

Device: AJA FS HDR



Introduction

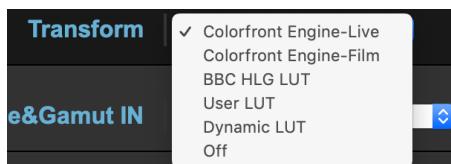
A number of parameters on the AJA FS HDR frame synchronizer can be controlled from a SKAARHOJ control panel. The complete feature set is not implemented but a large variety of actions can be found. This document gives you an overview of possible control parameters.

The implementation have been done on a HDR with Software Version 3.2.0.33

Colorfront Engine Control

Please notice the Colorfront Engine changes functionality depending on which Transform type the HDR is set too. Our integration has focused on implementing Colorfront Engine control for the **"Colorfront Engine-Live"** transform type and **not** the Colorfront Engine-Film.

With v. 3.2.0.33, AJA has brought CC control to the FS-HDR. Color Correction is available only when not in Transform = Colorfront Engine.



Connection

Connection status to the FS HDR is shown in the serial monitor.

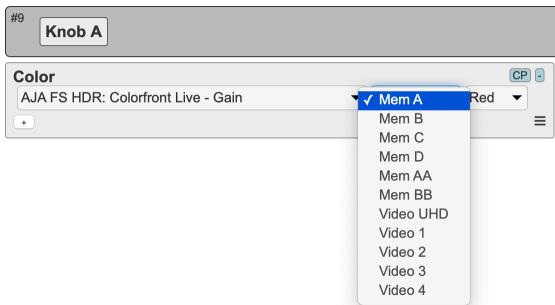
 A screenshot of the SKAARHOJ Serial Monitor interface. The top navigation bar includes "Firmware Updater", "Main", "IP Config", and "Serial". On the right side, there are buttons for "Send", "Reset", "Config", "Debug", "Ok", "Clear Presets", "Scroll down", and "Clear". The main window displays a log of booting information and connection attempts.

```

*****
SKAARHOJ Controller Booting
*****
SK_VERSION: branch_aja_fs_hdr
_defConfigCsc=243
SK_MODEL: SK_RCPV2
SK_SERIAL: 491459
EEPROM size: 32 kB
I2C 400 KHz mode activated
Init LEDs and buttons
Init Joystick
Calibration for analog component #1 (Fader): Start: 105, End: 112, Hysteresis: 5
Calibration for analog component #2 (Wheel): Start: 2, End: 3, Hysteresis: 4
HWVar:255
MAC address: 90:A1:DA:3B:48:7F
Requesting DHCP address... OK
IP address: 192.168.10.130
Subnet mask: 255.255.255.0
Gateway: 192.168.10.1
DNS: 192.168.10.1
Memory A-D restored
Compiled: Oct 29 2019 09:33:57
DeviceCore #0: AJAFSHDR0, IP = 192.168.10.26
setup() Done
-----
AJAFSHDR: Trying to connect to 192.168.10.26
HWc#46 Down Analog: 63
System action 2
Mem A: 1
System action 15
System action 17
System action 7
System action 17
AJAFSHDR: Init Phase 1 completed, requesting parameter values...
System action 17
System action 17
System action 17
38
.62
  
```

Mapping of Channels

From the same panel it is possible to control the 4 different 2K/HD/SD channels and switch between these on the fly. Alternatively if the HDR is in 4K/UltraHD mode just 1 channel is possible to control. When relevant the channel for Actions on the FS4 Device Core can be set to Mem A-D, Mem AA-BB or Video 0-4. In the default configurations you will often find this set to Mem A so the different channels can be controlled on the fly by changing the Memory Parameter A to values between 0 to 4 elsewhere on the panel. The mapping between the Memory A and channels are shown below.



Mem A = 0 = Video UHD (this is used in 4K/UltraHD mode)

