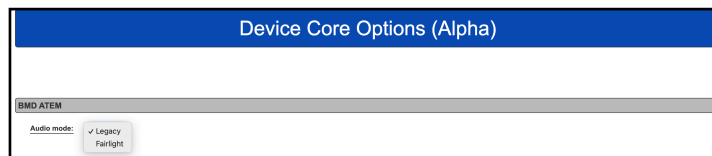


Device: BMD ATEM



Update November 2021

For Atem devices running Fairlight Engine for audio (including the Atem Mini series), it is possible to gain some audio control using the Device Core Options (Alpha) section on the Controller Configuration Page.



Update July 2022

At this time we can not guarantee full support of the Atem Constellation HD 2 M/E. Though it works fine for some customers, it is prone to connectivity and feedback delay issues. We are looking into the problem and have reached out to Blackmagic. This seems to be a common problem with 3rd party integrations for this model due to the way it sends data back to the connected devices.

Standalone Firmwares

Please find the latest standalone firmware updates at: <https://www.skaarhoj.com/support/firmware-updater/>

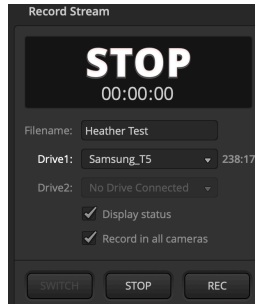
For the ATEM-TCP Link on AVR control of ME3 and ME4 is not possible due to memory restrictions. On the Due it works. See examples of ATEM-TCP Link commands at: <https://www.skaarhoj.com/products/atem-tcp-link/> and a list at the end of this manual.

Please notice we do not have a firmware update for the ATEM Proxy yet.

Controlling BMD Pocket Cinema Camera 4K/6K

Please Notice: The pocket cinema cameras ccu settings are only controllable via the Atem Mini series or when paired with a BMD BiDirectional SDI/HDMI 3G converter.

To record direct to storage in the camera, you need to enable Record In All Cameras in the Atem Software Control Interface. You will not be able to record to the cameras without also attaching a drive to record from the Atem Mini also. Unfortunately there is no feedback in the protocol to allow for confirmation if the cameras are recording.



A larger number of functions on the ATEM series of switchers can be controlled from a SKAARHOJ control panel and we have integrated with the ATEM switchers for a long time.

When using the ATEM Device Core our controllers can connect to the ATEM Switcher directly without the need of running ATEM Software Control Panel on your computer. But you can, and any change made either way will be reflected on each device.

You can connect to multiple ATEM Switchers from the same SKAARHOJ interface but limitations apply. The different ATEM Switchers varies in how many clients can be connected at the same time. For details see <https://www.youtube.com/watch?v=ApYouYfX5G4>

Please notice the ATEM Switchers are very picky as to latency for connected clients. Ensure a stable and fast network. If using VPN or other long distance network solutions latency may be too high and connection will not be established.

Protocol	Source Port (Random)	Destination Port
UDP	50100 -65300	9910

Connection

When a SKAARHOJ controller have successfully connected to the ATEM the serial monitor will report:
ATEM has initialized

The screenshot shows the SKAARHOJ Serial Monitor interface. The main window displays the following text:

```
*****
SKAARHOJ Controller Booting
*****
SK VERSION: v2.4.0
defConfigCsc=34
SK_MODEL: SK_LIVEFLY
SK_SERIAL: 491219
I2C 400 kHz mode activated
*** Init Module MC19 ***:
Calibration for analog component #1 (T-bar): Start: 35, End: 35, Hysteresis: 15
Waitcounter:0
HWvar:255
MAC address: 92:A1:DA:EF:5C:50
IP address: 192.168.10.99
Subnet mask: 255.255.255.0
Gateway: 192.168.10.1
DNS: 192.168.10.1
Memory A-D restored
Compiled: Jan 22 2020 15:18:20
DeviceCore #0: ATEM0, IP = 192.168.10.240
setup() Done
-----
ATEM Initialization: 1/?
ATEM Initialization: 2/26
System action 17
ATEM Initialization: 3/26
System action 17
System action 17
ATEM Initialization: 4/26
System action 17
ATEM Initialization: 5/26
ATEM Initialization: 6/26
ATEM Initialization: 7/26
ATEM Initialization: 8/26
ATEM Initialization: 9/26
ATEM Initialization: 10/26
ATEM Initialization: 11/26
ATEM Initialization: 12/26
ATEM Initialization: 13/26
ATEM Initialization: 14/26
ATEM Initialization: 15/26
ATEM Initialization: 16/26
ATEM Initialization: 17/26
ATEM Initialization: 18/26
ATEM Initialization: 19/26
ATEM Initialization: 20/26
ATEM Initialization: 21/26
ATEM Initialization: 22/26
126
.ATEM Initialization: 23/26
ATEM Initialization: 24/26
ATEM Initialization: 25/26
ATEM has initialized
121
.164
.164
.164
.164
.164
```

The text "ATEM has initialized" is highlighted with a red box. The interface includes a top bar with "SKAARHOJ" and "Main IP Config Serial Monitor" tabs, and a right sidebar with buttons: Reset, Config, Debug, Ok, Clear Presets, Scroll down, and Clear.

If the SKAARHOJ controller is unable to locate the ATEM on the network the serial monitor will report:
.Connection to ATEM Switcher has timed out - reconnecting!
Continuously connecting to ATEM switcher on IP 192.168.10.240

The screenshot shows the SKAARHOJ Serial Monitor interface. The main window displays the following text:

```
*****
SKAARHOJ Controller Booting
*****
SK VERSION: v2.4.0
defConfigCsc=34
SK_MODEL: SK_LIVEFLY
SK_SERIAL: 491219
I2C 400 kHz mode activated
*** Init Module MC19 ***:
Calibration for analog component #1 (T-bar): Start: 35, End: 35, Hysteresis: 15
Waitcounter:0
HWvar:255
MAC address: 92:A1:DA:EF:5C:50
IP address: 192.168.10.99
Subnet mask: 255.255.255.0
Gateway: 192.168.10.1
DNS: 192.168.10.1
Memory A-D restored
Compiled: Jan 22 2020 15:18:20
DeviceCore #0: ATEM0, IP = 192.168.10.240
setup() Done
-----
System action 17
System action 17
System action 17
System action 17
156
.200
.200
.200
.Connection to ATEM Switcher has timed out - reconnecting!
Continuously connecting to ATEM switcher on IP 192.168.10.240
120
.200
.200
.200
.200
.200
.Connection to ATEM Switcher has timed out - reconnecting!
Continuously connecting to ATEM switcher on IP 192.168.10.240
119
.200
.200
.200
```

The text ".Connection to ATEM Switcher has timed out - reconnecting!" and "Continuously connecting to ATEM switcher on IP 192.168.10.240" are repeated multiple times. The interface includes a top bar with "SKAARHOJ" and "Main IP Config Serial Monitor" tabs, and a right sidebar with buttons: Reset, Config, Debug, Ok, Clear Presets, Scroll down, and Clear.

