Installation and Operation Manual
Blackmagic Studio Cameras

Blackmagicdesign

Mac OS X™
Windows™
September 2015

Welcome

Thank you for purchasing a Blackmagic Studio Camera!

We are extremely excited to have designed the Blackmagic Studio Camera and Micro Studio Camera 4K. Ever since I was a teenager I have loved live production, it's so exciting!

Traditionally cameras with talkback and tally were very expensive and physically large, so hard to manage. We really wanted to solve this problem by designing a more compact camera that included all the talkback, tally and camera control features of physically much larger cameras.

That's why the Blackmagic Studio Camera was developed. We wanted to build a much smaller camera for portability, however normally small cameras have small tiny screens. We did not want that. What we really wanted was a much larger viewfinder! The result is Blackmagic Studio Camera, a small broadcast camera with a very large viewfinder that's wonderful to use! Precise focus and framing are so easy with a viewfinder this large!

Of course you get tally indicators, talkback, massive built in battery and of course a fantastic quality camera with flexible MFT lens mount. It's everything you need in a complete package! You can plug in larger wind protected microphones even with phantom power and with user installable optical fiber, you can add an SFP module when you need to run your camera miles away from your switcher! If you need, you can even add a HyperDeck Shuttle and use the camera for general production use!

Blackmagic Micro Studio Camera 4K takes the small size and capability of Blackmagic Studio Camera even further! This tiny camera pairs an amazing Ultra HD sensor with an incredibly tiny chassis and a host of remote control options. Now you can capture broadcast production footage from previously impossible locations, all with complete control from an ATEM switcher or via custom remote.
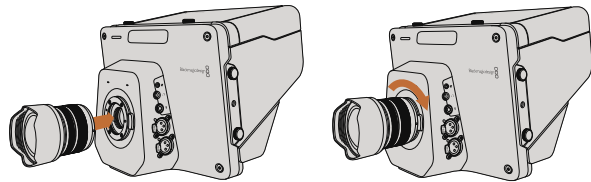
We hope you use your new camera for some amazing live productions and produce some fantastic looking work! We are extremely excited to see what creative work you produce!
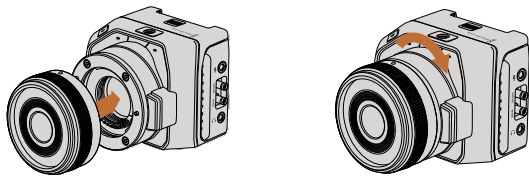
Grant Petty

Grant Petty
CEO Blackmagic Design
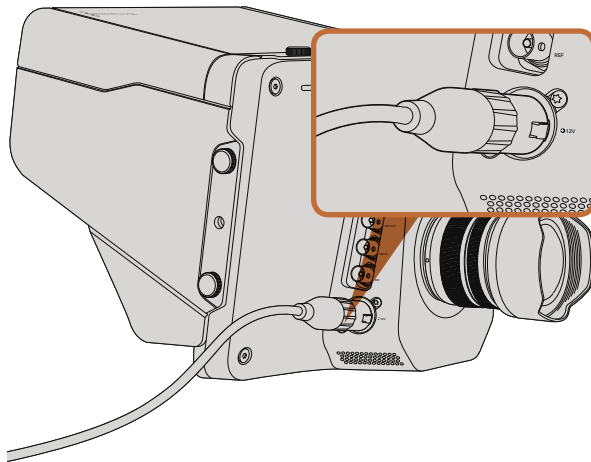
Contents

Blackmagic Studio Camera

Getting Started

Attaching and removing a lens on Studio Camera.

Attaching and removing a lens on Micro Studio Camera 4K.

Use the supplied power adapter to charge the internal battery and power the Studio Camera.

Attaching a Lens

Getting started with your Blackmagic Studio Camera or Blackmagic Micro Studio Camera 4K is as simple as attaching a lens and turning the camera on. To remove the protective dust cap from the lens mount, hold down the locking button and rotate the cap counterclockwise until it is released. We recommend you always turning off your Blackmagic camera prior to attaching or removing a lens.

To attach a lens:

Step 1.   Align the dot on your lens with the dot on the camera mount. Many lenses have either a blue, red or white dot or some other indicator.

Step 2.   Twist the lens clockwise until it locks into place.

Step 3.   To remove the lens, hold down the locking button, rotate the lens counterclockwise until its dot or indicator reaches the 12 o'clock position and gently remove.

When no lens is attached to the camera, the lens mount is exposed to dust and other debris so you'll want to keep the dust cap on whenever possible.

Turning Your Camera On

The Studio Camera has an internal battery that can be charged using the supplied power adapter. The camera can be charged and operated while connected via external power and will switch between power sources without any interruption.

Step 1.   Press the power button below the LCD. The live camera image will appear on the LCD.

Step 2.   Press and hold the power button to switch off the camera.

Micro Studio Camera 4K accepts LP-E6 and LP-E6N batteries, which can be charged with an external battery charger or slowly trickle charged by the camera. The camera can also be charged and operated via external power and will switch between power sources automatically if external power is interrupted. External power is provided via the Micro Studio Camera 4K's expansion port.

Step 1.   Press the power button on the right hand side of the camera. The tally light will glow white to indicate the camera is on.

Step 2.   Press and hold the power button to switch off your camera.

That's all there is to getting started. You can now connect your camera to a switcher, or ATEM Converter, and start creating your live production!
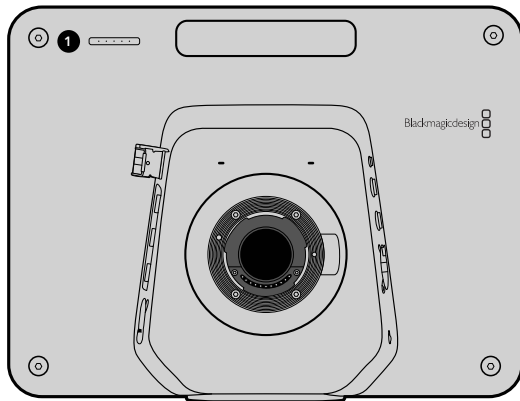
Blackmagic Studio Camera Features

Front Panel

1. Front Tally Light

Indicates to the on-air talent which camera is currently "live". See the 'monitoring settings' section in this manual for more details.

Left Panel

2. LANC Remote

2.5mm stereo jack for LANC remote control supports iris, zoom and focus control.

3. Aviation Headphones

0.25" TRS connector for monitoring PGM and control room audio with aviation style headsets.

4. Headphones Microphone Input

0.206" TRS connector for talking to the control room with aviation style headsets.

5. Audio Inputs

2 x 1/4" balanced XLR connectors for audio input.

6. Optical Input/Output

Optical input and output allows cable runs of up to 28 miles.

Refer to the 'Blackmagic Studio Camera - left panel' section in this manual for more details.

Right Panel

7. SDI Out

SDI output for connecting to a switcher or other device.

8. SDI In

SDI input allows the camera operator to view the Program (PGM) output.
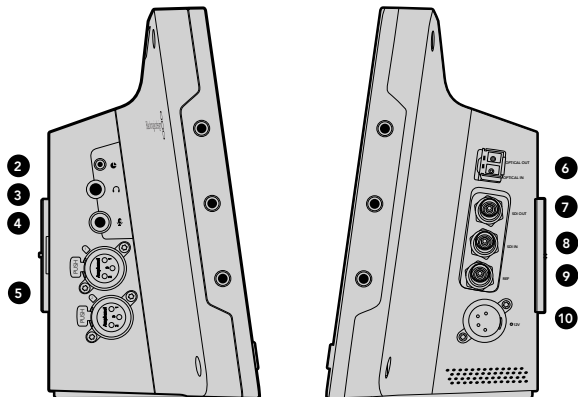
9. Reference Input

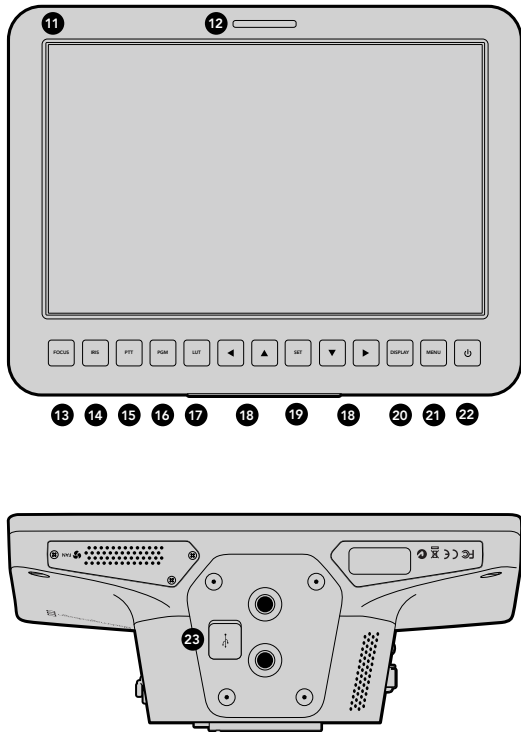Allows multiple cameras to be genlocked to a blackburst or tri-level reference signal.

10. Power

12 – 24V power input for power supply and battery charging.

Refer to the 'Blackmagic Studio Camera - right panel' section in this manual for more details.

Rear Panel

11. 10" LCD

Monitor live camera output or program output, or view the menu. See the 'monitoring section' in this manual for more details.

12. Rear Tally Light

When lit, it indicates to the camera operator that their camera is currently live.

13. Focus Button

Press once to auto focus or twice to display focus peaking on the LCD.

14. Iris Button

Press once for auto exposure.

15. Push To Talk Button (PTT)

Press and HOLD to talk. Press twice in quick succession for hands free communication. Press again to revert to the default behavior.

16. Program (PGM) Button

Press to toggle between live camera output and program output from a switcher control room.

17. Look Up Table (LUT) Button

Currently not implemented.

18. Menu Navigation Buttons

Navigate the menu on the LCD.

19. Set Button

Use this button to confirm your menu selections.

20. Display Button

Press this button to toggle overlays on and off.

21. Menu Button

Access the menu on the LCD.

22. Power Button

Press the power button to turn on the Blackmagic Studio Camera. Press and hold the button to turn the camera off.
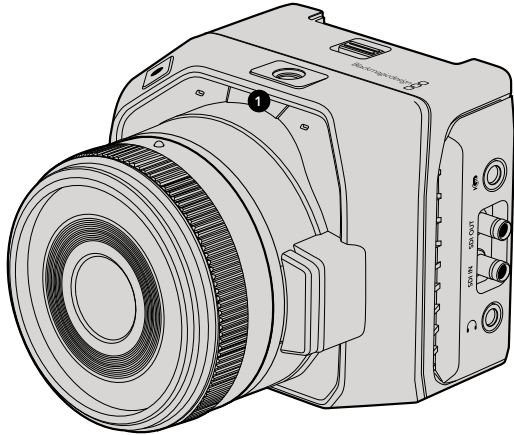
Refer to the 'button settings' section in this manual for more details.