Mem A = 1 = Video 1 = Channel Video 1

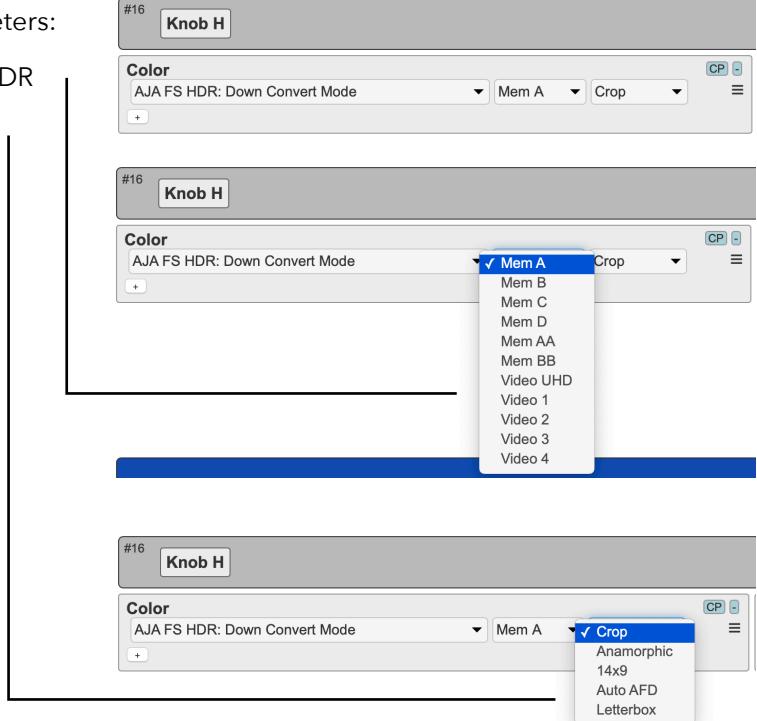
Mem A = 2 = Video 2 = Channel Video 2

Mem A = 3 = Video 3 = Channel Video 3

Mem A = 4 = Video 4 = Channel Video 4

A action is typically build up of two parameters:

- Selection of the Video Channel on the HDR
- Selection of a specific value if it exists



SKAARHOJ DEVICE CORES

This is a overview of the actions implemented in the Device Core

```
AJA FS HDR: Input
AJA FS HDR: Loss of input
AJA FS HDR: Output Format
AJA FS HDR: SD Aspect Ratio
AJA FS HDR: Up Convert Mode
AJA FS HDR: Down Convert Mode
AJA FS HDR: Custom Size/Pos
AJA FS HDR: Custom Size
AJA FS HDR: Custom Aspect
AJA FS HDR: Custom Position
AJA FS HDR: Region of Interest
AJA FS HDR: ROI
AJA FS HDR: Test Pattern Gen
AJA FS HDR: Test Pattern Type
AJA FS HDR: ProcAmp Enable
AJA FS HDR: ProcAmp Settings
AJA FS HDR: Transform
AJA FS HDR: Colorfront Live - Dyn Range&Garmut IN
AJA FS HDR: Colorfront Live - Dyn Range&Garmut OUT
AJA FS HDR: Colorfront Live - SDR Preview
AJA FS HDR: Colorfront Live - Colorfront Engine
AJA FS HDR: Colorfront Live - HDR Amount
AJA FS HDR: Colorfront Live - Amb Light Comp
AJA FS HDR: Colorfront Live - HDR Log Look
AJA FS HDR: Colorfront Live - SDR Softness
AJA FS HDR: Colorfront Live - Lift
AJA FS HDR: Colorfront Live - Gamma
AJA FS HDR: Colorfront Live - Gain
AJA FS HDR: Colorfront Live - Saturation
AJA FS HDR: Colorfront Live - Exposure
AJA FS HDR: Colorfront Live - Color Temp
AJA FS HDR: Colorfront Live - Tint
AJA FS HDR: Colorfront Live - BT.2408 Mode
AJA FS HDR: Colorfront Live - Colorfront Reset
AJA FS HDR: BBC HLG LUT
AJA FS HDR: User LUT
AJA FS HDR: Dynamic LUT - In Colorspace
AJA FS HDR: Dynamic LUT - Out Colorspace
AJA FS HDR: Dynamic LUT - In Scale
AJA FS HDR: Dynamic LUT - Out Scale
AJA FS HDR: Dynamic LUT - Transfer Characteristic
AJA FS HDR: Video Legalizer
AJA FS HDR: Video Legalizer Settings
AJA FS HDR: Freeze Output
AJA FS HDR: Color Corrector
AJA FS HDR: CC Gain
AJA FS HDR: CC Black
AJA FS HDR: CC Gamma
AJA FS HDR: Fan Speed
AJA FS HDR: Output Frame Rate
AJA FS HDR: Genlock Source
AJA FS HDR: Mon 2K Crop
AJA FS HDR: HDMI RGB Range
AJA FS HDR: Monitor Map
AJA FS HDR: Preset
AJA FS HDR: Audio Embed Map
AJA FS HDR: Audio Out
```

The Actions are divided by using the control categories from the Frame Sync.

AJA FS HDR: Input
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AJA FS HDR: Test Pattern Type
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AJA FS HDR: ProcAmp Settings
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AJA FS HDR: Colorfront Live - Dyn Range&Garmut OUT
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AJA FS HDR: Mon 2K Crop
AJA FS HDR: HDMI RGB Range
AJA FS HDR: Monitor Map
AJA FS HDR: Preset
AJA FS HDR: Audio Embed Map
AJA FS HDR: Audio Out