About ATEM Audio, Video and Camera Sources

Whenever you can select audio, video and camera sources you will find special options in the drop down:

- Whenever you see "Mem A"-"Mem L" it means the source selected will be the one from the list which the given memory register value currently points to, starting the counting from zero. For example, if Mem A is 41, the source will be "Bars" because its element number 42 in the list (and the first element, "Black", has number 0).
- For video sources, selecting AUX1-40 means the source will be whatever source is currently on AUX1-40. This will be dynamically evaluated.
- For video sources, selecting MVx/y means the source will be whatever source is currently on the multiviewer "x" (1-4) in window number "y". This will be dynamically evaluated.
- For camera sources, "Mem A"-"Mem L" will not point to the list, but simply refer to the camera number.

Device Configurations

Device configuration options exist:

- Index 0: **Sensor Gain / Camera Gain Setting Range**
 - If "0" = default
 - If "1" = Extended -12dB/12dB Range (-12, -6, 0, 6, 12)
 - If "2" = Original 0db/18dB Range (0, 6, 12, 18)

Example:

Enabling "Sensor Gain / Camera Gain Setting Range" with the extended could look like this device configuration code: "D0:0=1" where the general form would be "Dx:0=1" where "x" is the number of the device core as installed on the controller (starting with zero for the first device core).

To confirm that a device configuration is in fact detected by the controller, please check it out on the serial monitor where it will be mentioned:

```
Memory A-D restored
Compiled: Dec 18 2017 15:17:32
DeviceCore #0: ATEM0, IP = 192.168.10.240
ATEM: Extended CCU Sensor gain range
setup() Done
-----
Sending connect packet to ATEM switcher on IP 192.168.10.240 from port
55548
ATEM _hasInitialized = TRUE
171
---
```


Example: If the ATEM device core is the first like below:

Device Cores

Below, you can see the currently enabled device support on your controller. You can add and delete device cores in accordance with your requirements up to a maximum of 14 devices. To understand the development states Mature, Beta, Alpha and Planned (as well as Pro and Planned actions), please check out the [device core support page](#).

For general documentation, please see the [UniSketch Manual](#) and [System Actions Manual](#).

User configuration #2 ▾



BMD ATEM

BlackMagic Design ATEM Switcher series, all models. Comprehensive list of ATEM features supported including various meta features implemented in the controllers. This is recommended for the experts and advanced users. Connection to the ATEM switcher is via IP (UDP) directly to the switcher or through the [SKAARHOJ ATEM Proxy](#). See [ATEM Action Manual](#)

Save Settings

Add another device ▾

Then settings the extended rage would be set by this configuration under "Manage Media" on cores.skaarhoj.com:

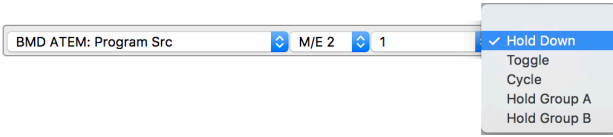


Device Core Options

Some device cores support additional options that can be defined through this text field. Please refer to the manual for the particular device core for details.




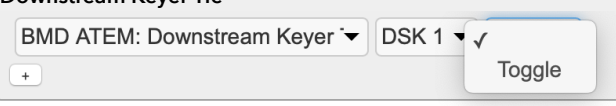

An excerpt of the actions in the ATEM Device Core

BMD ATEM: Program Src
 BMD ATEM: Preview Src
 BMD ATEM: Prv/Prg Src
 BMD ATEM: AUX Output Src
 BMD ATEM: Upstream Keyer
 BMD ATEM: Upstream Keyer Fill
 BMD ATEM: Upstream Keyer Key
 BMD ATEM: Upstream Keyer Type
 BMD ATEM: Downstream Keyer
 BMD ATEM: Downstream Keyer Fill
 BMD ATEM: Downstream Keyer Key
 BMD ATEM: Downstream Keyer Tie
 BMD ATEM: MP Still
 BMD ATEM: Cut
 BMD ATEM: Auto
 BMD ATEM: FTB
 BMD ATEM: Transition Style
 BMD ATEM: Transition Pos
 BMD ATEM: Transition Preview
 BMD ATEM: Next Transition
 BMD ATEM: Play Macro
 BMD ATEM: Audio
 BMD ATEM: Audio Volume
 BMD ATEM: Audio Balance
 BMD ATEM: Audio Levels
 BMD ATEM: Transition Rate
 BMD ATEM: Stream/Record
 BMD ATEM: Focus
 BMD ATEM: Iris
 BMD ATEM: Iris (f-stop)
 BMD ATEM: Sensor Gain
 BMD ATEM: Shutter
 BMD ATEM: White Balance
 BMD ATEM: Auto White Balance
 BMD ATEM: Lift
 BMD ATEM: Gamma
 BMD ATEM: Gain
 BMD ATEM: Hue
 BMD ATEM: Contrast
 BMD ATEM: Saturation
 BMD ATEM: Bars
 BMD ATEM: Detail
 BMD ATEM: CCU Settings
 BMD ATEM: PT Drive
 BMD ATEM: PT Preset
 BMD ATEM: Reset
 BMD ATEM: Video Tally
 BMD ATEM: Audio Tally
 BMD ATEM: PIP
 BMD ATEM: Digital Zoom
 BMD ATEM: DVE Size
 BMD ATEM: DVE Position
 BMD ATEM: DVE Border
 BMD ATEM: DVE Fill Source
 BMD ATEM: DVE Adjust
 BMD ATEM: DVE PTZ
 BMD ATEM: DVE Preset
 BMD ATEM: Audio Peaks
 BMD ATEM: Zoom
 BMD ATEM: SuperSource Fill
 BMD ATEM: SuperSource Adjust
 BMD ATEM: Hold Group Default
 BMD ATEM: AUX Follow Program
 BMD ATEM: Camera Select
 BMD ATEM: MemGroup Autorouter
 BMD ATEM: Coarse Scale
 BMD ATEM: Video Mode
 BMD ATEM: Push data