Bottom Panel

23. USB Connector

USB Mini-B port for camera firmware updates. See 'Blackmagic Camera Setup Utility' section in this manual.

Blackmagic Micro Studio Camera 4K Features

Front Panel

1. Tally Light

The Tally light indicates to on-air talent which camera is currently 'live,' as well as alerting the operator to the status of the camera. The following scenarios are possible:

- White - Powered
- Red - Live
- Alternating red and orange - Battery low when live
- Alternating white and orange - Battery low

You can adjust the brightness of the tally light in Micro Studio Camera 4K's settings. See the 'camera settings' section for more information.

Left Panel

2. HDMI Out

The HDMI output lets you preview your video output and navigate the camera menus using external monitors such as Blackmagic Video Assist. Output resolution is always 1080HD, regardless of the recording resolution, and you can choose to display overlays such as frame guides, a histogram, and audio levels. See the 'monitoring settings' section in this manual for more detail.

3. Expansion Port

DB-HD15 connector. Used for external power input and a range of remote control options as well as reference input. See the section 'Blackmagic Micro Studio Camera 4K expansion port' for details.

4. Menu Button

Use the menu buttons to access the camera's built in menu which can be displayed on an attached HDMI display.

5. Up Button

Use the button to navigate menus.

6. Down Button

Use this button to navigate menus.

7. Set Button

Use this button to confirm your menu selections.

8. Power Button

Press the power button to turn on the Blackmagic Micro Studio Camera 4K. Press and hold the button to turn the camera off.
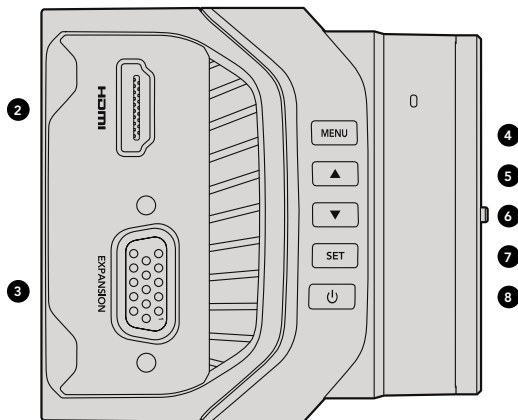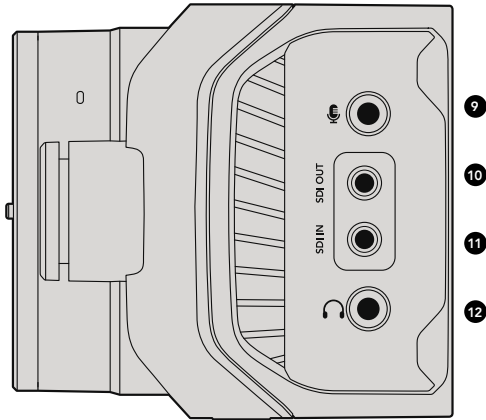
Right Panel

9. Analog Audio In
3.5mm stereo audio input, switchable between microphone and line-level input in menu.

10. SDI Out
SDI output for connecting to a switcher, external recorder or other device.

11. SDI In
SDI input allows camera control via ATEM switchers.

12. Headphone / Talkback
3.5mm jack for talkback with iPhone and Android style headsets. Double press the play/pause button on your headset to toggle talkback on and press it once again to turn talkback off.
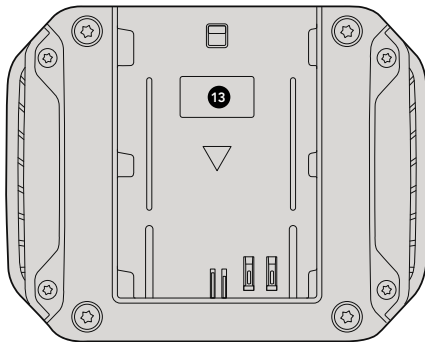
Rear Panel

13. Battery Slot
Blackmagic Micro Studio Camera 4K comes with one LP-E6 battery which fits into this slot. The battery will be trickle charged while the camera is connected to power via its expansion port.

Top Panel

14. Battery Release
Slide forward to release the battery.

Bottom Panel

15. USB Connector
USB port for camera firmware updates. See the 'Blackmagic Camera Setup' section in this manual.
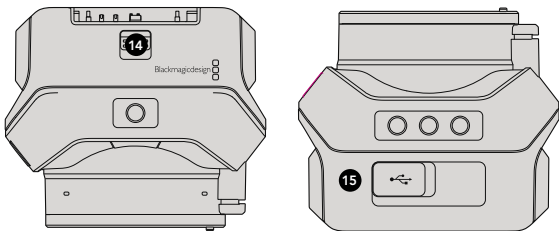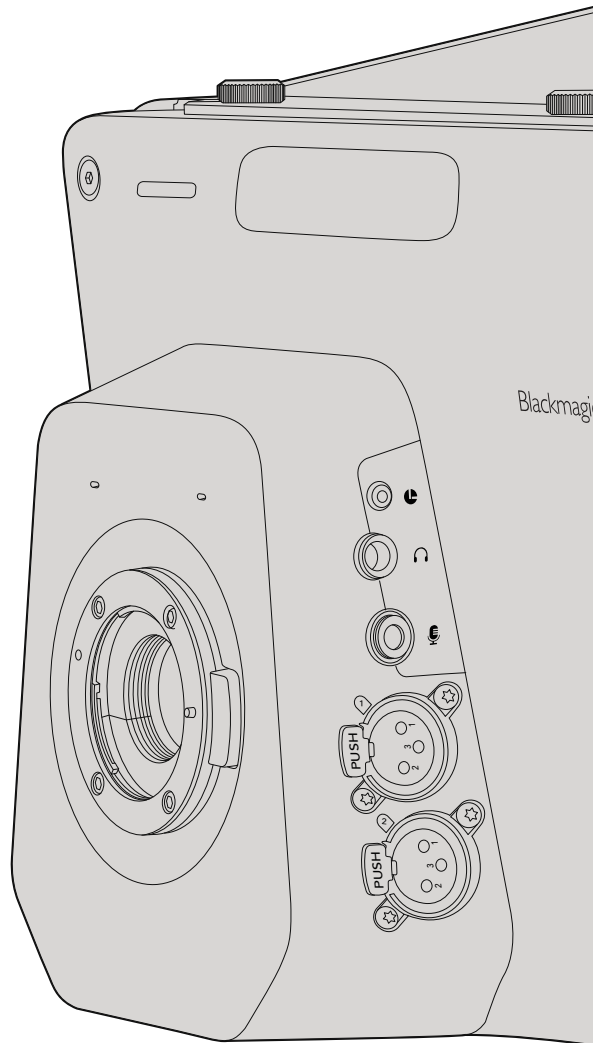
Blackmagic Studio Camera - Left Side

LANC Remote Control

The remote port on your camera is used to remotely control lens focus, iris and zoom adjustments when using a compatible lens. The port takes a 2.5 mm stereo jack using the standard LANC protocol.

Active MFT lenses allow you to control the zoom servo with a LANC controller. The following lenses are currently supported:

- Panasonic Lumix G X Vario PZ 14-42mm f/3.5-5.6 Power O.I.S. Lens
- Panasonic Lumix G X Vario PZ 45-175mm f/4.0-5.6 Zoom O.I.S. Lens
- Olympus M.Zuiko Digital ED 12-50mm f/3.5-6.3 EZ Micro 4/3 Lens
- Olympus M.Zuiko Digital ED 14-42mm f/3.5-5.6 EZ Micro 4/3 Lens

Headphones Output

For monitoring program and control room audio with aviation style headsets with "fixed wing" connectors. Aviation headsets range from single ear models for use in studio environments to full size noise cancelling models which are suitable for loud concerts or sporting events. Audio is taken from channel 15 and 16 of the incoming SDI signal. Channels 15 and 16 are rarely if ever used during production and so are very suitable to serve for the audio talkback.

Headphones Microphone Input

For talking to the control room with aviation style headsets. Audio is embedded into channel 15 and 16 of the SDI signal output.

Audio Inputs

Two channels of professional balanced analog audio is supported via XLR connectors. Use the audio menu to set the input levels for each channel. The inputs support both mic level inputs and line level inputs and the input type is also selected from the audio menu. Audio is embedded into channel 1 and 2 of the SDI stream.
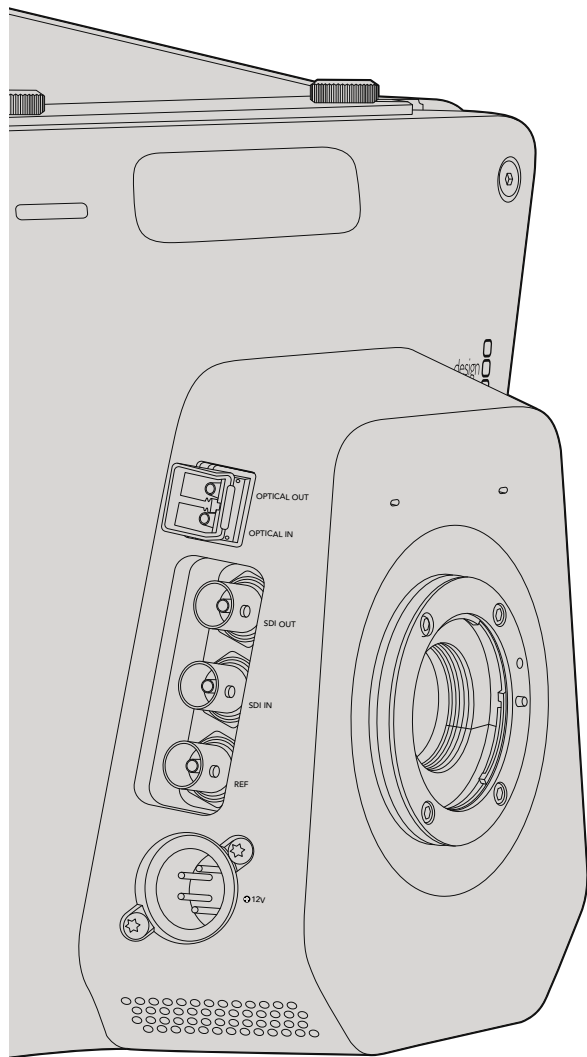
Blackmagic Studio Camera - Right Side

Optical Input/Output

For optical fiber input and output, you will need to install an optional optical fiber SFP module. This lets you connect industry standard LC connectors, supporting 3G-SDI on Studio Camera HD, and 6G-SDI on Studio Camera 4K. Optical fiber cable is widely available because it's the same cable used in computer networking. Optical fiber allows cable runs of up to 28 miles which is more than enough for even the most demanding outside broadcast event. If both optical and SDI inputs are connected, the output from the device which was connected first will be used. To purchase an optical fiber SFP module for your Blackmagic Studio Camera, contact your nearest Blackmagic Design reseller. You can find your nearest reseller on our website at www.blackmagicdesign.com/resellers.