Channels - Input

Channels - Format

Channels - Scale

Channels - Test Gen

Channels - Color

Channels - Freeze

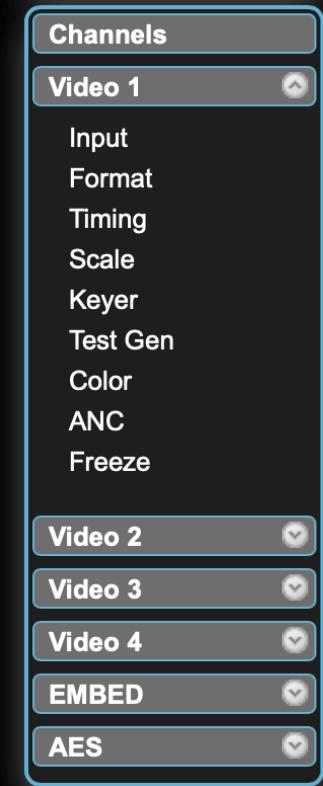
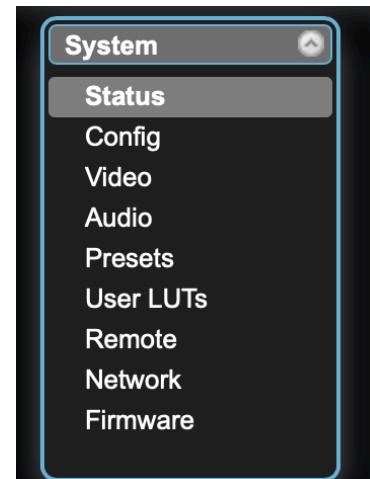
Channels - Color

Status - Config

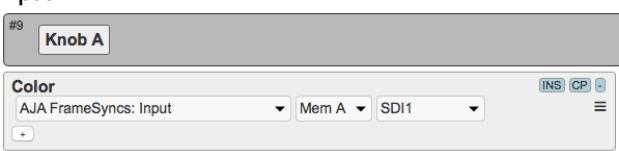
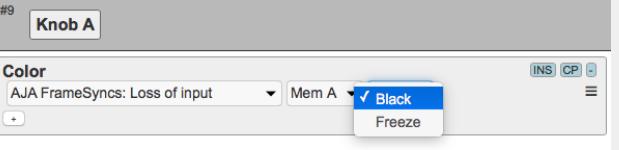
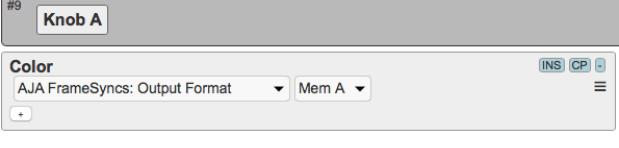
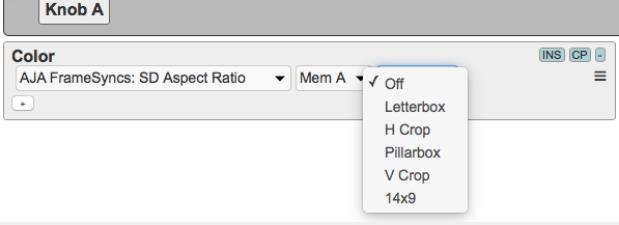
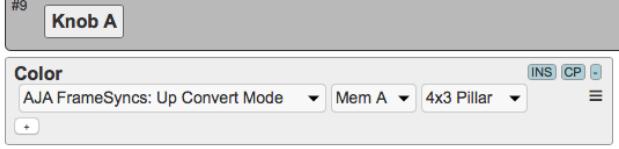
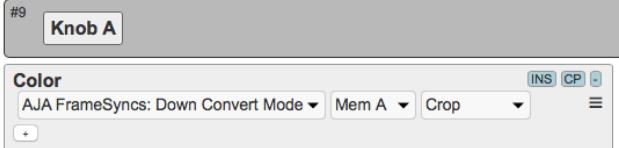
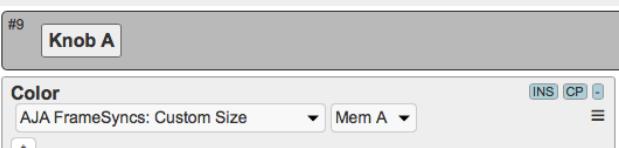
Status - Video