This is a table of actions for Blackmagic Design ATEM Switchers

<p>Program Src</p> 	<p>Sets Program Source on the given M/E row.</p> <p><i>Binary triggers:</i> Sets the selected source on Program. If Hold Down is selected, the source will fall back to the previous source whenever the trigger is released. Toggle will select the source, but on a subsequent trigger, it will fall back to the previous value. If Cycle mode is selected, a trigger will set the next source on Program (corresponds to a single pulse input). Hold Group A+B works like "Hold Down" but adds the previous source to a queue from which the fall back value is pulled when the button is released.</p> <p><i>Pulse inputs:</i> Will cycle through and set the possible sources for Program limited by the selected source and not including Black, unless Black is selected as source in which case all possible sources are traversed.</p> <p><i>Binary outputs:</i> On when actual Program Src matches selected source (or when trigger is held in Cycle mode)</p> <p><i>Button colors:</i> Will be red when Program Src matches selected source, otherwise dim. In Cycle mode color will be highlighted when button is held down.</p>
<p>Preview Src</p> 	<p>Sets Preview Source on the given M/E row.</p> <p><i>Binary triggers:</i> Sets the selected source on Program. If Hold Down is selected, the source will fall back to the previous source whenever the trigger is released. Toggle will select the source, but on a subsequent trigger, it will fall back to the previous value. If Cycle mode is selected, a trigger will set the next source on Program (corresponds to a single pulse input). Hold Group A+B works like "Hold Down" but adds the previous source to a queue from which the fall back value is pulled when the button is released.</p> <p><i>Pulse inputs:</i> Will cycle through and set the possible sources for Preview limited by the selected source and not including Black, unless Black is selected as source in which case all possible sources are traversed.</p> <p><i>Binary outputs:</i> On when actual Preview Src matches selected source (or when trigger is held in Cycle mode)</p> <p><i>Button colors:</i> Will be green when Program Src matches selected source, otherwise dim. In Cycle mode color will be highlighted when button is held down.</p>
<p>Prv/Prg Src</p> 	<p>Set Preview Source on the given M/E row and if the trigger is held down for more than 1 second, it will perform a Cut action too.</p> <p><i>Binary inputs:</i> Sets the select source on Preview. If Cycle mode is selected, a trigger will set the next source on Preview (corresponds to a single pulse input) when released unless the button is held until a Cut is performed in which case no new Preview source is selected.</p> <p><i>Pulse inputs:</i> Will cycle through and set the possible sources for Preview limited by the selected source and not including Black, unless Black is selected as source in which case all possible sources are traversed.</p> <p><i>Binary outputs:</i> On when actual Preview source or Program source matches the selected source (or when trigger is held in Cycle mode)</p> <p><i>Button colors:</i> Will be red or green when Program or Preview Src matches selected source, otherwise dim. In Cycle mode color will be highlighted when button is held down. For mono-color buttons, the button will blink when the source is on preview (normally green on a multicolor button).</p>

<h3>AUX Output Src</h3> <div> <div>ATEM: AUX Output Src</div> <div>AUX 1</div> <div>3</div> </div> <div> <input checked="" type="checkbox"/> Hold Down <input type="checkbox"/> Toggle <input type="checkbox"/> Hold Group A <input type="checkbox"/> Hold Group B <input type="checkbox"/> Cycle </div>	<p>Set AUX source on the given AUX bus.</p> <p>Binary inputs: Sets the select source on the AUX bus. If Hold Down is selected, the source will fall back to the previous source whenever the trigger is released. Toggle will select the source, but on a second trigger, it will fall back to the previous value. Hold Groups will fall back to a previous source for a group of triggers using a queue system and finally to the first previous value before any trigger in the group was activated. If Cycle mode is selected, a trigger will set the next source on the AUX bus (corresponds to a single pulse input).</p> <p>Pulse inputs: Will cycle through and set the possible sources for AUX limited by the selected source and not including Black, unless Black is selected as source in which case all possible sources are traversed.</p> <p>Binary outputs: On when actual AUX bus source matches selected source (or when trigger is held in Cycle mode)</p> <p>Button colors: will be highlighted when AUX bus source matches selected source, otherwise dim. In Cycle mode color will be highlighted when button is held down.</p>
<h3>Upstream Keyer</h3> <div> <div>ATEM: Upstream Keyer</div> <div>M/E 1</div> <div>Keyer 1</div> </div> <div> <input type="checkbox"/> Toggle <input checked="" type="checkbox"/> On <input type="checkbox"/> Off <input type="checkbox"/> Hold Down <input type="checkbox"/> Auto </div> <div>#2</div>	<p>Turns upstream keyers on and off</p> <p>Binary inputs: If Toggle mode, the given upstream keyer is turned on/off successively. If On or Off the upstream keyer is set On or Off respectively. Hold Down will turn the keyer on as long as the trigger is held. Auto will fade in the keyer (still pending as of June 2016)</p> <p>Pulse inputs: Will turn on/off</p> <p>Binary outputs: Follows highlighted button color.</p> <p>Button colors: Will be highlighted if the keyers state corresponds to the selected mode. For most modes except "Off" this means the color will be highlighted (but for Off a button is highlight in case the keyer is actually off)</p>
<h3>Upstream Keyer Fill</h3> <div> <div>ATEM: Upstream Keyer Fill</div> <div>M/E 1</div> <div>Keyer 1</div> <div>1</div> <div>+</div> </div>	<p>Selects the fill source for Upstream Keyer</p> <p>Binary inputs: Sets the selected source.</p> <p>Pulse inputs: Cycles through the available sources. Press and hold will reset to the selected source.</p> <p>Binary outputs: On if current keyer source is the selected source.</p> <p>Button colors: Will be highlighted if current keyer source is the selected source.</p>
<h3>Upstream Keyer Key</h3> <div> <div>BMD ATEM: Upstream Keyer Key</div> <div>M/E 1</div> <div>Keyer 1</div> <div>Bars</div> </div>	<p>Selects the fill source for Upstream Keyer Key Source</p> <p>Binary inputs: Sets the selected source.</p> <p>Pulse inputs: Cycles through the available sources.</p> <p>Binary outputs: On if current keyer source is the selected source.</p> <p>Button colors: Will be highlighted if current keyer source is the selected source.</p>
<h3>Upstream Keyer Type</h3> <div> <div>BMD ATEM: Upstream Keyer Type</div> <div>M/E 1</div> <div>Keyer 1</div> <div> <input checked="" type="checkbox"/> Cycle <input type="checkbox"/> Luma <input type="checkbox"/> Chroma <input type="checkbox"/> Pattern <input type="checkbox"/> DVE </div> </div>	<p>Selects the keyer type settings</p> <p>Binary inputs: Sets the selected type. With Cycle it will cycle through the 4 options.</p> <p>Pulse inputs: Cycles through the available options</p> <p>Binary outputs: On if current option is the selected option.</p> <p>Button colors: Will be highlighted if current option is the selected option.</p>

