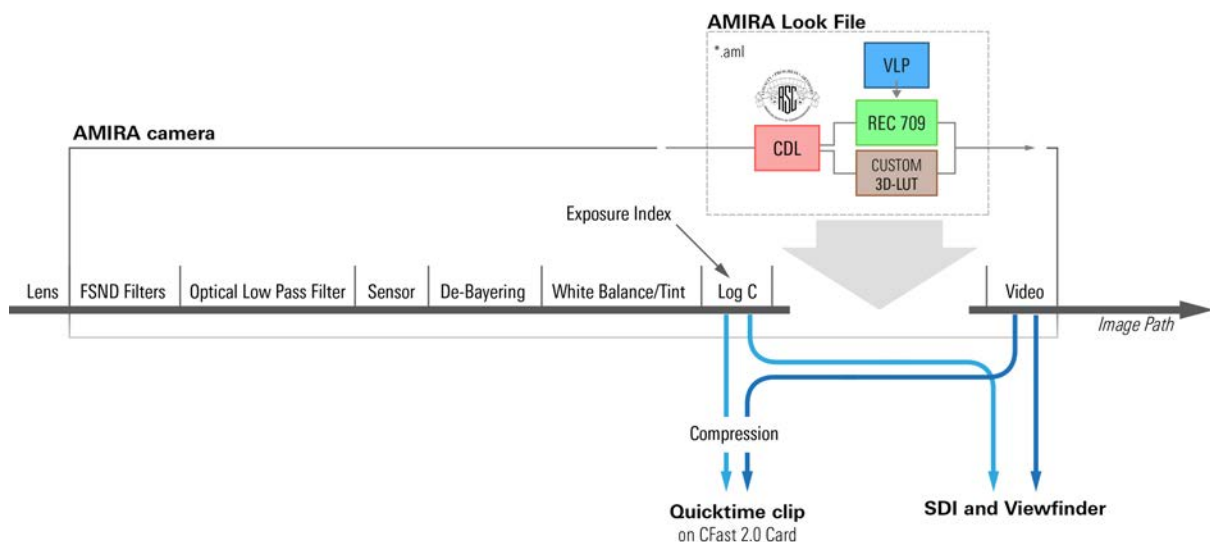
The ASC (American Society of Cinematographers) has standardized all relevant color transformation parameters in the ASC CDL policy, in order to allow for an standardized exchange of color transform data between the postproduction systems of different manufacturers. Image parameters can multiply the image data, adding an offset or raising to an exponent, independently of each of the color channels, which results in nine parameters plus color saturation as the 10th. In AMIRA the ASC CDL transforms are applied to the Log C image before the image is transformed for display on the viewfinder or monitor. This conversion can be done with the integrated AMIRA 3D LUT (to Rec 709) or a custom 3D LUT included in a look. Using the standard AMIRA 3D-LUT additionally allows for modification of Video Look Parameters.

CDL

- Slope (RGB, Master)
  This parameter affects the inclination of the Log C curve. The slope of the linear part of the Log C curve is equivalent to the gamma of the camera negative. The Log C curve has a gamma of approx. 0.51. Hence, using a slope parameter of 1.2 will have a similar effect to using a negative stock having a gamma of 0.6 (= 1.2 * 0.5). A parameter of less than 1.0 will lower the gamma accordingly.

  Note: Often it is assumed that the typical camera negative gamma is 0.6. Some motion picture films, however, have gamma values in the range from 0.45 to 0.6.

- Offset (RGB, Master)
  The CDL offset parameter is the most intuitive of the CDL parameters. Adding an offset to the Log C image has a similar effect to increasing the exposure index. For people familiar with the motion picture print film process, it's the same as printer lights.

- Power (RGB, Master)
  The CDL power parameter has no equivalent in the motion picture film process. It can be used to raise or lower the mid tones in the Log C domain. The effect of the numerical value of power is reversed compared to the slope parameter. A power value smaller than 1.0 will increase the brightness and a value greater than 1.0 will decrease the brightness of the mid tones.

- Saturation
  The saturation parameter is used to in- or decrease the colorfulness of the image. One can go all the way down to a de-saturated grey-scale image at a value of 0 or add up another 100% color at a level of 2.0.

Video Look Parameters

- Tone map parameters
  - Gamma
    This is a standard parameter in video processing; it affects the mid tones while leaving black and white unchanged. Values below 1.0 will darken the image, higher values will brighten the image.
  - Black gamma
    The parameter black gamma controls the toe of the tone map curve. Lower values of black gamma cause shadows to be darker (lower values cause the lower part of the curve to be steeper, higher values cause a more linear start). This parameter leaves the level of the mid grey unchanged over a wide range. Only for the lowest value of black gamma is the mid grey raised.
  - Knee
    The parameter knee controls the roll-off of the tone map curve. Lower knee values cause highlights to be brighter, while higher values produce an image showing dimmer and flatter highlights (lower values cause the upper part of the curve to be steeper, higher values cause a linear ending). This parameter leaves the level of the mid grey unchanged.

- Saturation by hue parameters
    AMIRA allows saturation to be controlled along the six color vector: red, yellow, green, cyan, blue, and magenta.
  - Red saturation
  - Yellow saturation
  - Green saturation
  - Cyan saturation
  - Blue saturation
  - Magenta saturation

- Saturation (overall)
    Besides CDL saturation the AMIRA also offers a video parameter to control the color saturation. It affects the image in a way that is very similar to the former.

Custom 3D-LUT

AMIRA allows custom 3D-LUTs from grading or on-set tools to be used in the camera (requires AMIRA Premium license). These 3D-LUTs need to be converted to an AMIRA Look File using the AMIRA Color Tool, before they can be loaded into the camera.
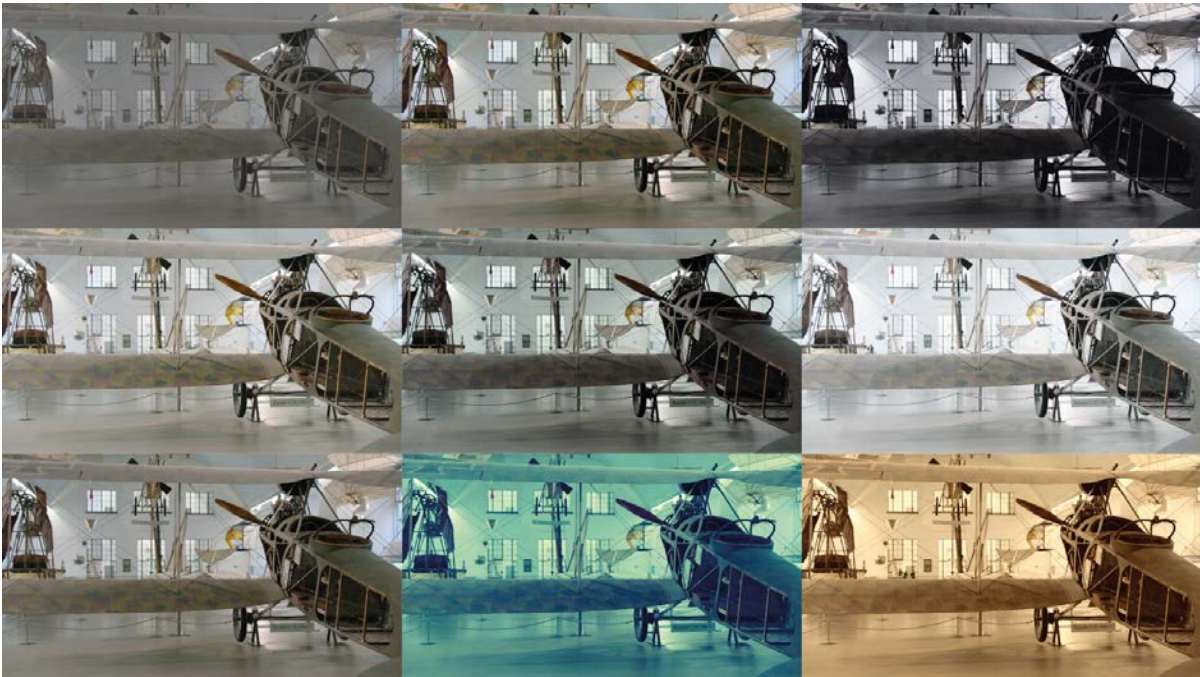
A selection of different looks applied side-by-side.