SDI Out

Use the SDI Out connector to output 10-bit 4:2:2 video to professional SDI video equipment such as routers, monitors, SDI capture devices and broadcast switchers. Blackmagic Studio Camera HD supports 3G-SDI, and Studio Camera 4K supports 12G-SDI.

SDI In

The SDI input allows the camera operator to view the Program (PGM) output. Simply press the PGM button to toggle between live camera output and Program output from a switcher control room. If both optical and SDI inputs are connected, the output from the device which was connected first will be used. If you're using the Studio Camera to record to a device such as the Blackmagic Hyperdeck Shuttle, the output from the Hyperdeck can be connected to the SDI input so you can playback what you have just recorded.

Reference Input

This allows multiple cameras to be genlocked to a blackburst or tri-level reference signal. Genlocking cameras to an external reference signal helps to prevent timing errors which may result in the picture jumping when switching between different cameras.

Power

Use the 12 – 24V power input for connecting your power supply and to charge the internal battery. When the battery is fully charged it will power the camera for up to 4 hours on Studio Camera HD, and up to 3 hours on Studio Camera 4K .
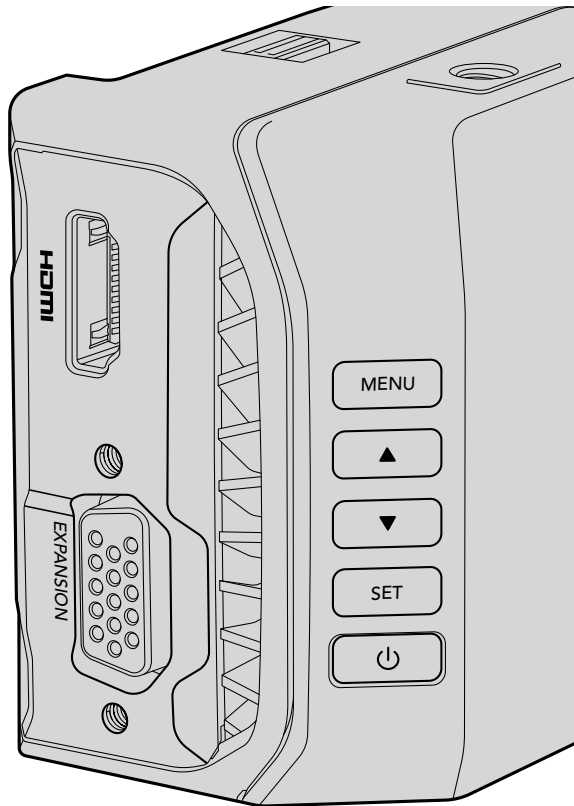
Blackmagic Micro Studio Camera 4K - Left Side

HDMI Output

The HDMI port on your Blackmagic Micro Studio Camera 4K outputs 10-bit 4:2:2 1080p video with 2 channels of audio for monitoring purposes. You can connect any HD capable HDMI monitor, such as Blackmagic Video Assist, to frame and focus shots as well as navigating the Micro Studio Camera 4K's menus.

The frame rate of the HDMI output will match the format of the camera. For example, if the camera is set to 2160p30, the HDMI output will be in 1080p30.

Expansion Port

Blackmagic Micro Studio Camera 4K's small size makes it easy to capture unique shots from close to the action or difficult to reach spots. While your Micro Studio Camera 4K can be easily tucked away out of sight, the same can't always be said of a camera operator. So being able to remotely control your camera is important to making full use of its tiny size.

You can adjust some settings on Micro Studio Camera 4K via SDI input with an ATEM Switcher, as detailed in the section 'Introducing Camera Control' in this manual. However, the majority of control options are provided by the expansion port.

Blackmagic Micro Studio Camera 4K's DB-HD15 connector provides a wide range of connections, including power, LANC remote, pan, tilt, zoom and genlock via the expansion cable included. We encourage you to use a wide range of easily available cables to access specific features, or to solder your own custom connections and adapt the Micro Studio Camera 4K to your needs. See the 'Blackmagic Micro Studio Camera 4K Expansion Port' section in this manual for more information.
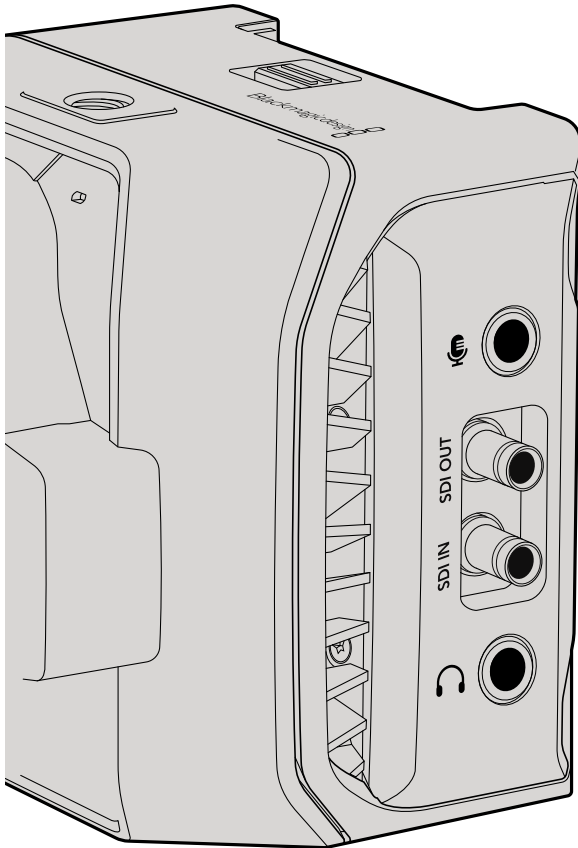
Blackmagic Micro Studio Camera 4K - Right Side

Analog Audio In

The 3.5mm stereo audio connector accepts microphone or line level audio. You can switch between these options in the camera's 'audio settings' menu. It's important to select the appropriate setting or your audio may sound too quiet or too loud.

SDI Out

Use the SDI out connector to output 10-bit 4:2:2 video to professional SDI video equipment such as routers, monitors, SDI capture devices and broadcast switchers. Blackmagic Micro Studio Camera 4K supports 6G-SDI. You will need a DIN 1.0/2.3 to SDI adapter cable to connect to devices with full size SDI connectors.

SDI In

Use the SDI in connector to control your Micro Studio Camera 4K via ATEM switchers. Refer to the section 'Introducing Camera Control' for information about which controls are available.

Headphone / Talkback audio

The 3.5mm headphone / talkback input lets you talk to the control room with iPhone or Android style headsets. Double press the play/pause button on your headset to enable talkback, and press once to disable. Audio is embedded into channel 15 and 16 of the SDI signal output.
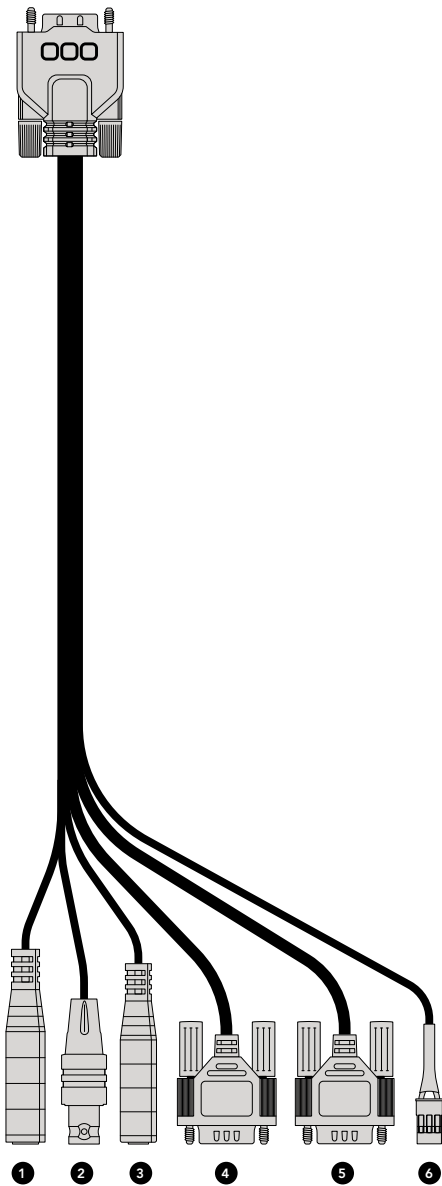
Blackmagic Micro Studio Camera 4K expansion cable.

Blackmagic Micro Studio Camera 4K Expansion Cable

There are two ways to access the expansion port's functions. You can use the expansion cable that comes with your Micro Studio Camera 4K, or solder your own custom connectors.

The expansion cable provides connectors for the following control options.

1. Power Input

The 12V power input connects via a DC jack and provides power to the Micro Studio Camera 4K, as well as trickle charging any batteries attached. When mains power is supplied, the camera will automatically turn on.

2. Reference Input

This allows multiple cameras to be genlocked to a blackburst or tri-level reference signal. Genlocking cameras to an external reference signal helps to prevent timing errors which may result in the picture jumping when switching between different cameras.

3. LANC

Connect wired LANC remote controllers to the 2.5mm jack for controlling functions like recording start and stop, iris adjustment, and manual focus from a tripod arm when using compatible lenses.

4. Pan Tilt Zoom

The RSS-422 connector is used to relay pan tilt zoom commands received by Micro Studio Camera 4K from its SDI input to a motorized head.

5. B4 Communication

The DB-9 connector allows you to power and control B4 broadcast lenses attached to the Micro Studio Camera 4K via an MFT to B4 adapter. A B4 lens with digital serial communication can be controlled, and power is supplied when the Micro Studio Camera 4K is connected to external power. You can adjust settings such as iris, focus and zoom in the same way you would an active MFT lens - either via an ATEM switcher using the 'camera control' menu,

6. S.Bus Digital Servo

By connecting to a compatible S.Bus receiver using the Futaba J cable, you have 18 S.Bus remote channels where features of the camera can be assigned to and remotely controlled. These features can include focus, servo zoom, iris control and other such features. For more information about mapping functions to S.Bus remote channels, see the 'menu settings' section of this manual.

Wiring diagram for the Blackmagic Micro Studio Camera Expansion Cable

When using Blackmagic Micro Studio Camera 4K's expansion port you may only want to access one or two functions. For example, you may want to control an attached B4 Broadcast Lens while simultaneously receiving 12V power and a reference signal. It's easy to make a connector that will give you just these functions without the clutter of additional, unused connectors.

Use the following diagram when wiring the expansion cable included or use it as an example for how you can wire up the connections on your own custom cable correctly. The full range of available pins are listed under group P1, while the subsets used for particular functions, as well as their layout within the appropriate connectors, are shown in groups P2 through P7.