<p>Downstream Keyer</p> 	<p>Turns downstream keyers on and off</p> <p><i>Binary inputs:</i> If Toggle mode, the given downstream keyer is turned on/off successively. If On or Off the downstream keyer is set On or Off respectively. Hold Down will turn the keyer on as long as the trigger is held. Auto will fade in the keyer.</p> <p><i>Pulse inputs:</i> Will turn on/off</p> <p><i>Binary outputs:</i> Follows highlighted button color</p> <p><i>Button colors:</i> Will be highlighted if the keyers state corresponds to the selected mode. For most modes except "Off" this means the color will be highlighted (but for Off a button is highlight in case the keyer is actually off)</p>
<p>Downstream Keyer Fill</p> 	<p>Selects the fill source for Downstream Keyer</p> <p><i>Binary inputs:</i> Sets the selected source.</p> <p><i>Pulse inputs:</i> Cycles through the available sources. Press and hold will reset to the selected source.</p> <p><i>Binary outputs:</i> On if current keyer source is the selected source.</p> <p><i>Button colors:</i> Will be highlighted if current keyer source is the selected source.</p>
<p>Downstream Keyer Key</p> 	<p>Selects the key source for Downstream Keyer</p> <p><i>Binary inputs:</i> Sets the selected source.</p> <p><i>Pulse inputs:</i> Cycles through the available sources. Press and hold will reset to the selected source.</p> <p><i>Binary outputs:</i> On if current keyer source is the selected source.</p> <p><i>Button colors:</i> Will be highlighted if current keyer source is the selected source.</p>
<p>Downstream Keyer Tie</p> 	<p>Tie the selected Downstream Keyer</p> <p><i>Binary inputs:</i> Enable selected downstream keyer. If Toggle turn Tie on/off</p> <p><i>Pulse inputs:</i> Not implemented (besides with press and hold)</p> <p><i>Binary outputs:</i> On if Tie is enabled</p> <p><i>Button colors:</i> Will be highlighted if Tie is on..</p>
<p>MP Still</p> 	<p>Sets selected Media Player Source.</p> <p><i>Binary inputs:</i> Sets the selected source in selected Media Player. If Hold Down is selected, the source will fall back to the previous source whenever the trigger is released. Toggle will select the source, but on a subsequent trigger, it will fall back to the previous value. If Cycle mode is selected, a trigger will set the next source on in selected Media Player (corresponds to a single pulse input).</p> <p><i>Pulse inputs:</i> Cycles through the available sources. Press and hold will reset to the selected source.</p> <p><i>Binary outputs:</i> On if current media player source is the selected source.</p> <p><i>Button colors:</i> Will be highlighted if current media player source is the selected source.</p>

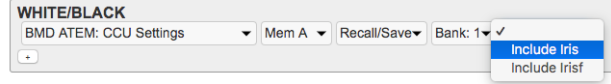
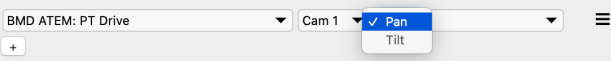

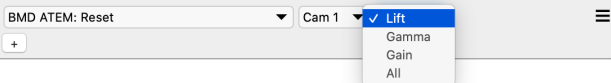


<p>CUT</p> <div> <div>#7</div> <div>1</div> </div> <div> <div>ATEM: Cut</div> <div> <div>✓ M/E 1</div> <div>M/E 2</div> </div> <div>+</div> </div>	<p>Executes CUT transition on selected M/E bus.</p> <p><i>Binary triggers:</i> Transitions source in preview to program and program to preview.</p> <p><i>Pulse inputs:</i> Toggles Preview and Program. Pressing down executes the command.</p> <p><i>Binary outputs:</i> On while transition executes.</p> <p><i>Button colors:</i> Will be highlighted when held down.</p>
<p>AUTO</p> <div> <div>#7</div> <div>1</div> </div> <div> <div>ATEM: Auto</div> <div> <div>✓ M/E 1</div> <div>M/E 2</div> </div> <div>+</div> </div>	<p>Executes assigned transition on the selected M/E bus.</p> <p><i>Binary trigger:</i> Transition source in preview to program and program to preview using the transition type assigned to the selected M/E bus.</p> <p><i>Pulse inputs:</i> Turning executes the transition. Pressing down executes the transition</p> <p><i>Binary outputs:</i> On while transition executes.</p> <p><i>Button colors:</i> Red while executing transition</p>
<p>Fade to Black (FTB)</p> <div> <div>#7</div> <div>1</div> </div> <div> <div>ATEM: FTB</div> <div> <div>✓ M/E 1</div> <div>M/E 2</div> </div> <div>+</div> </div>	<p>Fades Program Output to Black on selected M/E bus.</p> <p><i>Binary trigger:</i> Pressed once, fades program output to black on selected M/E bus. Pressed a second times, fades program up from back on selected M/E bus.</p> <p><i>Pulse input:</i> Turning executes the transition. Pressing down executes transition</p> <p><i>Binary output:</i> On when FTB active</p> <p><i>Button colors:</i> Solid red while executing transition. Flashes red while in black.</p>
<p>Transition Style</p> <div> <div>#7</div> <div>1</div> </div> <div> <div>ATEM: Transition Style</div> <div> <div>⌵ M/E 1</div> <div> <div>✓ Cycle</div> <div>Mix</div> <div>Dip</div> <div>Wipe</div> <div>Stinger</div> <div>DVE</div> </div> </div> <div>+</div> </div> <div> <div>#8</div> <div>2</div> </div>	<p>Selects the Auto Transition type for selected M/E bus.</p> <p><i>Binary trigger:</i> Will cycle through available auto transition types on selected M/E bus.</p> <p><i>Pulse input:</i> Pressing left or right will cycle through transition types.</p> <p><i>Binary output:</i> On when selection matches</p> <p><i>Button color:</i> Highlighted when Transition style matches selection</p>
<p>Transition Position</p> <div> <div>BMD ATEM: Transition Pos</div> <div> <div>✓ M/E 1</div> <div>M/E 2</div> <div>M/E 3</div> <div>M/E 4</div> <div>Mem A</div> </div> <div>+</div> </div>	<p>Controls Transition Position via analog component (slider, fader, T-bar)</p> <p><i>Binary trigger:</i> Not implemented.</p> <p><i>Pulse input:</i> Not implemented.</p> <p><i>Analog input:</i> Sets transition position</p> <p><i>Binary output:</i> On during transition</p> <p><i>Button color:</i></p> <p>Note: If action assigned directly on a transition LED bar the LED bar will always light up from the same side. However if on the transition LED bar the system action "Tie to HWC#" is used and tied to the slider/fader/T-bar the order of the LEDs will be correct.</p>

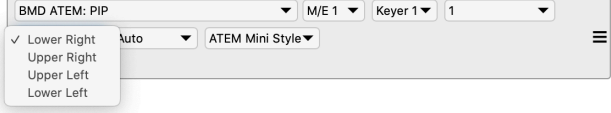
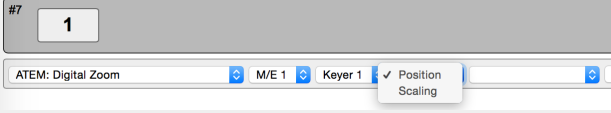
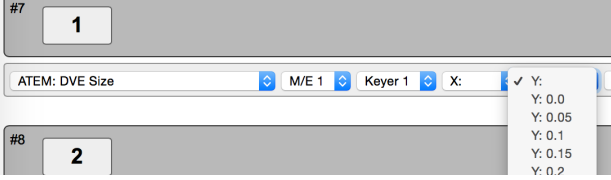
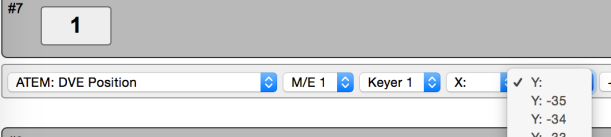
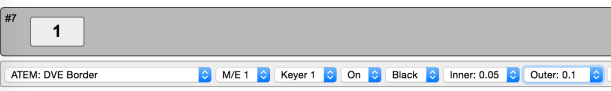