AMIRA Look File in use

If you have a look at the bigger picture, you can see how and where the AMIRA look file sits in the workflow and how it is embedded in each clip's file header.
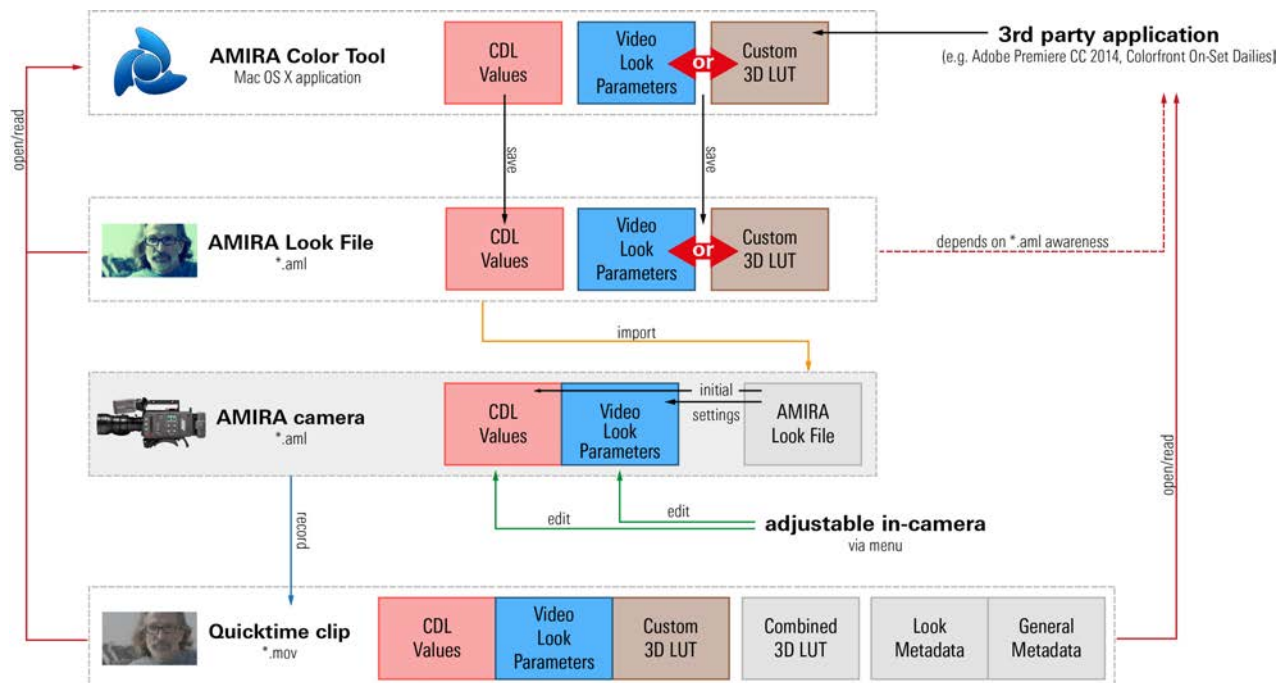
Besides the AMIRA look file the clip's file header holds a combined 3D-LUT. It holds all color changes from the look file, but combined to a 3D-LUT. Adobe Premiere CC 2014 for example makes use of this combined 3D-LUT: when you load AMIRA footage to the viewer, Premiere auto-applys a Lumetri effect with this LUT to the clip.

Altering the image with the look file:

1. Log C
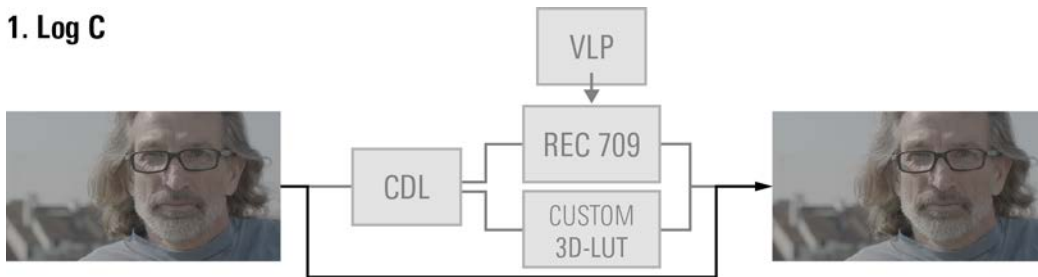
When you decide not to alter the image at all a flat Log C encoded image will be recorded. The look path is being by-passed.

2. Video (Rec 709)
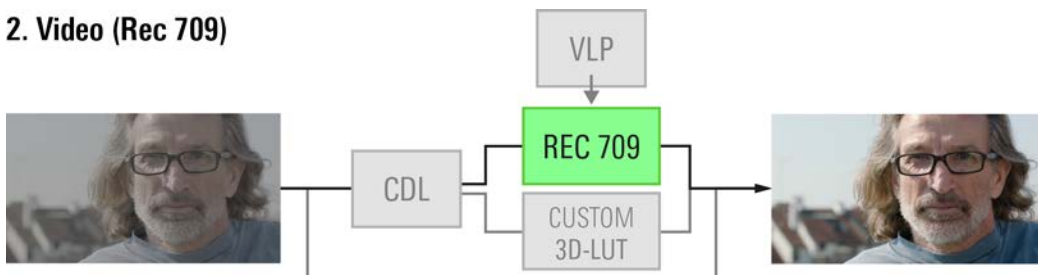
Choosing the "Rec 709" look converts the image to the default HD video color space Rec 709. This conversion is achieved by a built-in 3D-LUT.

3. VLP (editing Rec 709)
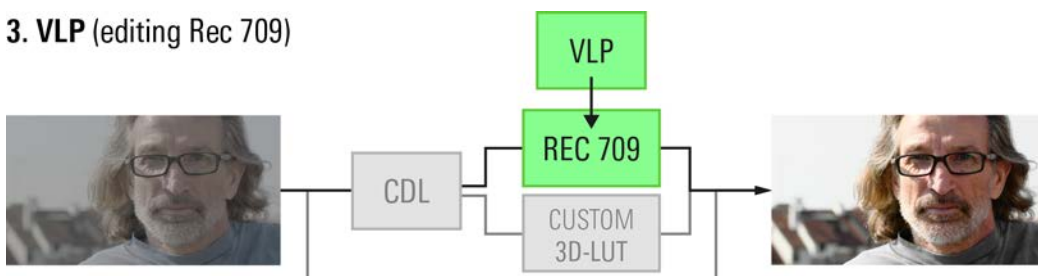
The Video Look Parameters ("broadcast-style parameters") directly change the built-in 3D-LUT which does the Rec 709 conversion. The target color space stays Rec 709.

4. CDL (Rec 709)
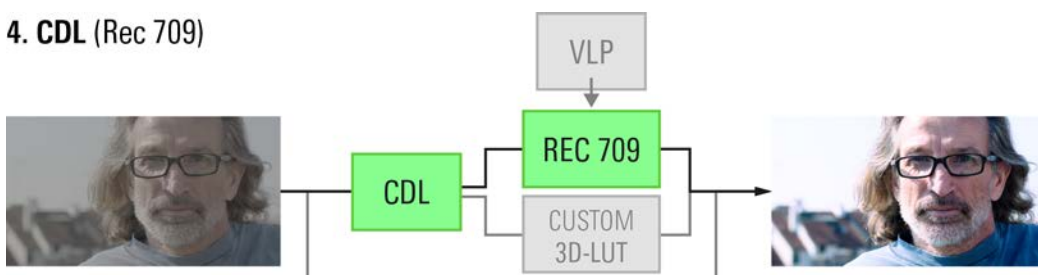
If you have a cinema background you might have come in contact with the ASC's Color Decision List. So this could be your tool of choice. The image is being altered on a Log C basis and will be converted to Rec 709/Video color space using the build-in 3D-LUT in a second step.