P1

1	Ground	**6**	Power +12V in
2	S. Bus	**7**	Ground
3	PTZ RS422 Tx-	**8**	PTZ RS422 Tx+
4	Ground	**9**	LANC Data
5	Reference Input	**10**	LANC Power

11	Ground
12	PTZ RS422 Rx-
13	PTZ RS422 Rx+
14	B4 Lens Control Transmit
15	B4 Lens Control Receive

PIN ASSIGNMENT

2	S. Bus	1
		2
GROUND		3

GROUND		1
12	PTZ RS422 Rx-	2
8	PTZ RS422 Tx+	3
GROUND		4
		5
GROUND		6
13	PTZ RS422 Rx+	7
3	PTZ RS422 Tx-	8
GROUND		9

GROUND		1
14	B4 Lens Control Transmit	2
15	B4 Lens Control Receive	3
GROUND		4
6	Power +12V in*	5

OTHER

5	Reference Input	CENTER
GROUND		SLEEVE

9	LANC Data	TIP
10	LANC Power	RING
GROUND		SLEEVE

6	Power +12V in	PIN
GROUND		SLEEVE

Camera settings - Blackmagic Studio Camera.

Camera Settings

To configure settings on your Blackmagic Studio Camera or Blackmagic Micro Studio Camera 4K, press the 'menu' button. Use the menu navigation buttons to highlight menus and press the 'set' button to confirm your selection.

If you are using the Micro Studio Camera 4K, you will need to connect an external monitor via the camera's HDMI port to view menu settings.

Video Format

Select your desired video format using the navigation buttons. For example, to select between 1080p and 1080i formats, press the left or right arrow buttons to progress through the format options. Press the 'set' button to confirm the format you want.

Turn the page to see a list of supported video formats.

Gain

Gain settings are helpful when you are shooting in low light conditions. The default setting is 0dB and gain can be increased in 6dB increments up to 18dB.

Detail

Use this setting to sharpen your image live from your Studio Camera. Decrease or increase the level of sharpening by selecting 'off' or 'default' for low sharpening, 'medium' and 'high'.

Auto Exposure

Blackmagic Micro Studio Camera 4K gives you several auto exposure options.

Iris

Maintains a constant shutter speed while changing the aperture to achieve a constant exposure.

Shutter

Maintains a constant aperture while changing the shutter speed to achieve a constant exposure.

Iris + Shutter

Mantains the correct exposure levels by adjusting the aperture. If the maximum or minimum available aperture is reached and exposure still cannot be maintained, Micro Studio Camera 4K will begin adjusting the shutter speed to keep exposure constant.

Camera settings - Blackmagic Micro Studio Camera 4K.

Shutter + Iris

Maintains the correct exposure levels by adjusting the shutter speed. If the maximum or minimum available shutter speed is reached and exposure still cannot be maintained, Micro Studio Camera 4K will begin adjusting the aperture to keep exposure constant.

Manual Trigger

Iris aperture and shutter speed are set manually and exposure may vary with changing light conditions.

White Balance

Eighteen white balance presets are selectable for a variety of color temperature conditions.

- 2500, 2800, 3000, 3200, 3400, 3600, 4000, 4500 and 4800K for various conditions under tungsten, incandescent or fluorescent light, or under dull natural light including candle light, sunrise/sunset, morning, and after noon light.
- 5000, 5200, 5400 and 5600K for outdoors on a clear, sunny day.
- 6000, 6500, 7000, 7500 and 8000K for a variety of daylight conditions.

Shutter Speed

Shutter speed complements the gain setting by regulating the amount of light on the sensor. There are 15 different shutter speeds available ranging from 1/50 sec to 1/2000 sec.
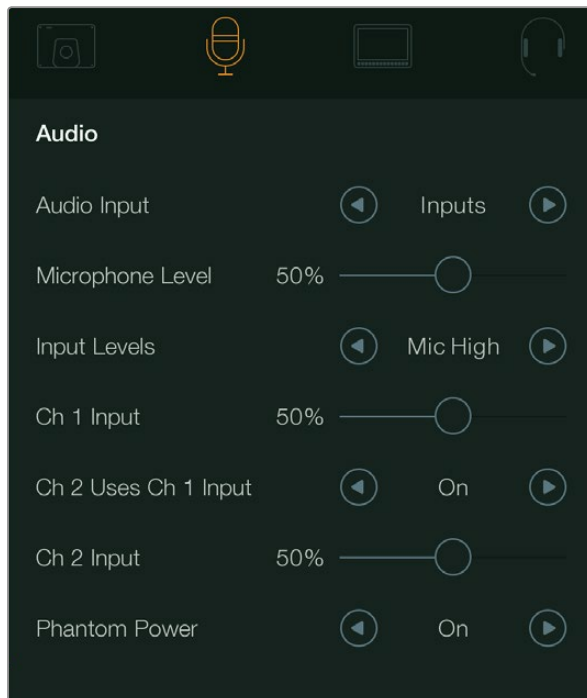
Blackmagic Studio Cameras Supported Video Formats

All Studio Cameras	Micro Studio Camera 4K Additional Formats	Studio Camera 4K Additional Formats
720p50	2160p23.98	2160p23.98
720p59.94	2160p24	2160p24
720p60	2160p25	2160p25
1080i50	2160p29.97	2160p29.97
1080i59.94	2160p30	2160p30
1080i60		2160p50
1080p23.98		2160p59.94
1080p24		2160p60
1080p25		
1080p29.97		
1080p30		
1080p50		
1080p59.94		
1080p60		

Audio settings - Blackmagic Studio Camera.

Audio Settings

To adjust audio input and audio monitoring settings on your Blackmagic Studio Camera, press the 'menu' button and select the microphone icon to the left of the display. Use the menu navigation buttons to highlight menus and use the 'set' button to confirm your selection.

Automatic Gain Control

Blackmagic Micro Studio Camera 4K features an automatic audio gain control setting that lets camera adjust the audio recording levels. It automatically reduces the audio gain levels if the input level gets too loud and subtly raises it if it is too low.

Audio Input

Switches audio between using the camera's internal microphone and the XLR audio connectors.

Microphone Level

Microphone input adjusts the recording levels of the built in microphone. Move the audio slider left or right to increase or decrease levels. Studio Camera has a built in stereo microphone. The built in microphone records to audio channels 1 and 2 when no external audio source is connected.

Input Level

External audio connectors support audio at microphone level or line level. Select Line when connecting external audio equipment such as an audio mixer or amplifier. Select the mic low or mic high setting depending on the signal strength of your microphone. It's important to select the appropriate level to avoid your external audio sounding almost inaudible or too hot and distorted. Set the external audio input levels by using the left and right arrows.

Ch 1 Input

Move the audio slider icon left or right to increase or decrease levels for channel 1. The external audio input overrides the built in microphone and is output to audio channel 1.

Ch 2 Uses Ch 1 Input

Select 'on' if you want to embed channel 1 external audio into channels 1 and 2 of the SDI or the optional optical fiber output. This is the same as connecting input 1 to both audio channels in the camera and is useful when using microphones with a single mini audio output and you need to connect both stereo audio channels to it. Select this setting to off if you want channel 1 audio to remain on one channel only and channel 2 will take audio from the channel 2 audio input, which is preferred when using stereo audio sources.

Ch 2 Input

Move the audio slider icon left or right to increase or decrease levels for channel 2. The external audio input overrides the built in microphone and is output to audio channel 2.

Phantom Power

Phantom power supplies power through microphone cables and is a convenient power source for condenser microphones. Enable or disable phantom power for studio cameras with XLR inputs by navigating to the 'audio' menu and selecting on or off using the arrow buttons. Phantom power is automatically disabled when the 'line input level' setting is selected. Be sure to wait at least 10 seconds for phantom power to discharge after disconnecting before plugging in a self powered microphone. Older ribbon type microphones are not suitable for phantom power usage.

Monitoring settings - Blackmagic Micro Studio Camera 4K.

Monitoring Settings

To adjust the display settings for the LCD, press the 'menu' button and select the monitor icon. Use the menu navigation buttons to highlight menus and use the 'set' button to confirm your selection.

HDMI Meters

Blackmagic Micro Studio Camera 4K gives you the option to select which meters you want to display on the HDMI output.

Histogram

The histogram shows the contrast between whites and blacks along a horizontal scale. The left edge of the histogram displays shadows, or blacks, and the far right displays highlights, or whites. When you close or open the lens aperture, you'll notice the information in the histogram moves to the left or right accordingly.

This setting toggles the histogram on and off. When on, this will appear in the bottom right corner of an attached monitor when 'HDMI overlays' are set to on.

Audio

The audio meter represents the current volume of left and right audio channels in two horizontal bars. Left is on top, right is on the bottom. If your audio levels rise too high, your audio peaks can be clipped and you will hear distortion in your audio. To avoid this, adjust the audio gain on your camera until your audio levels stay within safe levels.

This setting toggles the audio meter on and off. When on, this will appear in the bottom left corner of an attached monitor when 'HDMI overlay' are set to on.

HDMI Overlays

This setting is only available on Micro Studio Camera 4K. When set to 'on,' HDMI video output will include frame guides and information about the camera settings and identity, as well as any meters enabled via the 'HDMI meters' setting.

Brightness

Move the slider icon left or right to adjust brightness settings for the LCD. The default setting is 60%.

Zebra

Blackmagic Cameras have a zebra feature which gives an indication of exposure levels. Diagonal lines will appear across any part of the video that exceeds the zebra exposure level.

Turn zebra on and select the desired zebra warning level by using the left and right arrows. The default setting is medium.
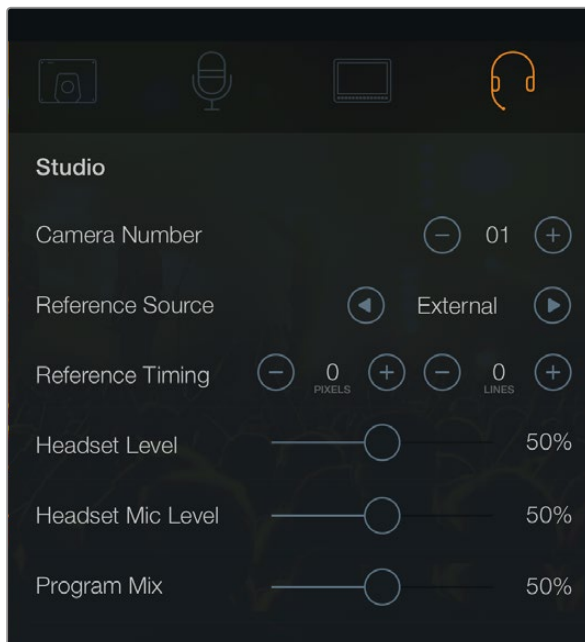
Focus Peaking

Allows you to change the level of focus peaking. The settings include: off, low, medium and high. Adjust this setting when you are using a very sharp lens and the peaking covers the entire image. The default setting is medium.

Front Tally Brightness

Changes the brightness of the front tally light. Settings include: off, low, medium and high. The default setting is medium.

Rear Tally Brightness

Changes the brightness of the rear tally light. Settings include: low, medium and high. The default setting is medium.

Tally Light Brightness

Changes the brightness of the tally light on Micro Studio Camera 4K. The default setting is medium.

Display Battery Percentage

Some LP-E6 batteries can tell the camera their charge levels directly via digital serial communication. If this option is enabled, you can display the battery levels for Micro Studio Camera 4K using a percentage value instead of graphical bars. However, if you find the percentage display inaccurate, you can switch back to using graphical bars which measures of the state of charge directly off the battery.