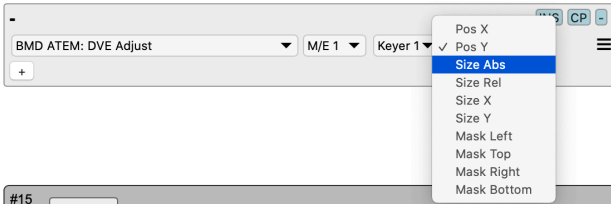
<p>Transition Preview</p> <p>BMD ATEM: Transition Preview</p> <p>+ M/E 1 M/E 2 M/E 3 M/E 4 Mem A</p>	<p>Toggle Transition Preview for selected ME.</p> <p><i>Binary trigger:</i> Sets Transition Preview to on/off</p> <p><i>Pulse input:</i> Not implemented (besides for press and hold)</p> <p><i>Binary output:</i> On when Transition Preview engaged</p> <p><i>Button color:</i> Highlighted when Transition Preview engaged</p>
<p>Next Transition</p> <p>Normal</p> <p>BMD ATEM: Next Transition M/E 1</p> <p>Background Toggle</p> <p>Key 1 Key 2 Key 3 Key 4</p>	<p>Description coming soon.</p>
<p>Play Macro</p> <p>#7 1</p> <p>ATEM: Play Macro 1</p> <p>#8 2</p> <p>Play Stop Toggle Hold Down Cycle</p>	<p>Will execute Macro command selected</p> <p><i>Binary trigger:</i> Play will play macro. Stop will stop macro. Toggle will play macro but on a subsequent trigger will stop macro. Hold down will play the macro. Cycle will cycle through available macros.</p> <p><i>Pulse input:</i> Cycle through available macros</p> <p><i>Binary output:</i> Not implemented</p> <p><i>Button color:</i> Will be highlighted when playing macro, otherwise dimmed.</p>
<p>Audio</p> <p>BMD ATEM: Audio 2 On</p> <p>Hold Down Toggle Cycle</p>	<p>Not working on ATEM Mini series</p> <p>Controls selected audio channel.</p> <p><i>Binary trigger:</i> Hold down will turn on desired function of audio channel, ie-On/Off, AVF On/AVF Off, Solo On/Solo Off, while held down. Toggle will turn on desired function, subsequent trigger will turn off. Cycle will cycle between On/Off/AVF On.</p> <p><i>Pulse input:</i> Cycle though On, Off and AVF</p> <p><i>Binary Output:</i> On when action criteria met (On, Off, AVF)</p> <p><i>Button color:</i> Highlighted when on. Otherwise dimmed.</p>
<p>Audio Volume</p> <p>BMD ATEM: Audio Volume 2</p>	<p>Not working on ATEM Mini series</p> <p>Control the Audio Volume of selected audio channel.</p> <p><i>Binary Input:</i> Left/Right button push adjust the volume linearly but does not cycle around. Push down for 1 second resets to 0dB.</p> <p><i>Pulse input:</i> Left/Right adjust the volume linearly but does not cycle around. Push down for 1 second resets to 0dB. If option "Off" is set, push down for 1 second turns audio all the way down.</p> <p><i>Binary Output:</i> On when triggered otherwise off.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<p>Audio Balance</p> <p>#7 1</p> <p>ATEM: Audio Balance 1</p>	<p>Not working on ATEM Mini series</p> <p>Control the Audio Balance of selected audio channel.</p> <p><i>Binary Input:</i> Left/Right button push adjust the audio balance but does not cycle around. Push down for 1 second resets balance.</p> <p><i>Pulse input:</i> Left/Right adjust the audio balance but does not cycle around. Push down for 1 second resets balance.</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>

<p>Audio Levels</p> <p>BMD ATEM: Audio Levels ▼ 5 ▼</p>	<p>Not working on ATEM Mini series</p> <p>Shows Audio Levels on LED bars and VU meters</p> <p><i>Binary Input:</i> Not implemented.</p> <p><i>Pulse input:</i> Not implemented.</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Indicates volume VU meter levels (green, yellow & red)</p>
<p>Transition Rate</p> <p>#7 1</p> <p>ATEM: Transition Rate M/E 1 ✓ Cycle Mix Dip Wipe DVE FTB DSK1 DSK2 Frames: 1 +</p> <p>#8 2</p>	<p>Adjusts the video transition rate for the selected M/E bus.</p> <p><i>Binary Input:</i> Cycles through the transition types.</p> <p>4-way buttons:</p> <p>Button press: Cycle through transition rate</p> <p>Left/Right press and hold: Adjust Frames</p> <p><i>Pulse Input:</i> Cycles through transition rate in frames for selected transition type. Holding down changes transition type you are adjusting. Subsequent triggers continue to cycle through available transition types.</p> <p><i>Binary output:</i> Not implemented.</p>
<p>Stream/Record</p> <p>#1 C2</p> <p>Normal INS CP -</p> <p>BMD ATEM: Stream/Record ✓ Stream Record</p> <p>Toggle +</p>	<p>Starts/Stops the Stream or Record from an ATEM Mini Pro</p> <p><i>Binary trigger:</i> If Toggle mode, the stream or record is turned on/off successively. If On or Off the stream or record is set On or Off respectively. Hold Down will trigger the stream or record on as long as the trigger is held.</p> <p><i>Pulse input:</i> Not implemented</p> <p><i>Binary output:</i> On when triggered</p> <p><i>Button color:</i> Red when on otherwise dimmed.</p>
<p>Focus</p> <p>BMD ATEM: Focus ▼ Cam 7 ▼</p>	<p>Controls Focus on BMD Cameras via relative values (focus in/out). An absolute focus parameter cannot be sent to the cameras (not supported by protocol)</p> <p><i>Binary Input:</i> Not implemented</p> <p><i>Pulse input:</i> Adjust focus in/out</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<p>Iris</p> <p>#7 1</p> <p>ATEM: Iris Cam 1 Limiter A Scaler A +</p>	<p>Changes iris value for the selected camera</p> <p>Iris range: 0-100% - will not reflect change in ATEM Software Control Panel but still transmit iris data.</p> <p><i>Binary inputs:</i> Will trigger auto iris</p> <p><i>Pulse inputs:</i> Changes the value up/down.</p> <p><i>Analog inputs:</i> Set the value between 0-100%</p> <p><i>Displays:</i> Will show the current value</p> <p>Values:</p> <ul style="list-style-type: none"> - Select Camera 1-20. If you choose Mem A-D, the camera value will be taken from the value of this memory register.