Status - Presets

Channels - EMBED + AES



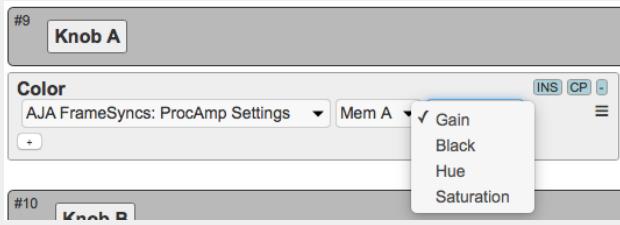
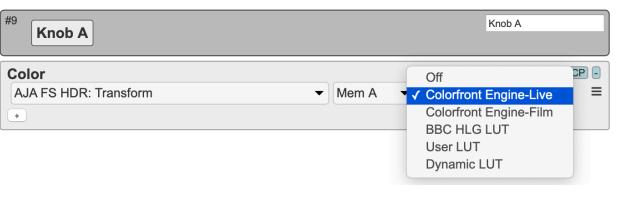
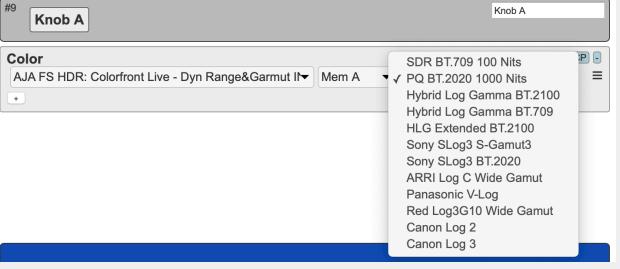
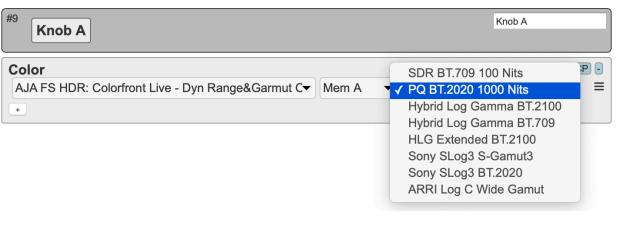
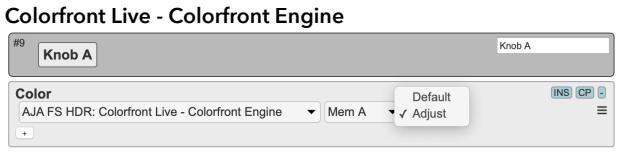
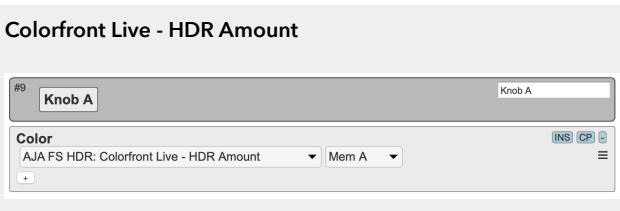
This is a table of actions for AJA FS HDR Device Core

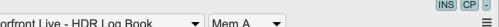
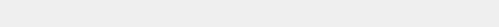
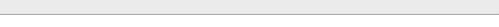
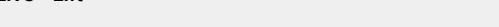
Input	 <p>Routes input to the selected Channel <i>Binary triggers:</i> Sets the selected input to the selected channel. <i>Pulse inputs:</i> Will cycle through the Inputs for the selected channel. <i>Displays:</i> "Input/Input x"</p>
Loss of input	 <p>Selects option for Loss of input <i>Binary triggers:</i> Sets the selected mode for loss of input. <i>Pulse inputs:</i> Will cycle through options for loss of input <i>Displays:</i> "In Loss mode"</p>
Output Format	 <p>Selects Output Format <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will cycle through options for Output Format <i>Displays:</i> "Output/Format"</p>
SD Aspect Ratio	 <p>Selects SD Aspect Ratio <i>Binary triggers:</i> Sets the selected SD Aspect Ratio <i>Pulse inputs:</i> Will cycle through options for Aspect Ratio <i>Displays:</i> "SD Aspect/mode"</p>
Up Convert Mode	 <p>Selects Up Convert Mode <i>Binary triggers:</i> Sets the selected Up Convert Mode <i>Pulse inputs:</i> Will cycle through options for Convert Mode <i>Displays:</i> "Up Conv/mode"</p>
Down Convert Mode	 <p>Selects Down Convert Mode <i>Binary triggers:</i> Sets the selected Down Convert Mode <i>Pulse inputs:</i> Will cycle through options for Convert Mode <i>Displays:</i> "Dn Conv/mode"</p>
Custom Size/Pos	 <p>Turn off/on Custom Size/Position <i>Binary triggers:</i> Sets Custom Size/Postion to on/off <i>Pulse inputs:</i> Will cycle through on/off for Custom Size/Pos <i>Displays:</i> "Cust S/P/mode"</p>
Custom Size	 <p>Sets the Custom Size <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will set the custom size <i>Displays:</i> "Cust Size/%"</p>

SKAARHOJ DEVICE CORES

Custom Aspect	Sets the Custom Aspect <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will set the custom aspect <i>Displays:</i> "Cust Asp/%"
Custom Postion	Sets the Custom Position for either H or V <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will set the custom position for H or V <i>Displays:</i> "CustPos H/%" or "CustPos V/%"
Region of Interest	Sets the Region of Interest <i>Binary triggers:</i> Sets Region of Interest. If Toggle is selected it will toggle between "Off" and the selected option. <i>Pulse inputs:</i> Will cycle through options for Region of Interest <i>Displays:</i> "ROI Mode/mode"
ROI	Sets the ROI parameters <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will cycle through the selected ROI parameter <i>Displays:</i> "ROI Left/%", "ROI Right/%", "ROI Top/%", "ROI Bottom/%"
Test Pattern Gen	Controls the Test Pattern Generator <i>Binary triggers:</i> Sets the generator to on or off <i>Pulse inputs:</i> Will cycle through on/off <i>Displays:</i> "Test Gen/mode"
Test Pattern Type	Controls the Test Pattern Type <i>Binary triggers:</i> Sets the type to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "Test Ptnr/mode"
ProcAmp Enable	Sets ProcAmp to on or off <i>Binary triggers:</i> Sets ProcAmp to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "ProcAmp/mode"