Studio Settings

To adjust the display settings for the LCD, press the 'menu' button and select the headphones icon. Use the menu navigation buttons to highlight menus and use the 'set' button to confirm your selection.

Camera Number

If you want your Studio Camera to receive tally signals from an ATEM switcher, you'll need to set the camera number on your camera. This ensures the switcher sends the tally signal to the correct camera. The camera number can be set to a value of 1-99. Default setting is 1.

Reference Source

Used to select the genlock source. The Studio Camera can lock to program SDI input or external genlock source. If using an external genlock source, be aware that changing that source will most likely cause a glitch as the camera locks to the new source.
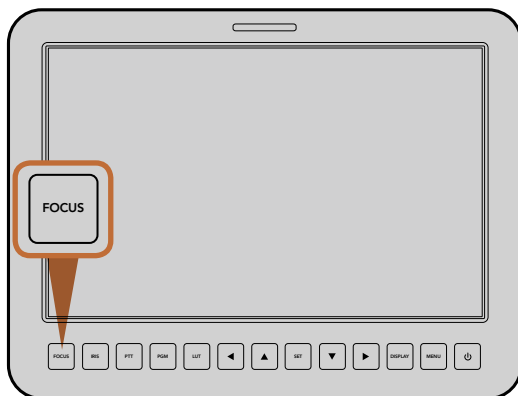
Reference Timing

Allows you to manually adjust the reference timing on a line or pixel basis.

Studio settings - Blackmagic Studio Camera.

Remote settings - Blackmagic Micro Studio Camera 4K.

Press the focus button once to auto focus. A quick double press of the focus button activates focus peaking.

Headset Level

Move the volume slider left or right to increase or decrease audio monitoring levels. The default setting is 50%.

Headset Mic Level

Move the volume slider left or right to increase or decrease audio microphone input levels. The default setting is 50%.

Program Mix

Changes the balance of camera sound to talkback sound. The headphones will output audio following what is displayed on the LCD. For instance, if you are in camera view, camera audio is heard. And if you are in program view, program audio is heard. The default setting is 0%.

Remote Settings

Blackmagic Micro Studio Camera 4K features an additional menu for setting remote functions. If you are using S.Bus to control your camera, you can use this menu to assign functions such, iris, shutter speed and so on to individual S.Bus channels. Simply select the function you wish to control and assign an available channel using the 'up,' 'down' and 'set' buttons.

Button Settings

Adjusting Lens Settings

Blackmagic Studio Camera supports electronic lens control, which allows you to adjust lens settings such as aperture and auto focus. The focus peaking feature creates a green edge around the sharpest parts of the image so you can easily confirm your focus. Focus peaking is only visible on the LCD and does not affect the SDI output.

Focus Button

When using the Studio Camera with an auto focus lens, press the focus button for focus peaking or auto focus. Press the focus button once to auto focus. A quick double press of the focus button activates focus peaking.

When using a manual lens, press the focus button once for focus peaking.

Iris Button

When using video dynamic range settings, a single press of the iris button will set an average exposure based on the highlights and shadows in your shot. When using film dynamic range settings, pressing the iris button sets your exposure to accommodate the brightest highlight in your shot. To set your aperture manually on your Studio camera, press the up and down menu navigation buttons.
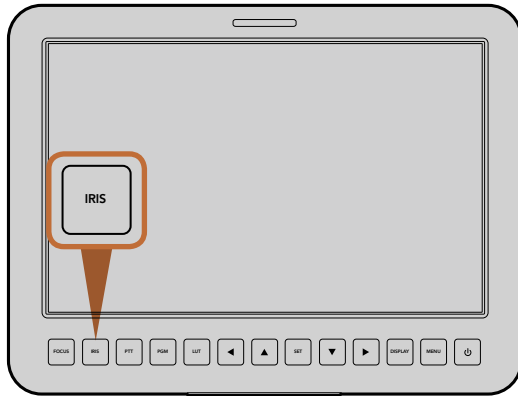
Press the iris button for auto exposure or use the up and down navigation controls for manual exposure.
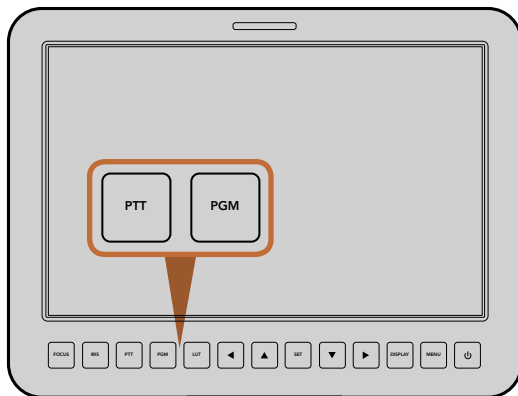
The Studio Camera features settings like PTT and PGM which are essential for live production.

Additional Settings

Push to Talk (PTT) Button

When doing live production it's vital that camera operators can talk to the director and others within the control room. Simply press and hold the button to begin talking. Press twice in quick succession for hands free communication. Press again to revert to the default behavior.

Program (PGM) Button

It's sometimes important for camera operators to see the program output, rather than just the view from their own camera. Press the button to toggle between live camera output and the program output from a switcher control room. You can use either the SDI input, or user upgradable optical fiber input to connect your external video source.

Look Up Table (LUT) Button

Currently not implemented.

Left, Up, Down, Right Buttons

Use these buttons to navigate the menus.

Set Button

Use this button to confirm your menu selections.

Display Button

Press this button to display useful information on your Studio Camera's 10" monitor, including:

- Frame guides with camera and lens settings such as camera number, video format and frame rate, shutter speed, white balance, battery life, gain setting and f-stop number.

Press the Disp button again to turn overlays off and monitor the image only. Overlays are visible on the 10" monitor. The SDI output is always clean.
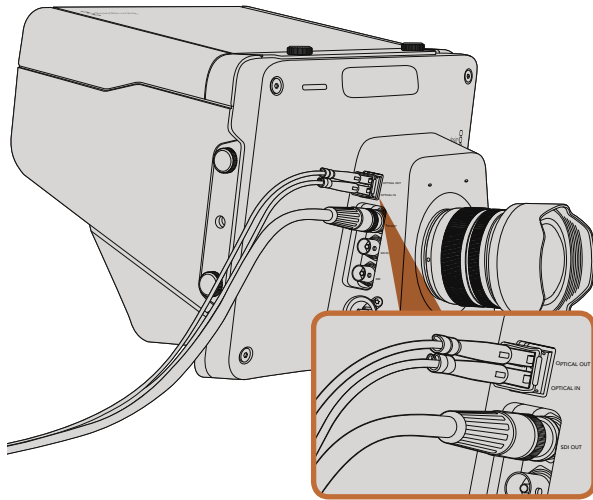
Menu Button

Press this button to bring up the menu and then use the arrow buttons to navigate.

Power Button

Press the power button to turn on the Blackmagic Studio Camera. Press and hold the button to turn the camera.

OPTICAL OUT
OPTICAL IN
SDI OUT

Connect your Studio Camera to a switcher via SDI, or via optical fiber with user upgradable SFP module installed.

SDI IN   SDI OUT

+12V POWER   HDMI IN   HDMI OUT   SDI IN   SDI OUT
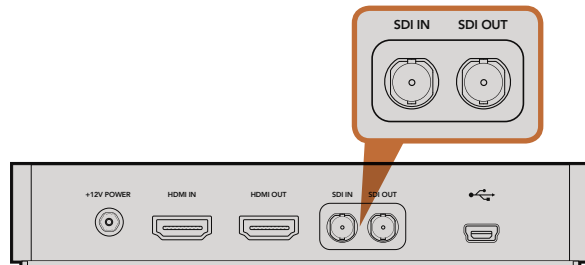
Connect the camera's SDI output to the HyperDeck's SDI input and connect the HyperDeck's SDI output to the camera's SDI input to view your recordings.

Connecting to Video Switchers

Blackmagic Studio Cameras output 10-bit 4:2:2 video so you can connect to broadcast switchers and other SDI video equipment. With the user upgradable SFP module installed you can connect via optical fiber, which means ATEM Camera Converters are not required at the camera end.

If you're using a Blackmagic Studio Camera HD or Studio Camera 4K, you can easily view the Program (PGM) output from the switcher by connecting it to your Studio Camera's SDI input, or to the optical fiber input when the user upgradable SFP module is installed.

Blackmagic Studio Camera also features a reference input which allows multiple cameras to be genlocked to a blackburst or tri-level reference signal. Genlocking cameras, VTRs and other devices to an external reference signal helps to eliminate timing errors which may result in the picture jumping when switching between different sources.

Connecting to Recorders

If you simply wish to record your Studio Camera's output, you can connect the SDI output to the SDI input of an SSD recorder such as the Blackmagic HyperDeck Shuttle. The SDI output from the HyperDeck can then be connected to the Studio Camera's SDI input, so you can view your recordings on the camera's LCD.

Blackmagic Camera Setup
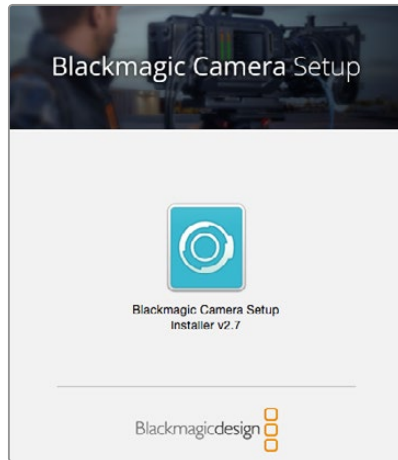
Blackmagic Camera Setup software.
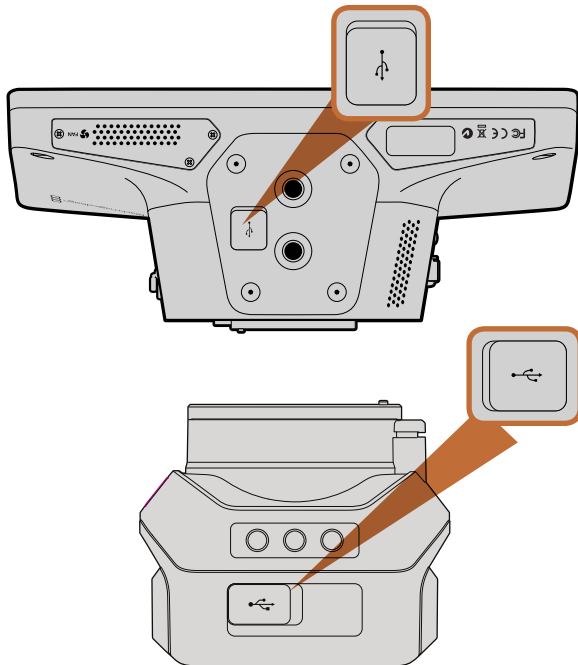
The Mini-B USB 2.0 ports are located on the underside of the cameras.