5. VLP & CDL (editing Rec 709)
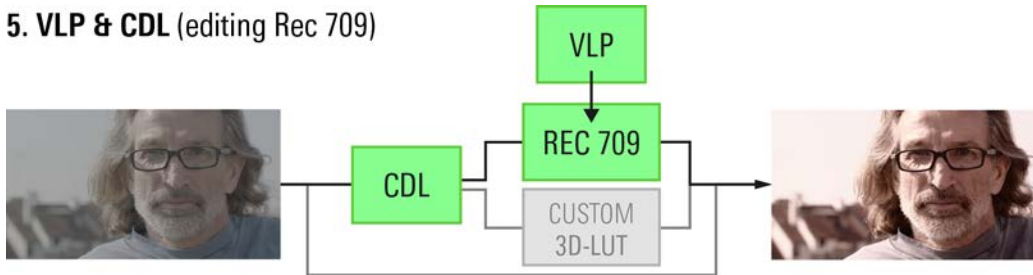
Combining CDL and VLP is also possible: this may be necessary to achieve certain looks. In the example image, the same Video Look Parameters as in "3. VLP (editing Rec 709)" are being used. In addition CDL saturation has been lowered while "CDL power" green and blue are increased and red is lowered.

6. Custom 3D-LUT
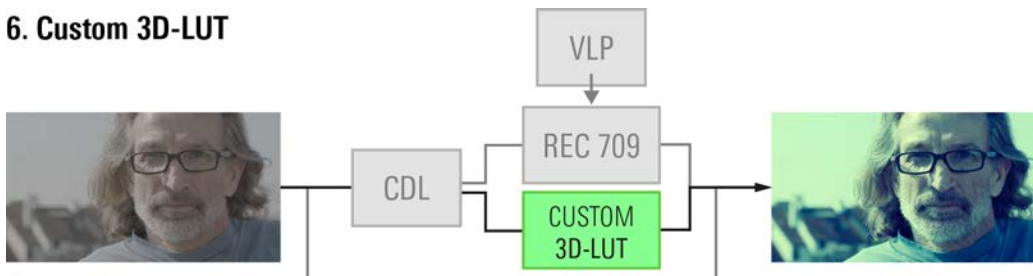
Way more complex color alternations (also possible for example is a negative image) can be achieved utilizing a Custom 3D-LUT. Because of the complexity of 3D-LUTs it is not possible to alter a custom LUT using the Video Look Parameters.

The example image is altered using a "Film Style Cross Process" 3D-LUT.

Please note: Custom 3D-LUT functionality is only supported with AMIRA Premium; CDL parameters are only supported with AMIRA Advanced and Premium license.

7. Custom 3D-LUT & CDL
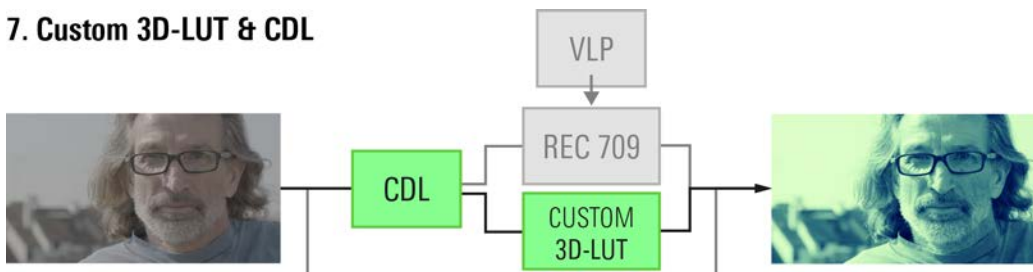
Nevertheless, in contrast to VLP, the upstream CDL values can be altered. As done for the example image: CDL saturation is lowered to almost zero. So Video Look Parameters cannot alter the Custom 3D-LUT – That's why it is either VLP or Custom 3D-LUT.

Comparing AMIRA to ALEXA

The following chart explains both cameras' image paths and one can see the differences between AMIRA and ALEXA's look functionality.
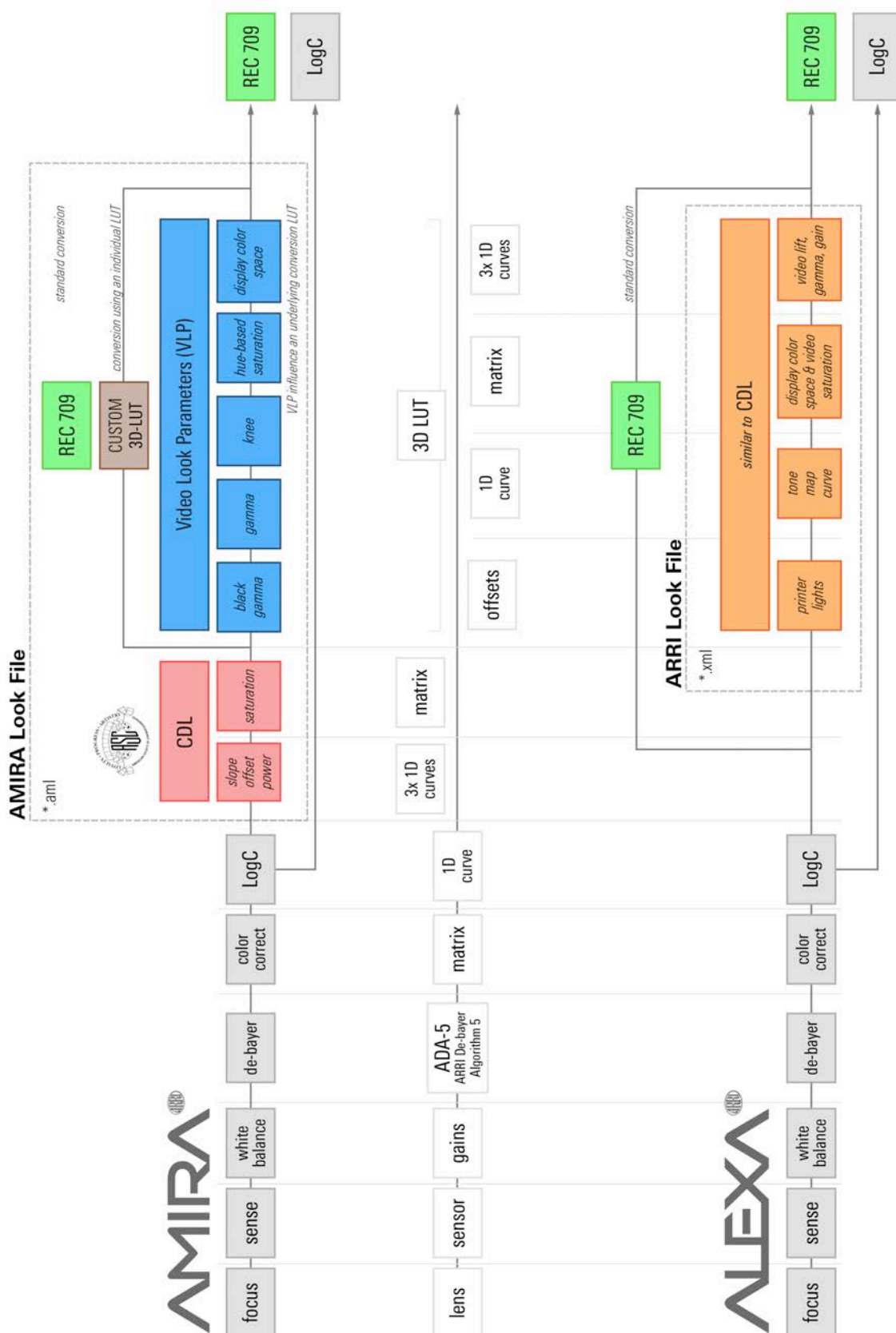
Further reading

For an in-depth read on AMIRA's color management and look creation have a look at our "Color By Numbers" document at http://www.arri.de/camera/amira/downloads.

For feedback or questions regarding this or other topics please email us at digitalworkflow@arri.de.

AMIRA
Color by Numbers

Date: 22 May 2014

1. Introduction

The ARRI AMIRA is a versatile documentary-style camera that combines exceptional image quality and affordable CFast 2.0 workflows with an ergonomic design that is optimized for single-operator use. Its flexible color processing chain offers the ease of editing video with the possibilities of capturing log data. This makes an AMIRA suitable for production scenarios ranging from daily broadcast production to high quality drama.

This document gives an insight to the color processing of an AMIRA and describes the creative options you can use when shooting with this camera.