SKAARHOJ DEVICE CORES

ProcAmp Settings 	<p>Controls the 4 ProcAmp values</p> <p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the selected ProcAmp parameter</p> <p>Displays: "Gain/value", "Black/value", "Hue/value", "Sat/value"</p> <p>For "Gain" + "Black" Analog inputs - Gain: Set the value between 0-1.5 Analog inputs - Black: Set the value between -20 - +20</p>
Transform 	<p>Sets the Transform type</p> <p>Binary triggers: Sets ProcAmp to the chosen mode</p> <p>Pulse inputs: Will cycle through the modes</p> <p>Displays: "Transform mode"</p>
Colorfront Live - Dyn Range&Gamut In 	<p>Sets the Dyn Range&Gamut IN</p> <p>Only for Transform = Colorfront Engine-Live</p> <p>Binary triggers: Sets Dyn Range&Gamut IN to the chosen mode</p> <p>Pulse inputs: Will cycle through the modes</p> <p>Displays: "Dyn R&G IN/mode"</p>
Colorfront Live - Dyn Range&Gamut Out 	<p>Sets the Dyn Range&Gamut OUT</p> <p>Only for Transform = Colorfront Engine-Live</p> <p>Binary triggers: Sets Dyn Range&Gamut OUT to the chosen mode</p> <p>Pulse inputs: Will cycle through the modes</p> <p>Displays: "Dyn R&G OUT/mode"</p>
Colorfront Live - SDR Preview 	<p>Controls SDR Preview</p> <p>Only for Transform = Colorfront Engine-Live</p> <p>Binary triggers: Sets SDR Preview to on or off</p> <p>Pulse inputs: Will cycle through on/off</p> <p>Displays: "SDR Prev./mode"</p>
Colorfront Live - Colorfront Engine 	<p>Controls Colorfront Engine</p> <p>Only for Transform = Colorfront Engine-Live</p> <p>Binary triggers: Sets Colorfront Engine to Default or Adjust</p> <p>Pulse inputs: Will cycle through Default/Adjust</p> <p>Displays: "Cfr Engine/mode"</p>
Colorfront Live - HDR Amount 	<p>Adjust HDR Amount</p> <p>Only for Transform = Colorfront Engine-Live</p> <p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the HDR Amount value</p> <p>Displays: "HDR Amount/value"</p>

Colorfront Live - Amb Light Comp	Adjust Amb Light Comp <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the Amb Light Comp value</p>
Colorfront Live - HDR Log Look	Displays: "Amb L. Com/value" Adjust HDR Log Look <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the HDR Log Look value</p>
Colorfront Live - SDR Softness	Displays: "HDR L. Loo/value" Adjust SDR Softness <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the SDR Softness value</p>
Colorfront Live - Lift	Displays: "SDR Soft./value" Controls the Colorfront Engine Lift RGB + Master Values <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the selected RGB + Master Lift value</p>
Colorfront Live - Gamma	Displays: "Lift R/value", "Lift G/value", "Lift B/value", "Lift M/value" Controls the Colorfront Engine Gamma RGB + Master Values <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the selected RGB + Master Gain value</p>
Colorfront Live - Gain	Displays: "Gamma R/value", "Gamma G/value", "Gamma B/value", "Gamma M/value" Controls the Colorfront Engine Gain RGB + Master Values <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the selected RGB + Master Gain value</p>
Colorfront Live - Saturation	Displays: "Gain R/value", "Gain G/value", "Gain B/value", "Gain M/value" Adjust Saturation <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Binary triggers: Not implemented</p> <p>Pulse inputs: Will cycle the Saturation value</p>
Colorfront Live - Exposure	Displays: "Saturation/value" Adjust Exposure <i>Only for Transform = Colorfront Engine-Live</i>
	<p>Analog inputs: Set the value between -4.000-4.000</p> <p>Binary triggers: Not implemented</p>
	<p>Pulse inputs: Will cycle the Exposure value</p>
	<p>Displays: "Exposure/value"</p>

SKAARHOJ DEVICE CORES

Colorfront Live - Color Temp



Adjust Color Temp

Only for Transform = Colorfront Engine-Live

Binary triggers: Not implemented

Pulse inputs: Will cycle the Color Temperature value

Displays: "Color Temp/value"