How to Update Your Camera Software on Mac OS X

After downloading the 'Blackmagic Camera Setup' software, unzip the downloaded file and double click on the .dmg disk image file. Launch the 'Blackmagic Camera Setup' installer and follow the onscreen instructions.

How to Update Your Camera Software on Windows

After downloading the 'Blackmagic Camera Setup' software and unzipping the downloaded file, you should see a 'Blackmagic Camera Setup' installer window. Double click on the installer icon and follow the onscreen prompts to complete the installation.

After the installation is complete, click on the Windows 'start' menu, and go to 'all programs'. Click on the Blackmagic Design folder to open the Blackmagic Camera setup software and instruction manuals.

How to Update your Camera's Internal Software

After installing the latest Blackmagic Camera setup software on your computer, connect a USB cable between the computer and your camera. The Mini-B USB 2.0 port is located on the underside of the camera.

Launch 'Blackmagic Camera Setup' and follow the onscreen prompts to update the camera software.
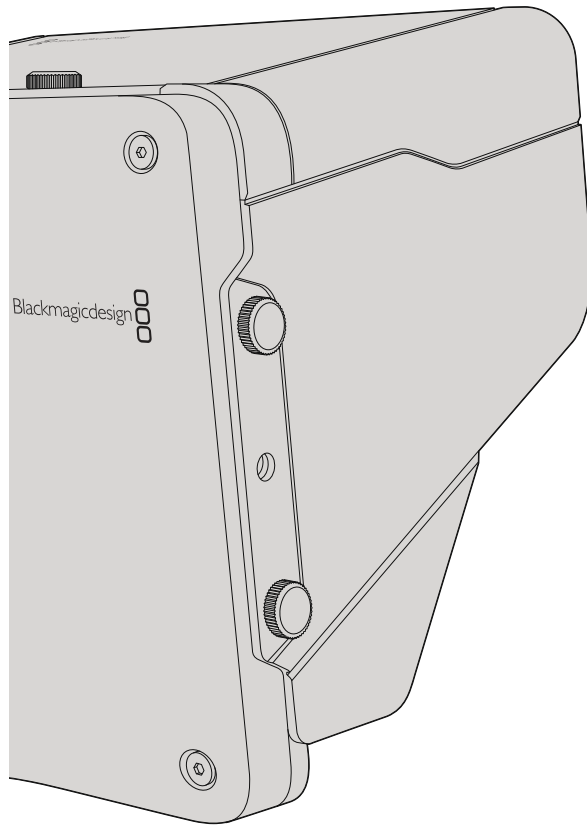
Sun Shade

The Studio Cameras include a foldable sun shade to shade the LCD in bright conditions and ensure optimum viewing is possible at all times.

Step 1.   Locate the 6 thumbscrews that are included with your Studio Camera.

Step 2.   Align the holes in the sun shade with the camera's mounting points and screw in 2 thumbscrews to the top and each side of the camera to firmly secure the sun shade.

Other Accessories

For studio use, you might want to mount the camera on a pedestal and add rails for large broadcast lenses and teleprompters. For outside broadcast use, your may want to attach microphones, external batteries, or LANC remote controllers. The camera includes two 3/8" mounting points on the bottom, and ten 1/4" mounting points on the sides and the top. This means you have the flexibility to customize your rig for any size production.

ATEM Camera Control.
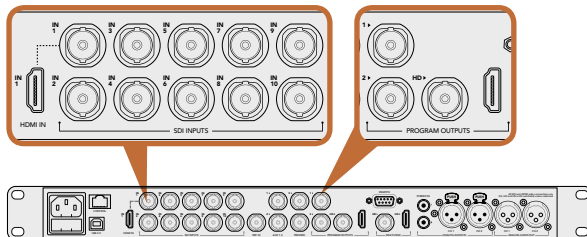
Connect your Blackmagic Studio Camera to any of the ATEM switcher's SDI inputs.

Connect multiple Blackmagic Studio Cameras via optical fiber using an ATEM Studio Converter.

Introducing Camera Control

Your Blackmagic Studio Camera can be controlled from an ATEM switcher using the Camera Control feature in ATEM Software Control. Clicking on the Camera button opens the camera control feature. Settings such as iris, gain, focus and zoom control are easily adjusted using compatible lenses, plus you can color balance cameras and create unique looks using the DaVinci Resolve primary color corrector.

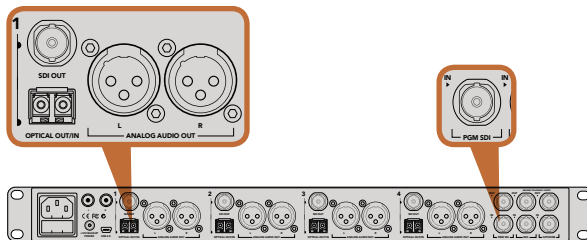The ATEM switcher control works by broadcasting camera control packets via all the non down converted SDI outputs of an ATEM switcher. So this means you can connect an SDI output of an ATEM switcher to your camera's video input, your camera will detect the control packets in the SDI link and allow you to control features in the camera itself. You can control your camera via both regular SDI, or via user upgradable optical fiber when the SFP module is installed.

Connecting via SDI

Step 1. Connect your Blackmagic Studio Camera's SDI Out to any SDI In on the ATEM switcher.

Step 2. Connect any one of the ATEM switcher's SDI outputs, except down converted or multi view outputs, to your Studio Camera's SDI In. Camera control signals are not sent via the multi view and down converted SDI outputs.

Step 3. On your Blackmagic Studio Camera, press Menu. Navigate to Studio Settings>Camera Number and set it to match the switcher input. For example, if studio camera 1 is connected to Cam 1 on the ATEM switcher, the camera number must also be set to 1. This ensures tally is sent to the correct camera.

Connecting via Optical Fiber

Step 1. With the user upgradable optical fiber SFP module installed in your Studio Camera, connect the Optical Out/In to the Optical Out/In on an ATEM Studio Converter.

Step 2. Connect a suitable SDI out from ATEM Studio Converter to any SDI In on the ATEM switcher.

Step 3. Connect any one of the ATEM switcher's SDI outputs, except down converted or multi view outputs to ATEM Studio Converter's SDI In. Camera control signals are not sent via the multi view and down converted SDI outputs.

Step 4. On your Blackmagic Studio Camera, press Menu. Navigate to Studio Settings>Camera Number and set it to match the switcher input. For example, if studio camera 1 is connected to Cam 1 on the ATEM switcher, your camera number must also be set to 1. This ensures tally is sent to the correct camera.

Open ATEM Software Control Preferences and set the switcher's button mapping to make sure you are switching the right camera with correct tally. Now you have a video connection from the switcher to your Blackmagic Studio Camera, you can also get the advantage of live tally indicators on your camera, as well as being able to view the program feed of the switcher by pressing your camera's PGM button.
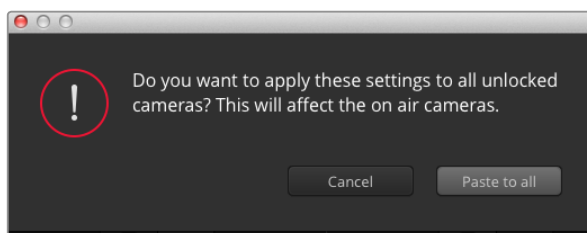
Click on the settings icon to select the Aux output for camera control.

Each camera controller displays the channel status so you know which camera is on air. Use the color wheels to adjust each YRGB channel's lift, gamma and gain settings.

When applying Paste to all, a warning message will appear asking you to confirm your action. This is so you don't accidentally paste new settings to any unlocked cameras that are currently on air.

Using Camera Control

Launch ATEM Software Control and click on the Camera button located at the bottom of the software window. You'll see a row of labeled camera controllers containing tools to adjust and refine each camera's image. The controllers are easy to use. Simply click the buttons using your mouse, or click and drag to adjust.

Camera Control Selection

The button row at the top of the camera control page lets you select the camera number you would like to control. If you have more cameras that fit onto the window size, or you are running the color corrector window, then you can use these buttons to select between which camera you would like to control. If you are using an Aux output for monitoring your camera control, pushing these buttons to change the camera to control will also send that camera's video output to the Aux output setup in the switcher preferences.

Channel Status

The channel status at the top of each camera controller displays the camera label, On Air indicator and lock button. Press the lock button to lock all the controls for a specific camera. When on air, the channel status illuminates red and displays the On Air alert.

Color Wheel

The color wheel is a powerful feature of the DaVinci Resolve color corrector and used to make color adjustments to each YRGB channel's lift, gamma and gain settings. You can select which setting to adjust by clicking on the three selection buttons above the color wheel.

Master Wheel

Use the master wheel below the color wheel to make contrast adjustments to all YRGB channels at once, or luminance only for each lift, gamma or gain setting.

Reset Buttons

The reset button near the top right of each camera controller lets you easily choose color correction settings to reset, copy or paste. Each color wheel also has its own reset button. Press to restore a setting to its default state, or copy/paste a setting. Locked controllers are not affected by the Paste feature.

The master reset button on the top right corner of the color corrector panel lets you reset lift, gamma and gain color wheels plus Contrast, Hue, Saturation and Lum Mix settings. You can paste color correction settings to camera controllers individually, or all cameras at once for a unified look. Iris, focus, coarse and pedestal settings are not affected by the Paste feature. When applying Paste to all, a warning message will appear asking you to confirm your action. This is so you don't accidentally paste new settings to any unlocked cameras that are currently on air.

The iris/pedestal control illuminates red when its respective camera is on air.
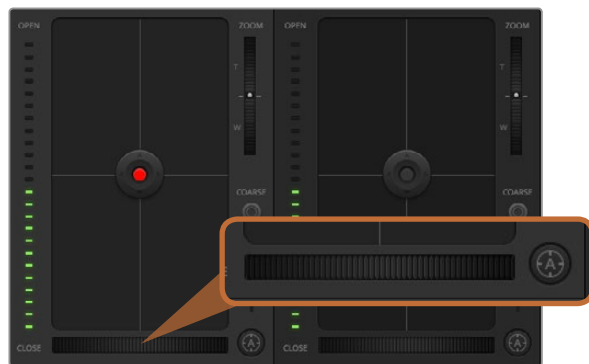
Click on the auto focus button or drag the manual focus adjustment left or right to focus a compatible lens.

Iris/Pedestal Control

The iris/pedestal control is located within the cross hairs of each camera controller. The control illuminates red when its camera is on air.

To open or close the iris, drag the control up or down. Holding the shift key allows only iris adjustments.

To darken or lift the pedestal, drag the control left or right. Holding the command key on a Mac, or the Control key on Windows, allows only pedestal adjustments.

Zoom Control

When using compatible lenses with an electronic zoom feature, you can zoom your lens in and out using the zoom control. The controller works just like the zoom rocker on a lens, with telephoto on one end, and wide angle on the other. Click on the zoom control, located above the coarse slider, and drag up to zoom in, or drag down to zoom out.