Table of Contents

2. Shooting with the AMIRA

The ARRI AMIRA uses a new revision of the same Super 35 sensor, that can be found in the ARRI ALEXA and ALEXA XT cameras. This enables an AMIRA to capture 16:9 HD or 2K QuickTime ProRes clips at up to 200 frames per second. As with the ALEXA, an AMIRA allows you to store your footage, encoded as **Log C** data or **Rec 709** video. These terms refer to two types of image encoding that are commonly used in today's broadcast and feature productions.

2.1. Rec 709 Video

Rec 709 video is the default video encoding in an HDTV production. Without the time, the budget or the tools to allow color grading, shooting Rec 709 video for recording will produce images that are ready to use for edit or TV broadcast without further conversion. The term **video** refers to images that are encoded for display on a computer, video monitor, or digital projector.

Rec 709, short for ITU Rec. BT.709, defines the primary colors and white point of HDTV displays. In addition to this, the contrast characteristic curve for flat panel displays is defined in ITU Rec. BT.1886.

2.2. Log C

If you have access to current editing tools, you can unlock the camera's true potential by recording Log C. The digital numbers in a Log C encoded image are proportional to the exposure measured in stops. This creates a flat "data curve" which provides optimum control over the image information in the top range of the camera's 14-stop latitude. Log C encoding, which is the same basis for all ALEXA and AMIRA camera formats, stores color information in the native camera color space.

To properly view the footage on a monitor, it has to be converted to the color space of the viewing device (e.g. Rec 709 video for an HDTV).

2.3. Processing Chain

After an exposed image is read from the sensor, the camera first applies a white balance and then encodes the sensor-linear image to a Log C image, which can be recorded.

The default video output option, or default look of the AMIRA is Rec 709 video. If you set the camera to deliver Rec 709, the camera renders the video output based on the Log C encoded image.
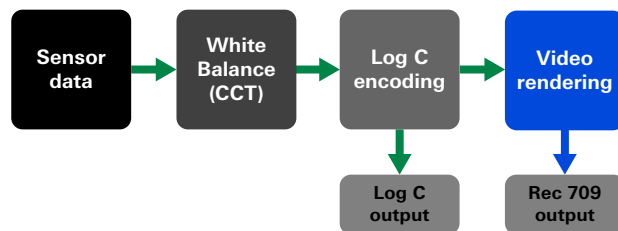
2.4. Capturing Images with Looks

Using the GAMMA menu in the camera, you can choose between Look and Log C output for **Recording**, **SDI**, and **EVF/Monitor** (the viewfinder ant its external display). While you typically want the look to be visible in the viewfinder and over the SDI outputs, you may prefer to keep the recorded image in Log C, unless you have to deliver Rec 709 files straight out of the camera.

Rec: Look

Selecting **Look** for the recorded image means that will be transformed with the look. The active look becomes inseparable from the image.

If the look, for example, produces a black and white image, you will not be able to take the look out to get the colors back.
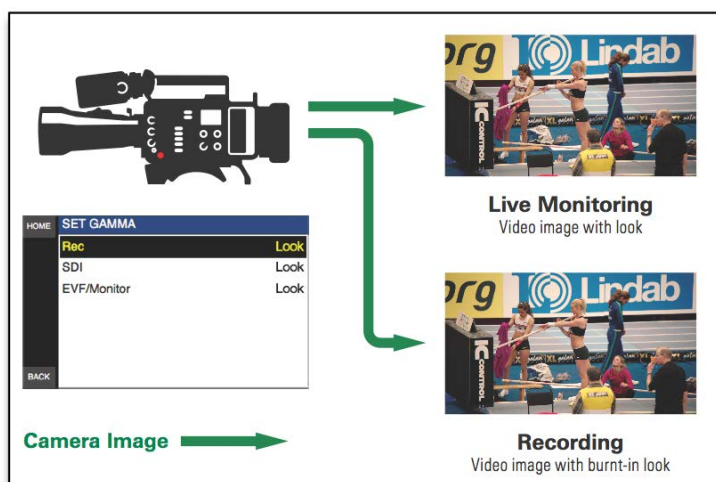
Rec: Log C

Selecting **Log C** for the recorded image means that the look is registered only as metadata, embedded in the camera footage.
Since the look can be applied, or simply discarded, recording Log C with look metadata is a non-destructive operation.
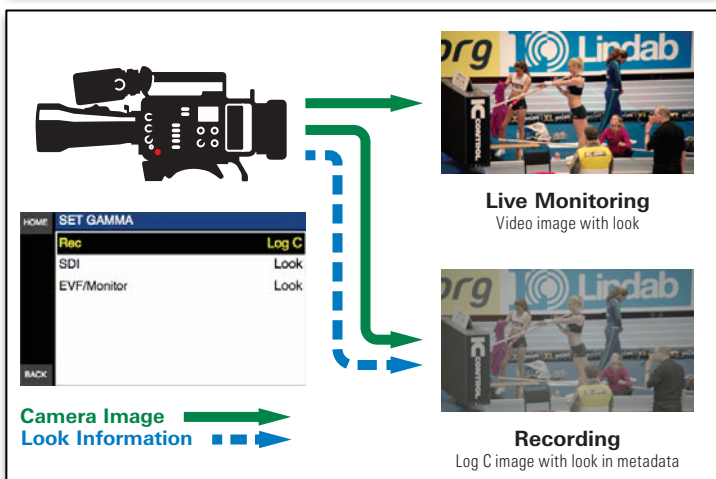
3. Look Controls

Next to the default Rec 709 video look, the AMIRA's LOOK menu offers a few look options, to deliver, for example, a softer transition into highlights (LCC), or more vivid images. Depending on the camera license – Eco, Advanced, or Premium – the look menu allows you to create your own look by modifying one of the presets, or to manage (add, duplicate, modify, export and delete) a look or to bring in a 3D LUT that was created with a color grading tool and use that as the look.

An AMIRA Look File can be put together from two sets of control parameters. The first part are ASC CDL parameters, that will be applied to the Log C encoded image. Second, a rendering 3D LUT, which controls the transformation of Log C data to the output color space.

This 3D LUT can be:
a) the default ARRI AMIRA 3D LUT, providing a Rec 709 video output.
b) a customized version of the 3D LUT with a tone map curve and/or color transformations that have been modified with the Video Look Parameters (see below).
c) an imported User 3D LUT, that was generated in a color grading tool. VLP controls are not available when an imported 3D LUT is used.

AMIRA Image Processing
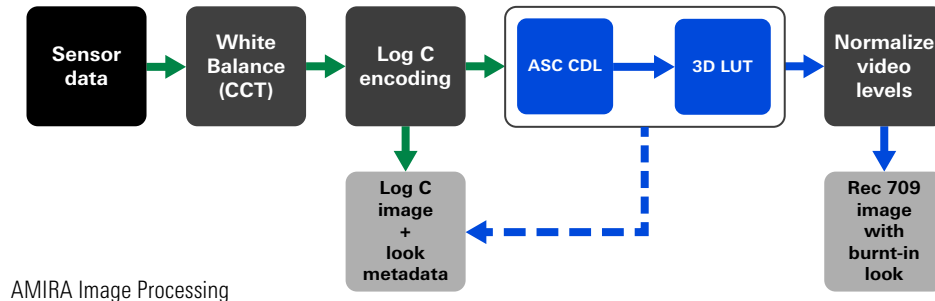
With the basic feature set, the AMIRA offers only the Video Look Parameters for look adjustments. The Advanced license adds ASC CDL controls and support for external look files. The Premium version enables all look options, including the use of custom 3D LUTs in the look files.

3.1. Why use Looks?

Establishing looks in early in the production process helps everyone, who is involved in the production. Being able to monitor images with their intended look during the shoot and during editing helps getting used to the visual language of the production. As a result, we hope to see less time spent in the color grading sessions, because everybody will have the same idea of what the images are supposed to look like.

To establish one or more looks, you can:

- Shoot some **reference images** representing the key visuals.
- **Establish the main looks** in a grading session with the colorist.
- **Use looks in camera** to monitor the image with look while on set.
- See images with look **during the edit**.
- Finalize color **grading based on looks**.

3.2. ASC CDL Transforms

The American Society of Cinematographers has specified a set of transforms that have become a standard in the post industry. The transforms are controlled by the parameters slope, offset, power and saturation (applied in that order), which are based on simple color manipulations of multiplying with a factor, adding an offset, or raising to an exponent. Noted as "Color Decision List" (ASC CDL), they serve as an exchange format for basic look transformations between color correction systems and editing tools by different manufacturers.