Adjust Color Temp

Only for Transform = Colorfront Engine-Live

Colorfront Live - Tint



Binary triggers: Not implemented

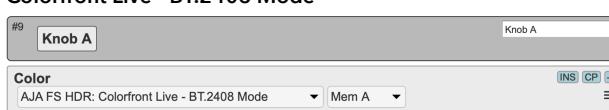
Pulse inputs: Will cycle the Tint value

Displays: "Tint/value"

Adjust BT.2408 Mode Value

Only for Transform = Colorfront Engine-Live

Colorfront Live - BT.2408 Mode



Binary triggers: Not implemented

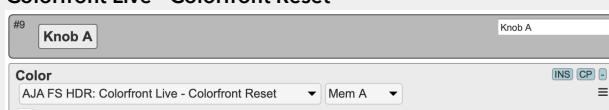
Pulse inputs: Will cycle the BT.2408 value

Displays: "BT.2408 M./value"

Reset the Colorfront values

Only for Transform = Colorfront Engine-Live

Colorfront Live - Colorfront Reset



Binary triggers: Resets Colorfront values but *only* with a long press

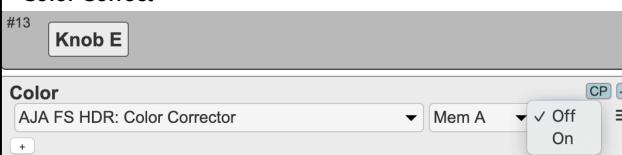
Pulse inputs: Not implemented

Displays: "CFE-Live/Reset"

Enables Color Correct

Only for Transform = Non-Colorfront Engine

Color Correct

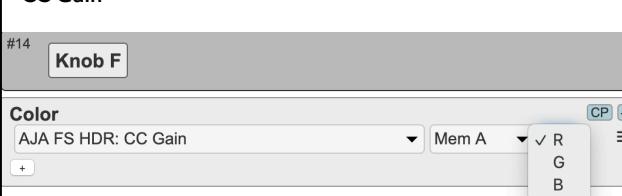


Binary triggers: Not implemented

Pulse inputs: Will toggle between On/Off

Displays: ColorCorr ON/ OFF

CC Gain



Controls the CC Gain RGB

Only for Transform = Non-Colorfront Engine

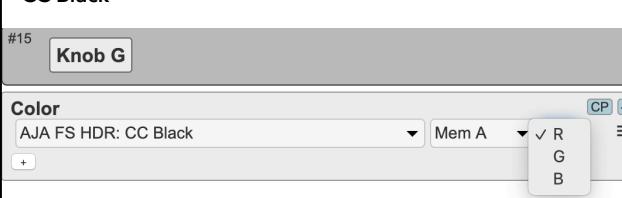
Binary triggers: Not implemented

Hold Down: Resets individual value to Unity

Pulse inputs: Will cycle the selected RGB

Displays: "Gain R/value", "Gain G/value", "Gain B/value"

CC Black



Controls the CC Black RGB

Only for Transform = Non-Colorfront Engine

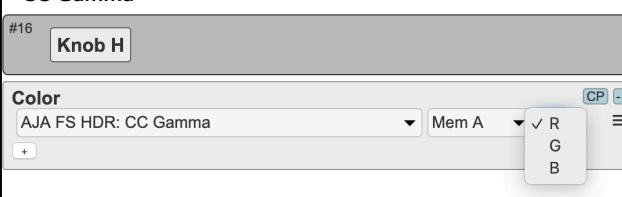
Binary triggers: Not implemented

Hold Down: Resets individual value to Unity

Pulse inputs: Will cycle the selected RGB

Displays: "Black R/value", "Black G/value", "Black B/value"

CC Gamma



Controls the CC Gamma RGB

Only for Transform = Non-Colorfront Engine

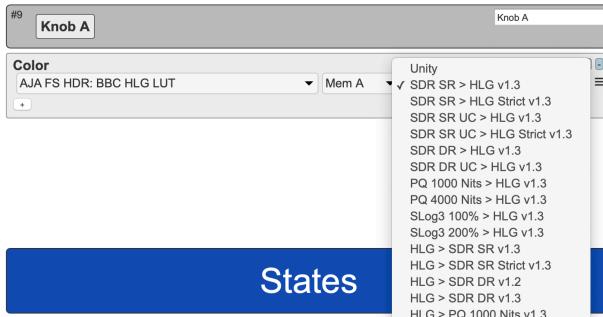
Binary triggers: Not implemented

Hold Down: Resets individual value to Unity

Pulse inputs: Will cycle the selected RGB

Displays: "Gamma R/value", "Gamma G/value", "Gamma B/value"