If your lens does not have active lens control or your camera does not support zoom control via the SDI camera control protocol then these settings will have no affect. If you are using Blackmagic Studio Camera or Blackmagic Studio Camera 4K, please make sure you have updated your camera software to v1.9.11 or later to ensure your camera has support for controlling MFT lenses with active zoom.

Coarse Setting

The coarse setting is located to the left of the iris/pedestal control and is used to limit the iris range. This feature helps you prevent over exposed images from going to air.

To set your coarse threshold, completely open the iris using the iris control, then drag the coarse setting up or down to set optimum exposure. Now when you adjust the iris, the coarse threshold will prevent it from going above optimum exposure.

Iris Indicator

The iris indicator is located to the right of the iris/pedestal control and displays a visual reference so you can easily see how open or closed the lens aperture is. The iris indicator is affected by the coarse setting.

Auto Focus Button

The auto focus button is located at the bottom left corner of each camera controller. Press to automatically set the focus when you have an active lens that supports electronic focus adjustments. It's important to know that while most lenses support electronic focus, some lenses can be set to manual or auto focus modes, and so you need to ensure your lens is set to auto focus mode. Sometimes this is set by sliding the focus ring on the lens forward or backward.
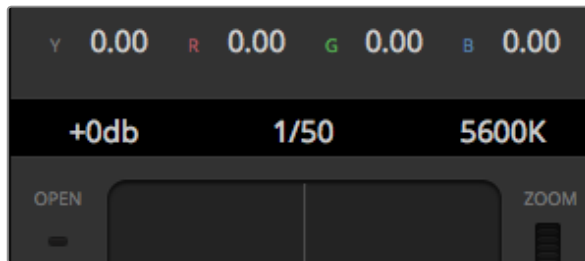
Hovering your mouse pointer over the gain, shutter speed and white balance indicators reveal arrows you can click on to adjust their respective settings.

Click on the DaVinci Resolve primary color corrector button to expand the color correction window and adjust settings.

Manual Focus Adjustment

When you want to adjust the focus on your camera manually, you can use the focus adjustment located at the bottom of each camera controller. Drag the wheel control left or right to manually adjust focus while viewing the video feed from the camera to ensure your image is nice and sharp.

Camera Gain

The camera gain setting allows you to turn on additional gain in your camera. This is important when you are operating in low light conditions and need extra gain in the front end of your camera to avoid your images being under exposed. You can decrease or increase gain by clicking on the left or right arrows on the dB gain setting.

You can turn on some gain when you need it, such as outdoor shoots when the light fades at sunset and you need to increase your image brightness. It's worth noting that adding gain will increase noise in your images.

Shutter Speed Control

The shutter speed control is located in the section between the color wheel and the iris/pedestal control. Decrease or increase the shutter speed by hovering your mouse pointer over the shutter speed indicator and then clicking on the left or right arrows.

If you see flicker in lights you can decrease your shutter speed to eliminate it. Decreasing shutter speed is a good way to brighten your images without using camera gain because you are increasing the exposure time of the image sensor. Increasing shutter speed will reduce motion blur so can be used when you want action shots to be sharp and clean with minimal motion blur.

White Balance

The white balance setting next to the shutter speed control can be adjusted by clicking on the left or right arrows on each side of the color temperature indicator. Different light sources emit warm or cool colors, so you can compensate by adjusting the white balance. This ensures the whites in your image stay white.

DaVinci Resolve Primary Color Corrector

If you have a color correction background, then you can change the camera control from a switcher style CCU interface to a user interface that's more like a primary color corrector on a post production color grading system.

Your Blackmagic Studio Camera features a DaVinci Resolve primary color corrector built in. If you have used DaVinci Resolve, then creatively, grading in your Blackmagic Studio Camera will be identical so you can use your color grading experience for live production.

Lift, gamma and gain color wheels in the color corrector panel.

The color corrector panel can be expanded out of any camera controller and provides expanded color correction control with extra settings and a full primary color corrector interface.

You have color wheels and settings such as saturation available and you can see shadows, mid tones and highlight settings all at the same time. Simply switch between cameras using the camera selection controls at the top of the window as you need.

Color Wheels

The Lift/Gamma/Gain controls allow tonally specific yet overlapping regions of adjustment. In photographic terms lift, gamma and gain corresponds to shadows, mid tones and highlights.

Use the color wheels in the following ways to make fine or aggressive adjustments:

- **Click and drag anywhere within the color ring:** Note that you don't need to drag the color balance indicator itself. As the color balance indicator moves, the RGB parameters underneath change to reflect the adjustments being made to each channel.
- **Shift-Click and drag within the color ring:** Jumps the color balance indicator to the absolute position of the pointer, letting you make faster and more extreme adjustments.
- **Double-click within the color ring:** Resets the color adjustment without resetting the master wheel adjustment for that control.
- **Click the reset control at the upper-right of a color ring:** Resets both the color balance control and its corresponding master wheel.

Master Wheels

Adjust the master wheels by dragging the wheel control left or right.

Use the master wheels below the color wheels to adjust each YRGB channels' lift, gamma and gain controls.

To make adjustments using the master wheel:

- **Drag the master wheel left or right:** Dragging to the left darkens the selected parameter of the image, dragging to the right lightens that parameter. As you make an adjustment, the YRGB parameters underneath change to reflect the adjustment you're making. To make a Y-only adjustment, hold down the ALT or Command key and drag left or right. Because the color corrector uses YRGB processing, you can get quite creative and create unique affects by adjusting the Y channel only. Y channel adjustments work best when the Lum Mix setting is set to the right side to use YRGB processing vs the left side to use regular RGB processing. Normally, most DaVinci Resolve colorists use the YRGB color corrector as you get a lot more control of color balance without affecting overall gain, so you spend less time getting the look you want.

Drag the sliders left or right to adjust Contrast, Saturation, Hue and Lum Mix settings.

Contrast, Saturation, Hue and Lum Mix settings.

Contrast Setting

The Contrast setting gives you control over the distance between the darkest and lightest values of an image. The effect is similar to making opposing adjustments using the lift and gain master wheels. The default setting is 50%.

Saturation Setting

The Saturation setting increases or decreases the amount of color in the image. The default setting is 50%.

Hue Setting

The Hue setting rotates all hues of the image around the full perimeter of the color wheel. The default setting of 180 degrees shows the original distribution of hues. Raising or lowering this value rotates all hues forward or backward along the hue distribution as seen on a color wheel.

Lum Mix Setting

The color corrector built into your Blackmagic Studio Camera is based on the DaVinci Resolve primary color corrector. DaVinci has been building color correctors since the early 1980's and most Hollywood films are color graded on DaVinci Resolve than any other method.

This means the color corrector built into your Blackmagic Studio Camera has some unique and creatively powerful features. The YRGB processing is one of those features.

When color grading, you can choose to use RGB processing, or YRGB processing. High end colorists use YRGB processing because you have more precise control over color and you can independently adjust the channels with better separation and more creative options.

When the Lum Mix control is set to the right side, you have the 100% output of the YRGB color corrector. When you have the Lum Mix control set to the left side, you get 100% output of the RGB corrector. You can set the Lum Mix to any position between the left and right to get a blend of output from both the RGB and YRGB correctors.

Which is the correct setting to use? That's up to you, as color correction is a pure creative process and there is no right and wrong, and the best setting is what you like the most and what you think looks good!

Synchronizing Settings

When connected, camera control signals are sent from the ATEM switcher to your Blackmagic Studio Camera. If a setting is accidentally adjusted from your Studio Camera, camera control will automatically reset that setting to maintain synchronization.

Blackmagic Video Device Embedded Control Protocol

Version 1.0

If you are a software developer you can use the Video Device Embedded Control Protocol to construct devices that integrate with our products. Here at Blackmagic Design, our approach is to open up our protocols and we eagerly look forward to seeing what you come up with!

Overview

This document describes an extensible protocol for sending a uni-directional stream of small control messages embedded in the non-active picture region of a digital video stream.

The video stream containing the protocol stream may be broadcast to a number of devices. Device addressing is used to allow the sender to specify which device each message is directed to.

Assumptions

Alignment and padding constraints are explicitly described in the protocol document. Bit fields are packed from LSB first. Message groups, individual messages and command headers are defined as, and can be assumed to be, 32 bit aligned.

Blanking Encoding

A message group is encoded into a SMPTE 291M packet with DID/SDID x51/x53 in the active region of VANC line 16.

Message Grouping

Up to 32 messages may be concatenated and transmitted in one blanking packet up to a maximum of 255 bytes payload. Under most circumstances, this should allow all messages to be sent with a maximum of one frame latency.

If the transmitting device queues more bytes of message packets than can be sent in a single frame, it should use heuristics to determine which packets to prioritise and send immediately. Lower priority messages can be delayed to later frames, or dropped entirely as appropriate.

Abstract Message Packet Format

Every message packet consists of a three byte header followed by an optional variable length data block. The maximum packet size is 64 bytes.

Destination device (uint8)
Device addresses are represented as an 8 bit unsigned integer. Individual devices are numbered 0 through 254 with the value 255 reserved to indicate a broadcast message to all devices.

Command length (uint8)
The command length is an 8 bit unsigned integer which specifies the length of the included command data. The length does NOT include the length of the header or any trailing padding bytes.

Command id (uint8)
The command id is an 8 bit unsigned integer which indicates the message type being sent. Receiving devices should ignore any commands that they do not understand. Commands 0 through 127 are reserved for commands that apply to multiple types of devices. Commands 128 through 255 are device specific.

Reserved (uint8)
This byte is reserved for alignment and expansion purposes. It should be set to zero.

Command data (uint8[])
The command data may contain between 0 and 60 bytes of data. The format of the data section is defined by the command itself.

Padding (uint8[])
Messages must be padded up to a 32 bit boundary with 0x0 bytes. Any padding bytes are NOT included in the command length.

Receiving devices should use the destination device address and/or the command identifier to determine which messages to process. The receiver should use the command length to skip irrelevant or unknown commands and should be careful to skip the implicit padding as well.

Defined Commands

Command 0 : change configuration

Category (uint8)

The category number specifies one of up to 256 configuration categories available on the device.

Parameter (uint8)

The parameter number specifies one of 256 potential configuration parameters available on the device. Parameters 0 through 127 are device specific parameters. Parameters 128 though 255 are reserved for parameters that apply to multiple types of devices.

Data type (uint8)

The data type specifies the type of the remaining data. The packet length is used to determine the number of elements in the message. Each message must contain an integral number of data elements.

Currently defined values are:

0: void / boolean

A void value is represented as a boolean array of length zero.

The data field is a 8 bit value with 0 meaning false and all other values meaning true.

1: signed byte

Data elements are signed bytes

2: signed 16 bit integer

Data elements are signed 16 bit values

3: signed 32 bit integer

Data elements are signed 32 bit values

4: signed 64 bit integer

Data elements are signed 64 bit values

5: UTF-8 string

Data elements represent a UTF-8 string with no terminating character.

Data types 6 through 127 are reserved.

128: signed 5.11 fixed point

Data elements are signed 16 bit integers representing a real number with 5 bits for the integer component and 11 bits for the fractional component.