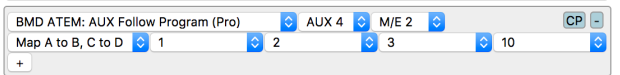
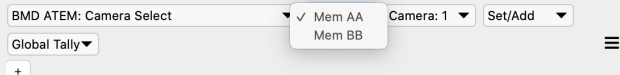
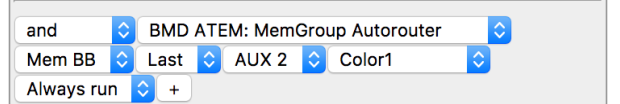
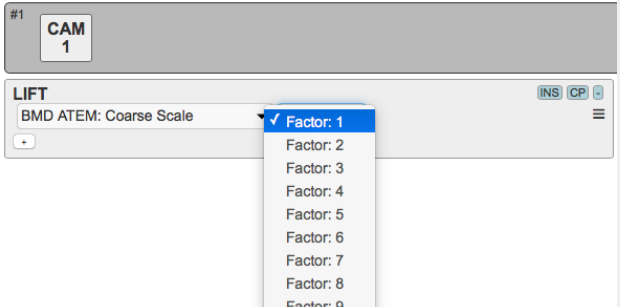
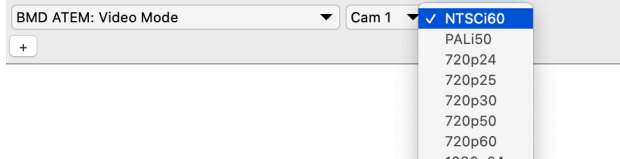
<p>Iris (f-stop)</p> <p>WHITE/BLACK</p> <p>BMD ATEM: Iris (f-stop) ▼ Cam 1 ▼ Limiter A ▼ Scaler A ▼</p> <p>+</p>	<p>Changes iris value for the selected camera</p> <p>Iris range: f1.4-f22 - will reflect change in ATEM Software Control Panel.</p> <p><i>Binary inputs:</i> Will trigger auto iris</p> <p><i>Pulse inputs:</i> Changes the value up/down.</p> <p><i>Analog inputs:</i> Set the value between f1.4-f22</p> <p><i>Displays:</i> Will show the current value</p> <p>Values:</p> <ul style="list-style-type: none"> - Select Camera 1-10. If you choose Mem A-D, the camera value will be taken from the value of this memory register.
<p>Sensor Gain</p> <p>BMD ATEM: Sensor Gain ▼ Cam 7 ▼</p> <p>+</p> <p> Cycle -12db -6db 0db 6db 12db 18db 24db </p>	<p>Controls Sensor Gain on BMD Cameras</p> <p><i>Binary Input:</i> Sets sensor gain to selected value . If Cycle selected sensor gain value goes up until maximum value is reached.</p> <p><i>Pulse input:</i> Adjust Sensor Gain up/down</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<p>Shutter</p> <p>BMD ATEM: Shutter ▼ Cam 7 ▼</p> <p>+</p> <p> Cycle 1/50 1/60 1/75 1/90 1/100 1/120 1/150 1/180 1/250 1/360 1/500 1/725 1/1000 1/1450 1/2000 </p> <p>#10 X1</p> <p>BMD ATEM: Shutter ▼ Cam 7 ▼</p> <p>+</p>	<p>Controls Shutter on BMD Cameras</p> <p><i>Binary Input:</i> Sets Shutter to selected value . If Cycle selected Shutter goes up until maximum value is reached.</p> <p><i>Pulse input:</i> Adjust Shutter Speed up/down</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<p>White Balance</p> <p>BMD ATEM: White Balance ▼ Cam 7 ▼ Cycle ▼</p> <p>+</p> <p>50K Step</p>	<p>Controls White Balance on BMD Cameras</p> <p><i>Binary Input:</i> Sets White Balance to selected value . If Cycle selected White Balance goes up until maximum value is reached.</p> <p><i>Pulse input:</i> Adjust White Balance up/down</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<p>Auto White Balance</p> <p>BMD ATEM: Auto White Balance ▼ Cam 7 ▼</p> <p>+</p> <p> Set Restore </p>	<p>Trigger Auto White Balance Set/Restore on BMD Cameras</p> <p><i>Binary Input:</i> Trigger the camera to perform a Auto White Balance</p> <p><i>Pulse input:</i> Not implemented.</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>

<h3>Lift/Gamma/Gain</h3> <div> <div> BMD ATEM: Lift <div> Y R G B </div> Cam 1 </div> <div>+</div> </div> <div> <div> BMD ATEM: Gamma <div> Y R G B </div> Cam 1 </div> <div>+</div> </div> <div> <div> BMD ATEM: Gain <div> Y R G B </div> Cam 1 </div> <div>+</div> </div>
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<h3>CCU Settings</h3> 	<p>Save, Recall or Save/Recall CCU Settings (color parameters)</p> <p><i>Binary inputs:</i> If Save mode, the given CCU settings will be saved to the chosen bank. Iris can be included if wanted. In Recall mode the CCU settings will be recalled. The button will blink for 10 seconds and if you push the button again within this period of time settings will revert back to the settings prior to the recall. If Recall/Save mode the two functions are combined. Press and hold will Save. One press will recall.</p> <p><i>Displays:</i> Will show File 1-6</p> <p>Values:</p> <ul style="list-style-type: none"> Select Camera 1-10. If you choose Mem A-D, the camera value will be taken from the value of this memory register. A total of 6 banks can be selected, not per camera but in <i>total</i>. The function originates from the RCP implementation. <p>CCU Settings include: Lift YRGB + Gamma YRGB + Gain YRGB + Contrast + Saturation + Hue + LumMix + Shutter + Iris + irisf + Gain</p>
<h3>PT Drive (Pan and Tilt)</h3> 	<p>Controls Pan and Tilt on robotics heads connected to the expansion cable on a Micro Studio Camera</p>
<h3>PT Preset</h3> 	<p>Save, Recall or Save/Recall Pan/Tilt Settings (zoom and focus not included)</p> <p><i>Binary inputs:</i> If Save mode, the given Pan/Tilt settings will be saved to the chosen bank. In Recall mode the Pan/Tilt settings will be recalled. In Recall/Save mode (the blank option) the two functions are combined. Press and hold will Save. One press will recall.</p> <p><i>Displays:</i> Will show Cam x: Set/Pre/Rec/Del</p> <p>Values:</p> <ul style="list-style-type: none"> Select Camera 1-10. If you choose Mem A-D, the camera value will be taken from the value of this memory register. A total of 6 banks can be selected, not per camera but in <i>total</i>. The function originates from the RCP implementation.
<h3>Reset</h3> 	<p>Reset color values on BMD Cameras</p> <p><i>Binary Input:</i> Resets the selected Color parameter (or all 3 for All) to default values.</p> <p><i>Pulse input:</i> Not implemented.</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<h3>Video Tally</h3> 	<p>Shows the "Video Tally" for Program, Preview or both. Uses the generic Video Tally information from the ATEM Switcher. So if a source is activated via a DSK or USK in a PIP or the like, that will be reflected in the Video Tally output as well</p>
<h3>Audio Tally</h3> 	<p>Have been implemented - description coming soon</p>