The AMIRA image processing applies the ASC CDL transforms to the Log C encoded image. This enables manipulations like exposure correction or bringing down highlights, before the picture is converted to the display color space with its steeper contrast curve.

The ASC CDL adjustments are available for AMIRA Advanced and Premium.

Slope

The linear section of the Log C curve is equivalent to the gamma of a negative film stock. The Log C curve has a default gamma of approximately 0.51, which can be adjusted with the slope parameter.

A slope value of 1.2 will have a similar effect as using negative stock with a gamma of 0.6 (= 1.2 * 0.5).
A parameter below 1.0 will lower the gamma accordingly.

Offset

Offset is the most intuitive of the CDL parameters. It has a similar effect as increasing the exposure index on the camera. If you are familiar with the motion picture print film process, it's the same as printer lights.

The images below show a scene that was exposed for 1600 ASA. In one case, the camera was set to EI 800, resulting in an underexposure of one stop. This was corrected with a CDL offset value of 0.07.
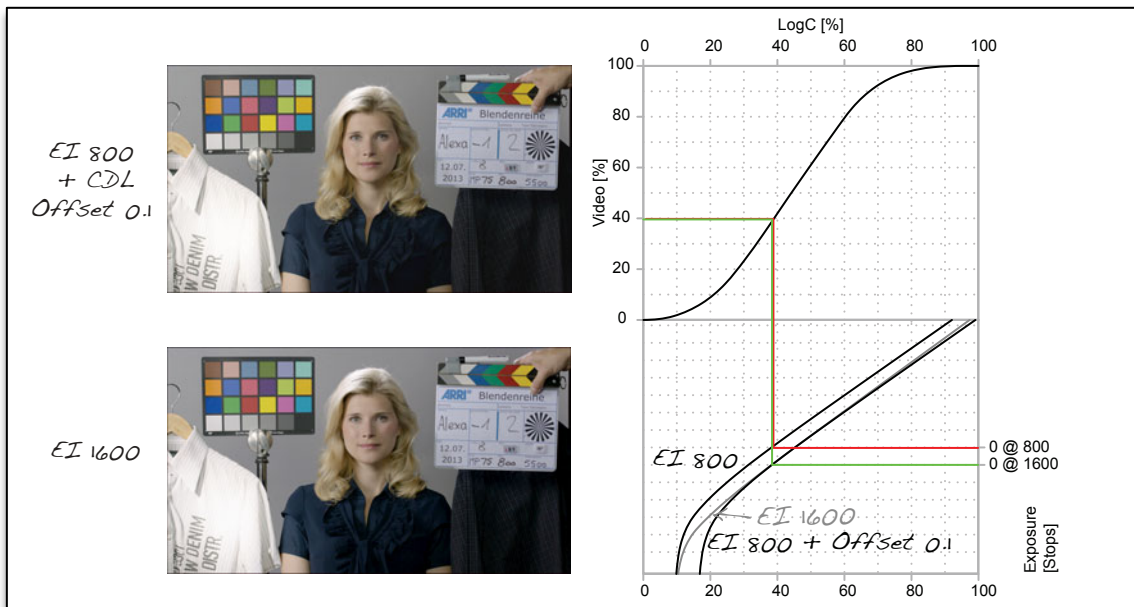
Power

Power can be used to adjust the mid tones, similar to the Gamma parameter in video color grading.

A power value below 1.0 will increase the brightness of the mid tones.
A value greater than 1.0 will decrease their brightness.

(Log) Saturation

The saturation parameter affects all color components in the Log domain.

Slope + Offset = Lift

Very often, slope is combined with an offset to compensate the change in overall brightness. In other words, this operation tries to keep the white point at a fixed position and rotate the (Log C) curve around that point. In video color grading, this combination is called lift.

As an example, a slope of 1.15 with an offset of -0.15 will keep the highlights at a constant level.
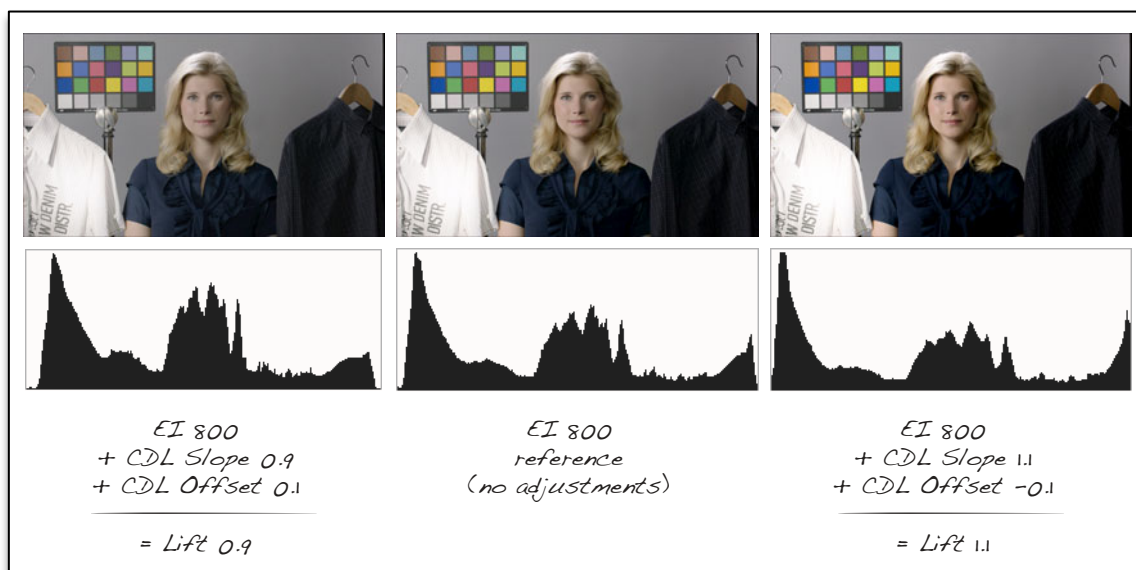
3.3. 3D LUT and Video Look Parameters

The AMIRA uses a 3D LUT to generate a Rec 709 video image from Log C data. Next to the ASC CDL parameters, which apply to the Log C image, the camera also offers a set of Video Look Parameters (VLP), that influence the tone mapping and color transformation of the rendering 3D LUT.

The VLP control knee, black gamma and the gamma of the tone map curve, which affect the contrast characteristic of the output image. The VLP also include values for saturation and the saturation by hue for the six color vectors of green, yellow, red, magenta, blue, and cyan.

Regardless of the adjustments, the underlying 3D LUT always performs a Log C to Rec 709 color space conversion.

Video Look Parameters are available in all three AMIRA license bundles.
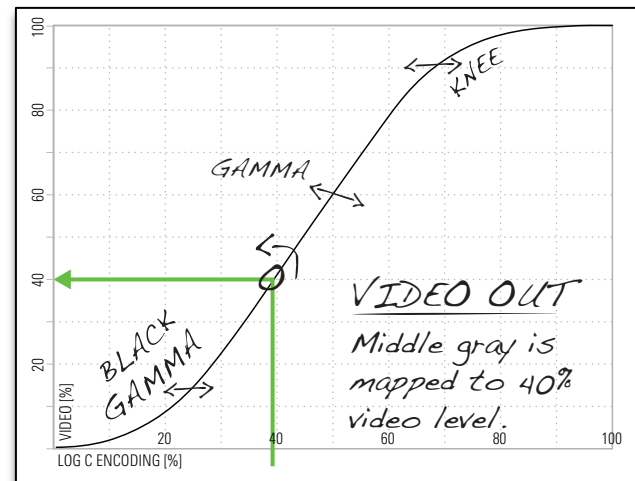
Knee

The knee parameter controls the transition of mid-tones into highlights. Values below 0.5 (default) produce harder highlights, higher values soften them. Knee is applied to all channels equally (master control). It has no effect on the mid gray level.

Black gamma

The black gamma controls the shadow detail in the image. Values below 0.5 (default) bring down the blacks, higher values brightens them. Black gamma is applied as master control. It only affects the mid gray level for very high values.