The fixed point representation is equal to the real value multiplied by 2^11.

The representable range is from -16.0 to 15.9995 (15 + 2047/2048).

Data types 129 through 255 are available for device specific purposes.

Operation type (uint8)

The operation type specifies what action to perform on the specified parameter. Currently defined values are:

0: assign value

The supplied values are assigned to the specified parameter. Each element will be clamped according to its valid range.

A void parameter may only be "assigned" an empty list of boolean type. This operation will trigger the action associated with that parameter.

A boolean value may be assigned the value zero for false, and any other value for true.

1: offset / toggle value

Each value specifies signed offsets of the same type to be added to the current parameter values.The resulting parameter value will be clamped according to their valid range.

It is not valid to apply an offset to a void value.

Applying any offset other than zero to a boolean value will invert that value.

Operation types 2 through 127 are reserved. Operation types 128 through 255 are available for device specific purposes..

Data (void)

The data field is 0 or more bytes as determined by the data type and number of elements.

The category, parameter, data type and operation type partition a 24 bit operation space.

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
Lens	0						
	.0	Focus	fixed16		0.0	1.0	0.0=near, 1.0=far
	.1	Instantaneous autofocus	void				trigger instantaneous autofocus
	.2	Aperture (f-stop)	fixed16		-1.0	16.0	Aperture Value (where fnumber = sqrt(2^AV))
	.3	Aperture (normalised)	fixed16		0.0	1.0	0.0=smallest, 1.0=largest
	.4	Aperture (ordinal)	int16		0	n	Steps through available aperture values from minimum (0) to maximum (n)
	.5	Instantaneous auto aperture	void				trigger instantaneous auto aperture
	.6	Optical image stabilisation	boolean				true=enabled, false=disabled
	.7	Set absolute zoom (mm)	int16		0	max	Move to specified focal length in mm, from minimum (0) to maximum (max)
	.8	Set absolute zoom (normalised)	fixed16		0.0	1.0	Move to specified normalised focal length: 0.0=wide, 1.0=tele
	.9	Set continuous zoom (speed)	fixed16		-1.0	+1.0	Start/stop zooming at specified rate: -1.0=zoom wider fast, 0.0=stop, +1.0=zoom tele fast
Video	1						
	.0	Video mode	int8	[0] = frame rate			24, 25, 30, 50, 60
				[1] = M-rate			0=regular, 1=M-rate
				[2] = dimensions			0=NTSC, 1=PAL, 2=720, 3=1080, 4=2k, 5=2k DCI, 6=UHD
				[3] = interlaced			0=progressive, 1=interlaced
				[4] = colour space			0=YUV
	.1	Sensor Gain	int8		1	16	1x, 2x, 4x, 8x, 16x gain
	.2	Manual White Balance	int16		3200	7500	Colour temperature in K

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
	.3	Reserved					Reserved
	.4	Reserved					Reserved
	.5	Exposure (us)	int32		1	42000	time in us
	.6	Exposure (ordinal)	int16		0	n	Steps through available exposure values from minimum (0) to maximum (n)
	.7	Dynamic Range Mode	int8 enum		0	1	0 = film, 1 = video
	.8	Video sharpening level	int8 enum		0	3	0=Off, 1=Low, 2=Medium, 3=High
Audio	2						
	.0	Mic level	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum
	.1	Headphone level	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum
	.2	Headphone program mix	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum
	.3	Speaker level	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum
	.4	Input type	int8		0	2	0=internal mic, 1=line level input, 2=low mic level input, 3=high mic level input
	.5	Input levels	fixed16	[0] ch0	0.0	1.0	0.0=minimum, 1.0=maximum
				[1] ch1	0.0	1.0	0.0=minimum, 1.0=maximum
	.6	Phantom power	boolean				true = powered, false = not powered
Output	3						
	.0	Overlays	uint16 bit field				0x1 = display status
							0x2 = display guides
							Some cameras don't allow separate control of guides and status overlays.
Display	4						
	.0	Brightness	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
	.1	Overlays	int16 bit field				0x4 = zebra 0x8 = peaking
	.2	Zebra level	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum
	.3	Peaking level	fixed16		0.0	1.0	0.0=minimum, 1.0=maximum
	.4	Colour bars display time (seconds)	int8		0	30	0=disable bars, 1-30=enable bars with timeout (s)
Tally	5						
	.0	Tally brightness	fixed16		0.0	1.0	Sets the tally front and tally rear brightness to the same level. 0.0=minimum, 1.0=maximum
	.1	Tally front brightness	fixed16		0.0	1.0	Sets the tally front brightness. 0.0=minimum, 1.0=maximum
	.2	Tally rear brightness	fixed16		0.0	1.0	Sets the tally rear brightness. 0.0=minimum, 1.0=maximum
							Tally rear brightness cannot be turned off
Reference	6						
	.0	Source	int8 enum		0	1	0=internal, 1=program, 2=external
	.1	Offset	int32				+/- offset in pixels
Configuration	7						
	.0	Real Time Clock	int32	[0] time			BCD - HHMMSSFF
				[1] date			BCD - YYYYMMDD
	.1	Reserved					Reserved
Colour Correction	8						
	.0	Lift Adjust	fixed16	[0] red	-2.0	2.0	default 0.0
				[1] green	-2.0	2.0	default 0.0
				[2] blue	-2.0	2.0	default 0.0

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
				[3] luma	-2.0	2.0	default 0.0
	.1	Gamma Adjust	fixed16	[0] red	-4.0	4.0	default 0.0
				[1] green	-4.0	4.0	default 0.0
				[2] blue	-4.0	4.0	default 0.0
				[3] luma	-4.0	4.0	default 0.0
	.2	Gain Adjust	fixed16	[0] red	0.0	16.0	default 1.0
				[1] green	0.0	16.0	default 1.0
				[2] blue	0.0	16.0	default 1.0
				[3] luma	0.0	16.0	default 1.0
	.3	Offset Adjust	fixed16	[0] red	-8.0	8.0	default 0.0
				[1] green	-8.0	8.0	default 0.0
				[2] blue	-8.0	8.0	default 0.0
				[3] luma	-8.0	8.0	default 0.0
	.4	Contrast Adjust	fixed16	[0] pivot	0.0	1.0	default 0.5
				[1] adj	0.0	2.0	default 1.0
	.5	Luma mix	fixed16		0.0	1.0	default 1.0
	.6	Colour Adjust	fixed16	[0] hue	-1.0	1.0	default 0.0
				[1] sat	0.0	2.0	default 1.0
	.7	Correction Reset Default	void				reset to defaults

Example Protocol Packets

Operation	Packet Length	Byte 0 destination	1 length	2 command	3 reserved	4 category	5 parameter	6 type	7 operation	8	9	10	11	12	13	14	15
		header				command				data							
trigger instantaneous auto focus on camera 4	8	4	4	0	0	0	1	0	0								
turn on OIS on all cameras	12	255	5	0	0	0	6	0	0	1	0	0	0				
set exposure to 10 ms on camera 4 (10 ms = 10000 us = 0x00002710)	12	4	8	0	0	1	5	3	0	0x10	0x27	0x00	0x00				
add 15% to zebra level (15 % = 0.15 f = 0x0133 fp)	12	4	6	0	0	4	2	128	1	0x33	0x01	0	0				
select 1080p 23.98 mode on all cameras	16	255	9	0	0	1	0	1	0	24	1	3	0	0	0	0	0
subtract 0.3 from gamma adjust for green & blue (-0.3 ~= 0xfd9a fp)	16	4	12	0	0	8	1	128	1	0	0	0x9a	0xfd	0x9a	0xfd	0	0
all operations combined	76	4	4	0	0	0	1	0	0	255	5	0	0	0	6	0	0
		1	0	0	0	4	8	0	0	1	5	3	0	0x10	0x27	0x00	0x00
		4	6	0	0	4	2	128	1	0x33	0x01	0	0	255	9	0	0
		1	0	1	0	24	1	3	0	0	0	0	0	4	12	0	0
		8	1	128	1	0	0	0x9a	0xfd	0x9a	0xfd	0	0				

Getting Help

The fastest way to obtain help is to go to the Blackmagic Design online support pages and check the latest support material available for your camera.

Blackmagic Design Online Support Pages

The latest manual, software and support notes can be found at the Blackmagic Design support centre at www.blackmagicdesign.com/support.

Contacting Blackmagic Design Support

If you can't find the help you need in our support material, please use the "Send us an email" button on the support page for your camera to email a support request. Alternatively, click on the "Find your local support team" button on the support page and call your nearest Blackmagic Design support office.

Checking the Software Version Currently Installed

To check which version of Blackmagic Camera Setup software is installed on your computer, open the About Blackmagic Camera Setup window.

- On Mac OS X, open Blackmagic Camera Setup from the Applications folder. Select About Blackmagic Camera Setup from the application menu to reveal the version number.
- On Windows, open Blackmagic Camera Setup from your Start menu or Start Screen. Click on the Help menu and select About Blackmagic Camera Setup to reveal the version number.

How to Get the Latest Software Updates

After checking the version of Blackmagic Camera Setup software installed on your computer, please visit the Blackmagic Support Center at www.blackmagicdesign.com/support to check for the latest updates. While it is usually a good idea to run the latest updates, it is wise to avoid updating any software if you are in the middle of an important project.

Battery Replacement

The Studio Camera's built in battery is not user-serviceable. Should the battery require replacement, you will need to send it to your nearest Blackmagic Design service center for replacement. If the camera is outside of its warranty period, the battery replacement will incur a small service fee for the cost of the battery, labor and return of the camera to you. Please contact Blackmagic Design Support to find out details of where to send your camera, how to package it safely and how much the replacement will cost in your country.

12 Month Limited Warranty

Blackmagic Design warrants that this product will be free from defects in materials and workmanship for a period of 12 months from the date of purchase. If a product proves to be defective during this warranty period, Blackmagic Design, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify Blackmagic Design of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by Blackmagic Design, with shipping charges pre paid. Customer shall be responsible for paying all shipping charges, insurance, duties, taxes, and any other charges for products returned to us for any reason.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Blackmagic Design shall not be obligated to furnish service under this warranty: a) to repair damage resulting from attempts by personnel other than Blackmagic Design representatives to install, repair or service the product, b) to repair damage resulting from improper use or connection to incompatible equipment, c) to repair any damage or malfunction caused by the use of non Blackmagic Design parts or supplies, or d) to service a product that has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product. THIS WARRANTY IS GIVEN BY BLACKMAGIC DESIGN IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. BLACKMAGIC DESIGN AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. BLACKMAGIC DESIGN'S RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE WHOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER BLACKMAGIC DESIGN OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. BLACKMAGIC DESIGN IS NOT LIABLE FOR ANY ILLEGAL USE OF EQUIPMENT BY CUSTOMER. BLACKMAGIC IS NOT LIABLE FOR ANY DAMAGES RESULTING FROM USE OF THIS PRODUCT. USER OPERATES THIS PRODUCT AT OWN RISK.