<h3>Picture-In-Picture (PIP)</h3> 	<p>Activates Picture-In-Picture (PIP) for selected keyer, source, position and transition style (on/off or Auto)</p> <p><i>Binary Input:</i> For Toggle press will result in PIP on/off. Direct set to On or Off is also possible. Via Auto the PIP fades in/out. For Hold Down PIP is only activated when button is held down. If "ATEM Mini Style" is selected the position of the 4 PIP locations matches the settings on the ATEM Mini and thereby also turn on/off the PIP buttons on that controller.</p> <p><i>Pulse input:</i> Not implemented.</p> <p><i>Binary Output:</i> Not implemented.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<h3>Digital Zoom</h3> 	<p>Have been implemented - description coming soon</p>
<h3>DVE Size</h3> 	<p>Have been implemented - description coming soon</p> <p>DVE Size on ATEM Mini cannot go above 1.00 (on other ATEM models it can go much higher)</p>
<h3>DVE Position</h3> 	<p>Have been implemented - description coming soon</p>
<h3>DVE Border</h3> 	<p>Have been implemented - description coming soon</p>
<h3>DVE Fill Source</h3> 	<p>Selects the DVE Fill Source</p> <p><i>Binary Input:</i> Paired with System: Force HWC Type: Pulsed will cycle through available fill sources for selected M/E and Keyer combination</p> <p><i>Pulse Input:</i> Will cycle through available fill sources for selected M/E and keyer combination.</p> <p><i>Binary Output:</i> On when triggered otherwise off.</p> <p><i>Button color:</i> Highlight when pushed, otherwise dimmed.</p>
<h3>DVE Adjust</h3> 	<p>Adjusts various parameters on the DVE</p> <p><i>Binary Input:</i></p> <p><i>Pulse Input:</i></p> <p><i>Speed Input:</i></p> <p><i>Binary Output:</i></p> <p><i>Button color:</i></p>

<div> <div>DVE PTZ</div> <div> <div>BMD ATEM: DVE PTZ</div> <div>M/E 1</div> <div>Keyer 1</div> <div> <div>✓ Pan</div> <div>Tilt</div> <div>Zoom</div> </div> </div> </div>	<div>Controls position and scaling of DVE</div> <div>Binary Input:</div> <div>Pulse Input:</div> <div>Speed Input:</div> <div>Binary Output:</div> <div>Button color:</div>
<div> <div>DVE Preset</div> <div> <div>BMD ATEM: DVE Preset</div> <div>M/E 1</div> <div>Keyer 1</div> <div>Recall/Set</div> </div> <div> <div>Preset: 1</div> <div> <div>✓ Transition Time (s): 0</div> <div>Transition Time (s): 1</div> <div>Transition Time (s): 2</div> <div>Transition Time (s): 3</div> <div>Transition Time (s): 4</div> <div>Transition Time (s): 5</div> <div>Transition Time (s): 6</div> <div>Transition Time (s): 7</div> <div>Transition Time (s): 8</div> </div> </div> </div>	<div>Save/Recall DVE Presets</div> <div>Binary Input:</div> <div>Pulse Input:</div> <div>Speed Input:</div> <div>Binary Output:</div> <div>Button color:</div>
<div> <div>Audio Peaks</div> <div> <div>BMD ATEM: Audio Peaks</div> <div>1</div> </div> </div>	<div>Save/Recall DVE Presets</div> <div>Binary Input:</div> <div>Pulse Input:</div> <div>Speed Input:</div> <div>Binary Output:</div> <div>Button color:</div>
<div> <div>Zoom</div> <div> <div>BMD ATEM: Zoom</div> <div>Cam 1</div> </div> </div>	<div>Controls Zoom on BMD Cameras via relative values (Zoom in/out). An absolute zoom parameter cannot be sent to the cameras (not supported by protocol)</div> <div>Binary Input: Not implemented</div> <div>Pulse input: Adjust focus in/out</div> <div>Speed input: Adjust zoom in/out</div> <div>Binary Output: Not implemented.</div> <div>Button color: Highlight when pushed, otherwise dimmed.</div>
<div> <div>SuperSource Fill</div> <div> <div>BMD ATEM: SuperSource Fill</div> <div>Box 1</div> <div>5</div> <div> <div>✓</div> <div>Hold Down</div> <div>Toggle</div> <div>Cycle</div> </div> </div> </div>	
<div> <div>SuperSource Adjust</div> <div> <div>BMD ATEM: SuperSource Adjust</div> <div>Box 1</div> <div> <div>✓ Pos X</div> <div>Pos Y</div> <div>Size</div> <div>Crop Left</div> <div>Crop Top</div> <div>Crop Right</div> <div>Crop Bottom</div> </div> </div> </div>	

<h3>Hold Group Defaults</h3> 	<p>Configuration of a fixed Hold Group default source - the source that a Hold Group queue will fall back to.</p> <p>If you are using Hold Groups with very quick triggers you may experience that the original source was not correctly picked up due to the timing gap between a command is sent and to the ATEM reports back the new value. With this configuration value you are guaranteed that the fall back will always be a particular source.</p> <p>This action does not depend on any trigger from the HWC, it will always be evaluated if inside the proper state and shift levels. Has a transparent return value.</p>
<h3>AUX Follow Mode</h3> 	<p>Forces an AUX channel to follow the Program output of an M/E (bus linking).</p> <p>The Mapping function allows you to exclude certain sets of sources. "Map A,B,C to D" means the sources entered in the following 3 drop downs (1,2, and 3 in the screenshot) will map to the forth source (10 in the screenshot). "Map A to B, C to D" means that the first source maps to the second and the third to the forth (in the example screenshot this would be 1 -> 2 and 3 -> 10).</p> <p>This action does not depend on any trigger from the HWC, it will always be evaluated if inside the proper state and shift levels. The way you could enable / disable this function is by placing it in a given shift level or state. Has a transparent return value.</p>
<h3>Camera Select</h3> 	
<h3>Memory Group Auto Router</h3> 	<p>Will monitor the selected memory group for its values (first or last) and if it changes it will set this value as the input for the selected aux output. If the value in the memory group is 0 (the group is empty) it will set the selected input source as input on the aux output.</p> <p>The Memory Group Auto Router will run either always or when a particular selected system flag is set.</p> <p>This action does not depend on any trigger from the HWC, it will always be evaluated if inside the proper state and shift levels. Has a transparent return value. This action is well suited to be placed in the Controller virtual HWC.</p>
<h3>Coarse Scale</h3> 	<p>Will change the steps for coarse adjustments. The parameter cannot be adjusted via binary/pulse/analog inputs. The action just need to added somewhere on the controller and it will take effect.</p>
<h3>Video Mode</h3> 	