Gamma

The gamma setting can be used to brighten or darken the mid tones, while leaving the black and white level unchanged. Values below 1.0 (default) will darken the image, higher values will brighten the image.
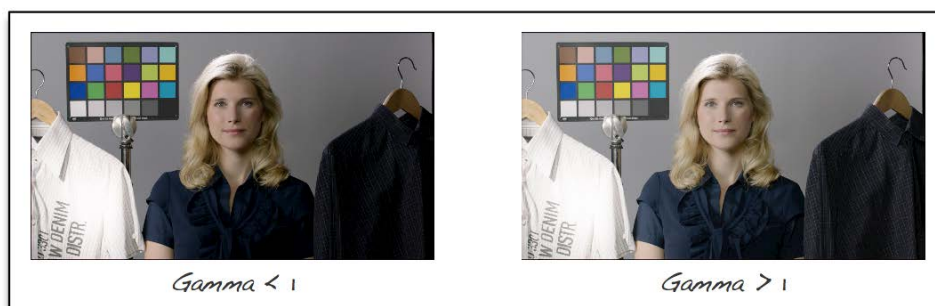
(Video) Saturation

The VLP set also includes a saturation control, which has a similar effect as the ASC saturation control. A value of 1.0 represents the default saturation.
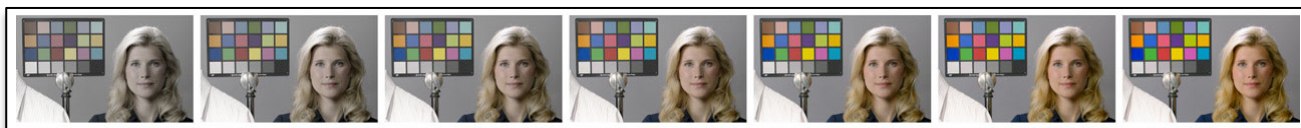
Saturation by Hue

The AMIRA allows you to control the saturation for the six color vectors red, yellow, green, cyan, blue, and magenta. In the images below, the center shows the scene, photographed with default values. Starting at the top left, going clockwise, you can see the effect of turning the hue values for green, yellow, red, magenta, blue, and cyan to zero (left group) or maximum (right group).

3.4. Custom 3D LUT

The AMIRA Premium can also use a look file that includes a custom 3D LUT, created and exported from a color grading tool. This LUT then needs to be stored in the AMIRA Look File format with the free AMIRA Color Tool (or directly in the color correction tool if it supports the export of AMIRA Look FIles).

Using a custom 3D LUT disables the video look parameter controls. The resulting look, however, can still be tuned with the ASC CDL parameters.

A grading system usually offers better and finer color adjustment options for all parameters described above. It also offers additional manipulations, that are not available with the set of CDL and VLP values, such as the ability to pick any key color, not just one of the six main color vectors, and change its chromaticity rather than just its saturation.
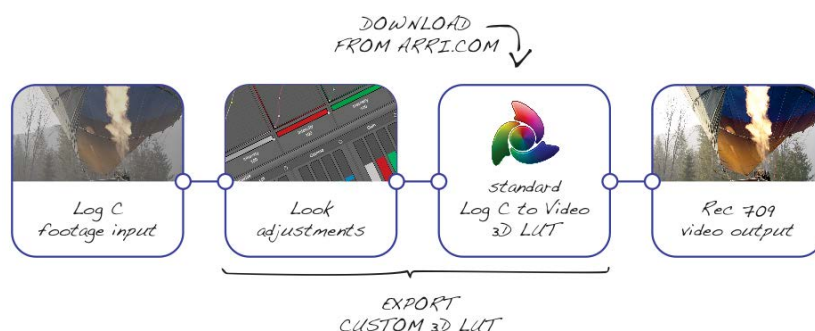
To generate a 3D LUT for use in the AMIRA, you can follow these steps:

1) Load Log C footage.
2) Apply creative color grading.
3) Apply Log C to Rec 709 video rendering (or any other output color space).
4) Show resulting look on a reference monitor.
5) Export the look for the AMIRA as a concatenated 3D LUT, using the transforms from steps 2 and 3.

A good line of action is to include a default ARRI Log C to Rec 709 video 3D LUTs as an output LUT (step 3) in the grade. This ensures that your color grade starts from a color-correct output image.

Remember, the default rendering 3D LUT performs a tone mapping and a color space conversion!
A default 3D LUT can be generated with our online ARRI LUT Generator at www.arri.com/alexa/tools.

4. Creating Looks

There are several ways to create a look for the AMIRA. One option is to use a dedicated color grading tool using the steps described above, to create a look from a custom 3D LUT. This option, however, is only available for AMIRA cameras running the Premium license bundle.

Another option would be the AMIRA Color Tool, a free Mac software by ARRI, that can be used to create an AMIRA Look file with all CDL and VLP controls using a graphical interface.

Last, but not least, the camera also offers a Look Parameter screen that will allow you to create or modify a look with nothing but the camera and a monitor, attached to the camera's HD-SDI output.

4.1. In-Camera Grading

The Gamma/Look menu in the AMIRA can be used to import, export, duplicate, load, edit and save looks. The basic AMIRA (Eco) is limited to three look options and lacks the ability to load or export a look.

Creating a Look from Scratch

Start by duplicating the default Rec 709 look and saving it under the new look's name. You can also overwrite a look. Default looks can be restored from the menu.

Adjust the ASC CDL parameters and/or the Video Look Parameters and monitor the changes via the SDI output.
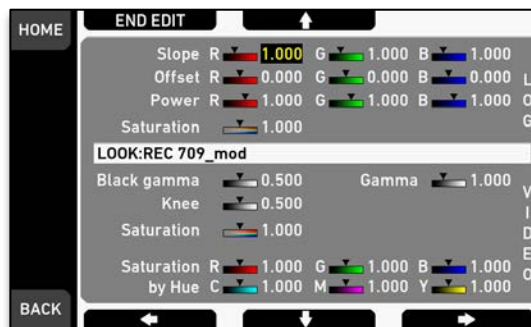
Tuning a Look

If adjustments like a change of the white balance cannot modify a look towards where you want it, you first should duplicate the original ARMIA Look File and save the copy under a new name. Next, use the ASC CDL controls to modify e.g. the color reproduction and/or the Video Look Parameters to adjust the tonal balance of the output. If the AMIRA Look File was created from a custom User 3D LUT, you can only make adjustments with the ASC CDL parameters.

4.2. AMIRA Color Tool

ARRI provides a free software that allows you to create, modify and store AMIRA Look Files outside the camera. The software can read files from camera footage or a library on the hard drive or import a custom 3D LUT that was created in a color grading tool and save looks in the AMIRA Look File format or export them as 3D LUT and separate CDL parameters (XML) or 3D LUT including CDL parameters for use in other applications.

Using the AMIRA Color Tool lets you work faster and more convenient than the camera menu. The software offers easy to use mouse or keyboard color controls (support for grading panels is planned).
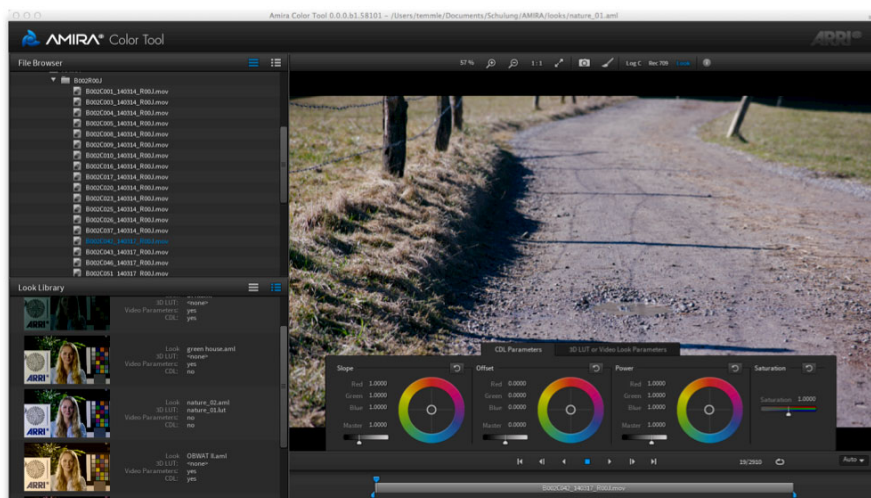
4.3. Look Examples

The AMIRA ships with some ready-to-use technical or creative looks. Except for the X-2-ALEXA Look, all are created with Video Look Parameters and thus can modified to your liking.