BBC HLG LUT



Sets the BBC HLG Lut mode

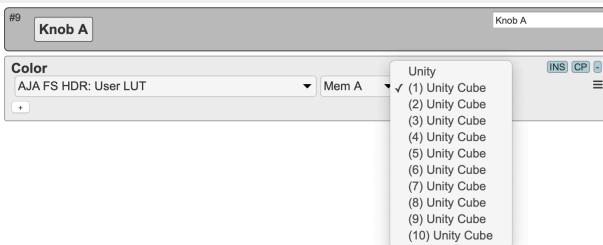
Only for Transform = BBC HLG LUT

Binary triggers: Sets BBC HLG Lut to the chosen mode

Pulse inputs: Will cycle through the modes

Displays: "BBC LUT/mode"

User LUT



Sets the User LUT mode

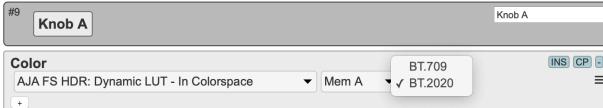
Only for Transform = User LUT

Binary triggers: Sets User LUT to the chosen mode

Pulse inputs: Will cycle through the modes

Displays: "User LUT/mode"

Dynamic LUT - In Colorspace



Sets the In Colorspace option for Dynamic LUT

Only for Transform = Dynamic LUT

Binary triggers: Sets In Colorspace to the chosen mode

Pulse inputs: Will cycle through the modes

Displays: "In Col.Sp/mode"

Dynamic LUT - Out Colorspace



Sets the Out Colorspace option for Dynamic LUT

Only for Transform = Dynamic LUT

Binary triggers: Sets Out Colorspace to the chosen mode

Pulse inputs: Will cycle through the modes

Displays: "Out Col.Sp/mode"

Dynamic LUT - In Scale



Sets the In Scale option for Dynamic LUT

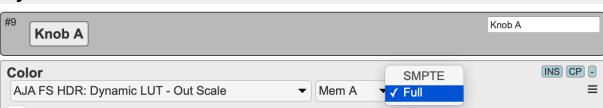
Only for Transform = Dynamic LUT

Binary triggers: Sets In Scale to the chosen mode

Pulse inputs: Will cycle through the modes

Displays: "In Scale/mode"

Dynamic LUT - In Scale



Sets the Out Scale option for Dynamic LUT

Only for Transform = Dynamic LUT

Binary triggers: Sets Out Scale to the chosen mode

Pulse inputs: Will cycle through the modes

Displays: "Out Scale/mode"

Dynamic LUT - Transfer Characteristic



Sets the Transfer Characteristic for Dynamic LUT

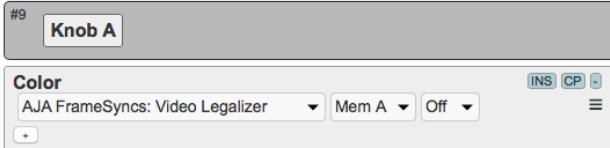
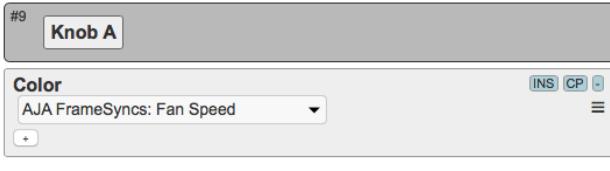
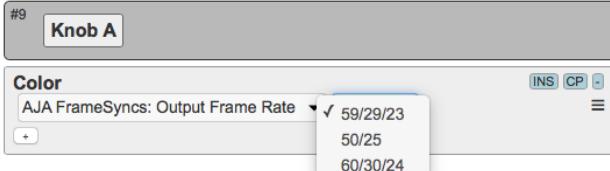
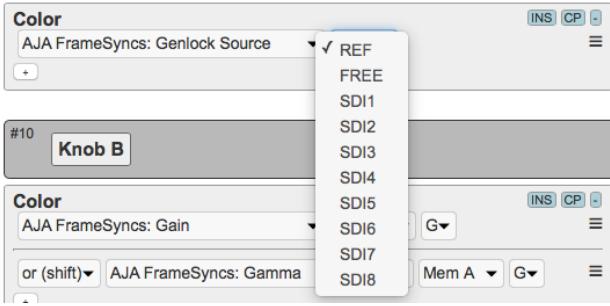
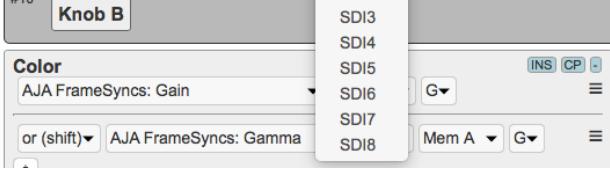
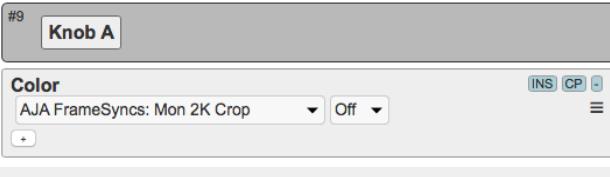
Only for Transform = Dynamic LUT