Push Data

BMD ATEM: Push data

Cam 1

✓ On trigger

5 sec

10 sec

30 sec

60 sec

+

Extract of ATEM-TCP Link commands

```

AtemConnected,
InputLongName,
InputShortName,
InputAvailability,
InputMEAvailability,
MultiViewerInputVideoSource,
ProgramInputVideoSource,
PreviewInputVideoSource,
TransitionStyle,
TransitionNextTransition,
TransitionStyleNext,
TransitionNextTransitionNext,
TransitionInTransition,
TransitionFramesRemaining,
TransitionPosition,
TransitionMixRate,
TransitionDipRate,
TransitionDipInput,
TransitionWipeRate,
TransitionWipePattern,
TransitionWipeWidth,
TransitionWipeFillSource,
TransitionWipeSymmetry,
TransitionWipeSoftness,
TransitionWipePositionX,
TransitionWipePositionY,
TransitionWipeReverse,
TransitionWipeFlipFlop,
TransitionDVERate,
TransitionDVESyle,
TransitionDVEFillSource,
TransitionDVEKeySource,
TransitionDVEEnableKey,
TransitionDVEPreMultiplied,
TransitionDVEClip,
TransitionDVEGain,
TransitionDVEInvertKey,
TransitionDVEReverse,
TransitionDVEFlipFlop,
KeyerOnAirEnabled,
KeyerType,
KeyerFlyEnabled,
KeyerFillSource,
KeyerKeySource,
KeyerMasked,
KeyerTop,
KeyerBottom,
KeyerLeft,
KeyerRight,
KeyDVESizeX,
KeyDVESizeY,
KeyDVEPositionX,
KeyDVEPositionY,
KeyDVERotation,
KeyDVEBorderEnabled,
KeyDVEShadow,
KeyDVEBorderBevel,
KeyDVEBorderOuterWidth,
KeyDVEBorderInnerWidth,
KeyDVEBorderOuterSoftness,
KeyDVEBorderInnerSoftness,
KeyDVEBorderBevelSoftness,
KeyDVEBorderBevelPosition,
KeyDVEBorderOpacity,
KeyDVEBorderHue,
KeyDVEBorderSaturation,
KeyDVEBorderLuma,
KeyDVELightSourceDirection,
KeyDVELightSourceAltitude,

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KeyDVEMasked,
 KeyDVETop,
 KeyDVEBottom,
 KeyDVELeft,
 KeyDVERight,
 KeyDVERate,
 DownstreamKeyerFillSource,
 DownstreamKeyerKeySource,
 DownstreamKeyerTie,
 DownstreamKeyerRate,
 DownstreamKeyerPreMultiplied,
 DownstreamKeyerClip,
 DownstreamKeyerGain,
 DownstreamKeyerInvertKey,
 DownstreamKeyerMasked,
 DownstreamKeyerTop,
 DownstreamKeyerBottom,
 DownstreamKeyerLeft,
 DownstreamKeyerRight,
 DownstreamKeyerOnAir,
 DownstreamKeyerInTransition,
 DownstreamKeyerIsAutoTransitioning,
 DownstreamKeyerFramesRemaining,
 FadeToBlackRate,
 FadeToBlackStateFullyBlack,
 FadeToBlackStateInTransition,
 FadeToBlackStateFramesRemaining,
 AuxSourceInput,
 CameraControlIris,
 CameraControlIrisf,
 CameraControlFocus,
 CameraControlGain,
 CameraControlWhiteBalance,
 CameraControlSharpeningLevel,
 CameraControlZoomNormalized,
 CameraControlZoomSpeed,
 CameraControlColorbars,
 CameraControlLiftR,
 CameraControlGammaR,
 CameraControlGainR,
 CameraControlLumMix,
 CameraControlHue,
 CameraControlShutter,
 CameraControlLiftG,
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 CameraControlSaturation,
 CameraControlLiftB,
 CameraControlGammaB,
 CameraControlGainB,
 CameraControlLiftY,
 CameraControlGammaY,
 CameraControlGainY,
 MediaPlayerSourceType,
 MediaPlayerSourceStillIndex,
 MediaPlayerSourceClipIndex,
 MediaPlayerStillFilesIsUsed,
 MediaPlayerStillFilesFileName,
 MacroRunStatusState,
 MacroRunStatusIsLooping,
 MacroRunStatusIndex,
 MacroPropertiesIsUsed,
 MacroPropertiesName,
 SuperSourceFillSource,
 SuperSourceKeySource,
 SuperSourceForeground,
 SuperSourcePreMultiplied,
 SuperSourceClip,
 SuperSourceGain,
 SuperSourceInvertKey,
 SuperSourceBorderEnabled,
 SuperSourceBorderBevel,

SuperSourceBorderOuterWidth,
 SuperSourceBorderInnerWidth,
 SuperSourceBorderOuterSoftness,
 SuperSourceBorderInnerSoftness,
 SuperSourceBorderBevelSoftness,
 SuperSourceBorderBevelPosition,
 SuperSourceBorderHue,
 SuperSourceBorderSaturation,
 SuperSourceBorderLuma,
 SuperSourceLightSourceDirection,
 SuperSourceLightSourceAltitude,
 SuperSourceBoxParametersEnabled,
 SuperSourceBoxParametersInputSource,
 SuperSourceBoxParametersPositionX,
 SuperSourceBoxParametersPositionY,
 SuperSourceBoxParametersSize,
 SuperSourceBoxParametersCropped,
 SuperSourceBoxParametersCropTop,
 SuperSourceBoxParametersCropBottom,
 SuperSourceBoxParametersCropLeft,
 SuperSourceBoxParametersCropRight,
 AudioMixerInputMixOption,
 AudioMixerInputVolume,
 AudioMixerInputBalance,
 AudioMixerMasterVolume,
 AudioMixerMonitorMonitorAudio,
 AudioMixerMonitorVolume,
 AudioMixerMonitorMute,
 AudioMixerMonitorSolo,
 AudioMixerMonitorSoloInput,
 AudioMixerMonitorDim,
 AudioMixerLevelsSources,
 AudioMixerLevelsMasterLeft,
 AudioMixerLevelsMasterRight,
 AudioMixerLevelsMasterPeakLeft,
 AudioMixerLevelsMasterPeakRight,
 AudioMixerLevelsMonitor,
 AudioMixerLevelsSourceOrder,
 AudioMixerLevelsSourceLeft,
 AudioMixerLevelsSourceRight,
 AudioMixerLevelsSourcePeakLeft,
 AudioMixerLevelsSourcePeakRight,
 AudioMixerTallySources,
 AudioMixerTallyAudioSource,
 AudioMixerTallyIsMixedIn,
 TallyBySourceSources,
 TallyBySourceVideoSource,
 TallyBySourceTallyFlags,
 performCutME,
 performAutoME,
 performDownstreamKeyerAutoKeyer,
 performFadeToBlackME,
 CameraControlAutoFocus,
 CameraControlAutoIris,
 CameraControlResetAll,
 MacroAction,
 MacroRunChangePropertiesLooping,
 AudioLevelsEnable,