LCC (Low Contrast Curve)

Black Gamma = 0.8, Knee = 0.85, Saturation = 0.7
If you cannot use Log C encoding, but need better highlight handling, you can use the LCC look. With this flattened Gamma curve, highlight definition and some black detail that would be lost by the typical Rec 709 tone mapping can still be accessed. For the final image, you can adjust the contrast to all critical image detail remains visible, but the overall softness is taken out again. Since the look already includes a Log C to Rec 709 color space conversion, no additional rendering step is required.

Commercial

Black Gamma = 0.3, Knee = 0.4, Gamma = 1.4
A creative, brighter look for nicer skin tones.

Landscape

Black Gamma = 0.3, Knee = 0.2, Gamma = 1.4, Saturation = 1.15
A creative look with a steeper contrast curve and lifted saturation.

Vibrant

Black Gamma = 0.4, Knee = 0.4, Saturation = 1.05, Saturation by Hue G/B/C/M = 1.15
This creative look boosts the color saturation except for red and yellow.

X-2-ALEXA

3D LUT (Premium Only)
This technical look produces a Rec 709 video output, closely matching that of an ALEXA camera.
This look is based on a 3D LUT and requires a premium license. To tweak this look, you can only use the CDL parameters.

5. Looks in the Edit

Full AMIRA Look Support

At NAB 2014, Adobe, Avid, Colorfront and Pomfort were the first to embrace this look concept. They presented beta versions of their software that can read the look information from the QuickTime metadata in each AMIRA Log C clip and automatically perform the video rendering based on that look file.

As a result, the editor, DIT or data wrangler see the same image including the look that active in the camera, as the footage was shot. This step is fully automatic, adjustable and reversible. It represents a big improvement to Log C workflows as it combines the superior elasticity of Log C footage with the simplicity of video workflows.
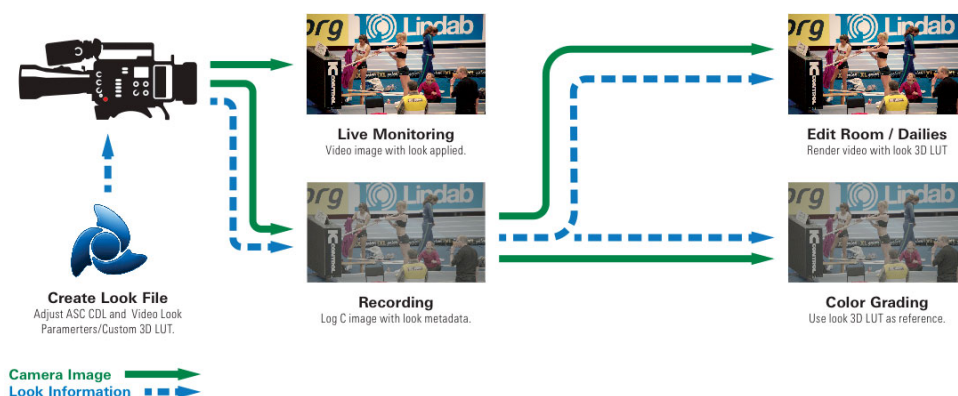
Basic Log C Support

Many major editing tools already offer at least basic support for Log C material. In some cases (Final Cut Pro X, Media Composer 7 and later), the application will automatically detect Log C encoded material and apply a default Log C to Rec 709 video conversion.

Without Log C or Look Support

If the editing tool in use does not offer Log C support of any kind, you can use the AMIRA Color Tool to extract the look from the footage, export the look as a 3D LUT and render Rec 709 video dailies with a tool such as the free Blackmagic DaVinci Resolve Lite.

To learn how this can be done, please have a look at the ALEXA Dailies using Resolve 10 White Paper, available from www.arri.com/alexa/downloads.

Create Look File
Adjust ASC CDL and Video Look Paramerters/Custom 3D LUT.

Live Monitoring
Video image with look applied.

Recording
Log C image with look metadata.

Extract Look File
Load footage and export look file as 3D LUT for edit/grading.

Edit Room / Dailies
Render video with look 3D LUT

Color Grading
Use look 3D LUT as reference.

Camera Image
Look Information

Keeping looks available

One advantage of the new color/look concept in the AMIRA is, that it is based on 3D LUTs, which are supported by a great number of post production tools. When a look is used (with Log C recording), the AMIRA stores different flavors of this look as metadata in the QuickTime clips.

- Complete 3D LUT including all CDL and VLP settings, or CDL and custom 3D LUT.
- 3D LUT including only VLP settings, without CDL values.
- CDL values without VLF settings.

Even if it takes years until you get back, for example to re-master the original footage, you will be able to extract the original intended look and use it as a reference for your work.

6. Contact

If you have questions or recommendations about this paper, please contact the ARRI Digital Workflow Solutions group at digitalworkflow@arri.de.

Arri AMIRA Intensive

(AbelCine)

Workshop Overview

- Camera Body Overview
  - Buttons & Side Panel
  - Inputs & Outputs
- AMIRA variants overview
- Sensor Resolutions and Areas
- Project Settings
  - Modes & Resolutions
  - Recording Formats & Output Options
  - File Naming & Meta Data

(AbelCine)

Workshop Overview

- Menu Overview
  - User Buttons
  - Functions
- Sensor Specifics
  - ISO / EI
  - Exposing Log
- Look Up Tables
  - Creating LUTs
- Workflows & Post

(AbelCine)

AMIRA specifications

- Super 35 - 16x9 Sensor
- 23.76 x 13.37mm image area
- 2880 x 1620 over-sampled for HD
- 3168 x 1782 surround view
- Fast rolling shutter
- Dual drivers on each photosite
- 800 ISO, 14-stops Dynamic Range (+7/-7)
- CFast 2.0 media
- Built in ND filters (Clear, 0.6, 1.2, 2.1)
- Interchangeable lens mount
  - 12-pin connector for ENG lenses

(AbelCine)

AMIRA "Eco" specifications

- HD 1920 x 1080
  - ProRes 422, 422 LT
- Frame Rates
  - 0.75 – 100 fps
- Rec709 only
- 3 fixed looks (in camera adjustable)
  - No importing custom 3D LUTs
- No dynamic auto tracking WB
- No WiFi camera control or Bluetooth audio monitoring
- No pre record

AbelCine

AMIRA Advanced Specifications

- HD 1920 x 1080
  - ProRes **422 HQ**, 422, 422 LT
- Frame Rates
  - 0.75 – **200** fps
- Rec709 & **Log C**
- **Complete look functions, import Looks**
  - No importing custom 3D LUTs
- **WiFi camera control & Bluetooth audio monitoring**
- **Dynamic auto tracking WB**
- **Pre Record**

AbelCine

AMIRA Premium Specifications

- **2K 2048 x 1152**, HD 1920 x 1080
  - ProRes **4444,** 422 HQ, 422, 422 LT
- Frame Rates
  - 0.75 – 200 fps
- Rec709 & Log C
- Complete look functions, import Looks
  - **Import custom 3D LUTs**
- WiFi camera control & Bluetooth audio monitoring
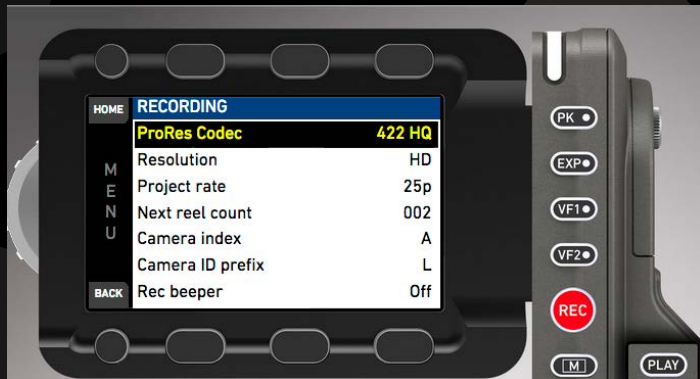- Dynamic auto tracking WB
- Pre Record

AbelCine

Sensor Sampling

Sensor Resolution	Image Area	Image Circle	Capture Format
2880 x 1620	23.76 x 13.365 mm	27.26 Ø	HD Output, ProRes HD
2868 x 1612	23.661 x 13.229 mm	27.11 Ø	ProRes 2K

16:9   HD = 1920x1080, 2K = 2048 x 1152

AbelCine

AMIRA Recording Menu

HOME	RECORDING	
	ProRes Codec	422 HQ
	Resolution	HD
	Project rate	25p
	Next reel count	002
	Camera index	A
	Camera ID prefix	L
BACK	Rec beeper	Off

AMIRA Record Capabilities

CODEC	Bit Depth	Resolution	Date Rate @ 24 FPS	Max Data/Hour @ 24 FPS	Record time per 120 GB Card
ProRes 422 LT	10	HD 2K	90 Mbit/s 100 Mbit/s	40 GB/h 45 GB/h	3 hours 2.5 hours
ProRes 422	10	HD 2K	125 Mbit/s 140 Mbit/s	57 GB/h 65 GB/h	125 min 110 min
ProRes 422 HQ	10	HD 2K	185 Mbit/s 210 Mbit/s	85 GB/h 98 GB/h	84 min 73 min
ProRes 4444	12	HD 2K	280 Mbit/s 320 Mbit/s	128 GB/h 146 GB/h	56 min 49 min

---

Tour of the Menus

What is Log?