Binary triggers: Sets Transfer Characteristic to the chosen mode

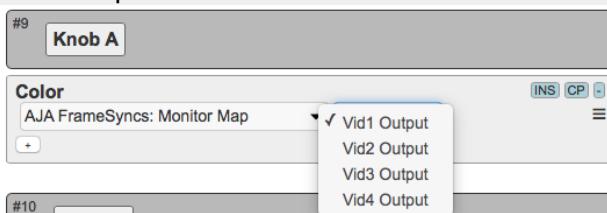
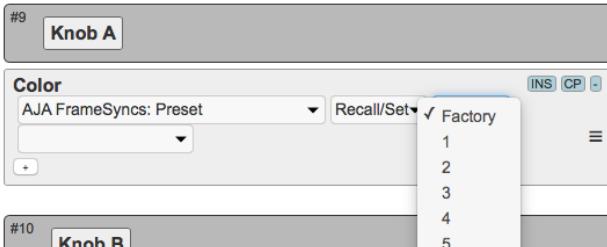
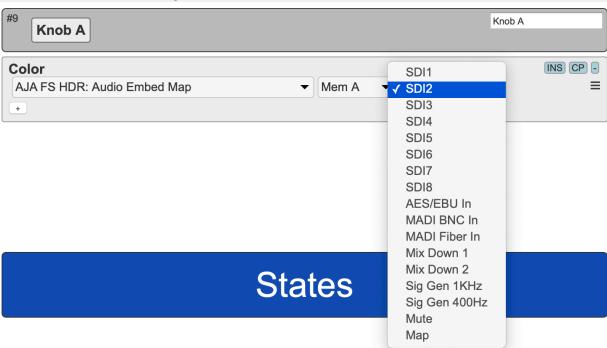
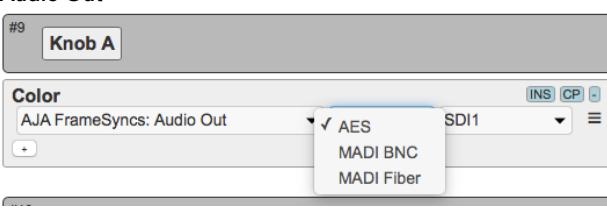
Pulse inputs: Will cycle through the modes

Displays: "Tra. Char/mode"

SKAARHOJ DEVICE CORES

Video Legalizer 	Sets the Video Legalizer to on or off <i>Binary triggers:</i> Sets the Video Legalizer to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "Legalizer mode"
Video Legalizer Settings 	Controls the Video Legalizer Settings <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will cycle through the selected values <i>Displays:</i> "LegWhite/value", "LegBlack/value", "LegChroma/value"
Freeze Output 	Controls the mode for Freeze Output <i>Binary triggers:</i> Sets the Freeze Output to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "Freeze mode"
Fan Speed 	Controls the Fan Speed <i>Binary triggers:</i> Not implemented <i>Pulse inputs:</i> Will cycle Fan Speeds <i>Displays:</i> "Fan Speed/value"
Output Frame Rate 	Controls the global Output Frame Rate <i>Binary triggers:</i> Sets the Output Frame Rate to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "FrameRate mode"
Genlock Source  Knob B 	Controls the global Genlock Source <i>Binary triggers:</i> Sets the Genlock Source to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "GenLokSrc mode"
Mon 2K Crop 	Controls the Mon 2K Crop <i>Binary triggers:</i> Sets the Mon 2K Crop to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "Mon2KCrop mode"

SKAARHOJ DEVICE CORES

HDMI RGB Range 	Controls the HDMI RGB Range <i>Binary triggers:</i> Sets the HDMI RGB Range to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "HDMIRGBRA/mode"
Monitor Map 	Controls the mapping of the Monitor Output <i>Binary triggers:</i> Sets the Monitor Map Routing to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "Mon Map/mode"
Presets 	Controls the Presets on the FS. Select between 40 Presets and the Factory Default <i>Binary triggers:</i> If "Recall/Set" - press and hold will perform a Preset Set If "Set" a single press will save the preset If "Recall" a single press will recall the preset <i>Pulse inputs:</i> Not implemented <i>Displays:</i> If "Recall/Set" "Preset/no" If "Set" "Set/no" If "Recall" "Recall/no"
Audio Embed Map 	Controls the Audio Embedding Mapping <i>Binary triggers:</i> Sets the Audio Embedding Mapping to the chosen mode <i>Pulse inputs:</i> Will cycle through the modes <i>Displays:</i> "Aud.Embed/mode"
Audio Out 	Controls the Audio Out for AES, MADI BND or MADI Fiber <i>Binary triggers:</i> Sets the Audio Rout to the chosen channel <i>Pulse inputs:</i> Will cycle through the channels for the chosen mode <i>Displays:</i> "Audio Out/channel"