- Log Recording:
  - It is VIDEO with a Logarithmic Exposure Encoding
- It is not Raw Data
  - Raw Data - (i.e. ARRIRAW)
 - Raw data is not video

What is Log C

- What is Log C anyway?
  - Video data stored in log format, directly corresponding to density of the original negative.
  - First invented by Kodak for their Cineon system.
  - Used to maximize dynamic range out of the camera.
  - Produced flat / desaturated film
- LogC has own unique Color Gamut

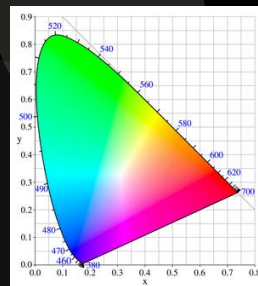*AbelCine*

What is Color Gamut

- Defining Color the way HUMANS see it
- CIE 1931 Color Space
  - International Commission of Illumination
    - 1931 Study which became CIE RGB
    - Later Modified to CIE XYZ Color Space
- All Color Gamuts are based on limitations of the CIE XYZ Color Space
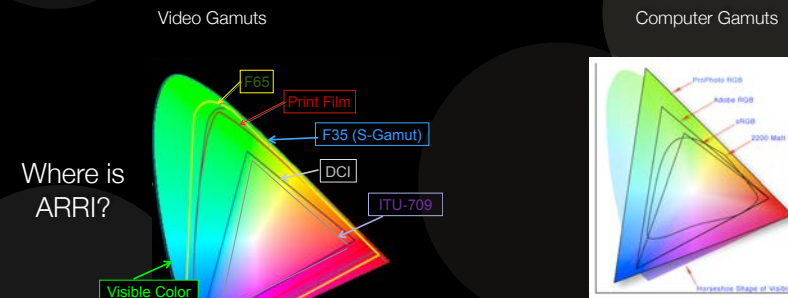- White Point = D6500 (Midday Sun)
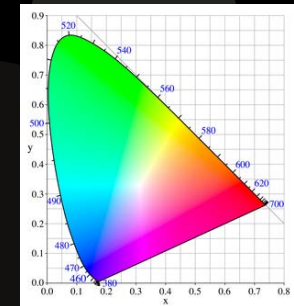
AbelCine

Color Gamut

- ITU-R Recommendation BT.709 (REC709)
- Used in HDTV Universally
- Defines primaries and limits of what colors can be shown in REC709 video.
- The full spectrum is CIE XYZ
- REC709 has limited color options (in triangle)

AbelCine

Color Gamut

Video Gamuts

Computer Gamuts

Where is ARRI?

F65
Print Film
F35 (S-Gamut)
DCI
ITU-709
Visible Color

ProPhoto RGB
Adobe RGB
sRGB
2200 Matt Paper

AbelCine

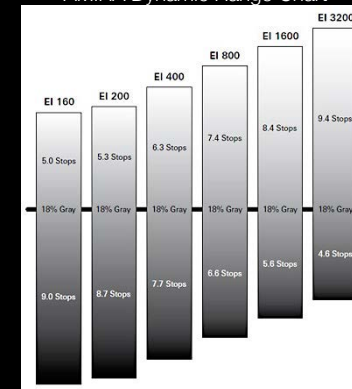# Slide 1: Log vs Linear

Linear   Log

- Linear (Scene Linear) Data
  - Linear to the light that hit the sensor
  - Linear to the Scene
- Log Data
  - Logarithmic 'Gamma' Curve applied to the linear data
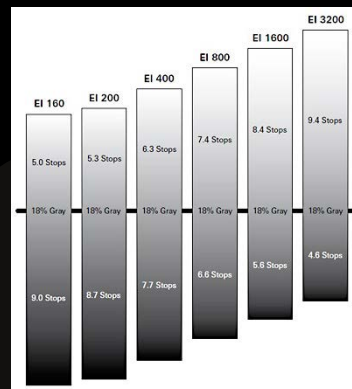 - Designed to maximize dynamic range

AbelCine

Slide 2: ISO / Exposure Index

AMIRA Dynamic Range Chart

AbelCine

Slide 3: Evaluating Exposure

- Waveform - Grey Point (18%) Levels
  - Rec709 - 50%
  - LogC - 39.1 %

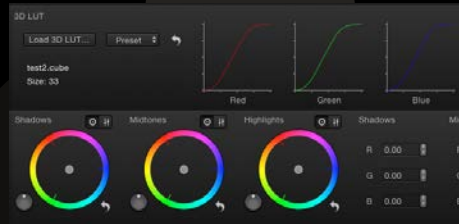AbelCine

Slide 4: Monitoring & Exposure Techniques

False Color

Color	Level	Description
red	99 – 100%	White clipping
yellow	97 – 99%	Just below white clipping/white shoulder
pink	52 – 56%	One stop over medium gray (Caucasian skin)
green	38 – 42%	18% neutral gray
blue	2.5 – 4.0%	Just above black clipping/black slope
purple	0 – 2.5%	Black clipping

Graphic Representation of Luminance Values

AbelCine

Looks & LUTS

- LUTs vs LOOKs
  - ARRI's Looks are for AMIRA only
  - LUTs (Look up Tables) are designed for Post
    - Many different flavors available
  - ASC CDL is the standard
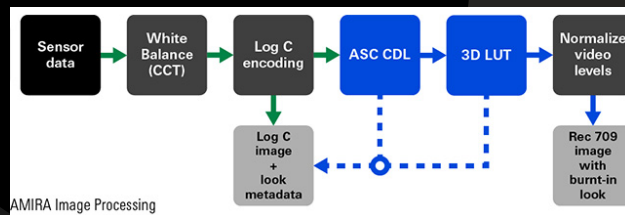
AbelCine

AMIRA Looks

- Enables in-camera 'Scene Files'
- Can be turned on for any output or recording
  - Record, SDI output, EVF / Mon
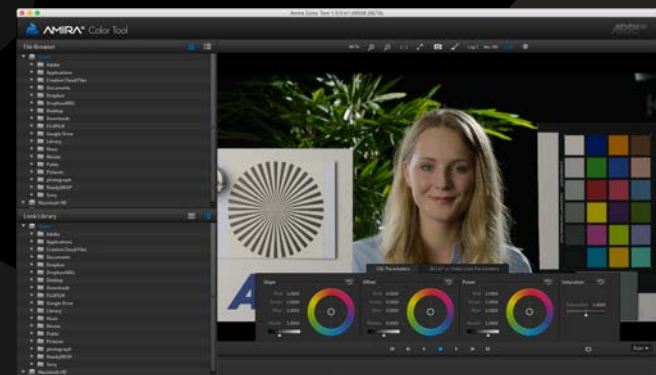- Look can be embedded as Metadata

AbelCine

AMIRA Color processing

AMIRA Image Processing

AbelCine

AMIRA Color Tool

AbelCine

Creating LUTS

- Pomfort LiveGrade
  - Supports hardware LUT boxes
    - HDLink Pro
    - IS Mini
  - Takes in LogC from Camera
  - Same adjustments as Color Tool
  - Export AMIRA Look Files (.aml)

AbelCine