BLACKMAGICDESIGN URSA BROADCAST INSTALLATION AND OPERATION MANUAL

Installation and Operation Manual

Blackmagic
URSA Broadcast

Includes Blackmagic Camera Fiber Converter,
Studio Fiber Converter, Blackmagic URSA Viewfinder,
URSA Studio Viewfinder and URSA Mini Shoulder Mount Kit

February 2018

Blackmagicdesign

Welcome

Thank you for purchasing Blackmagic URSA Broadcast!

Since we released our first digital film camera a few years ago we have been privileged to have received some of the best guidance and feedback we have ever had for a new product! We all grew up admiring the work of the world's leading cinematographers and DOPs and it's been an honor to spend hours in conversations with these legendary experts on the features we need to add to our cameras. Of course, everyone we speak to has good ideas also!

With URSA Broadcast, we've packaged an amazing broadcast sensor into a super small, light and sturdy metal chassis.

URSA Broadcast's beautiful user interface is designed for single operators who need quick, easy access to all of their camera's functions, while comprehensive ATEM switcher integration and extremely low latency gives you the perfect solution for live studio production, combined with full CCU features for incredible control over your camera directly from the switcher.

We also listened to single operators when we developed our URSA Viewfinder which is perfect for mobile ENG style shooting on the shoulder.

Additional features include ergonomic controls, interchangeable lens mounts and internal ND filters. If you are familiar with ENG cameras, we believe you will find these ergonomic controls and the built in ND filters extremely powerful.

We hope you use your URSA Broadcast to produce some of the world's most exciting television programming, documentaries and live studio content. We are extremely excited to see what creative work you produce and to get your feedback on new features you would like to see us add to URSA!

Grant Petty

Grant Petty
CEO Blackmagic Design

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Blackmagic URSA Broadcast

Getting Started

Getting started with URSA Broadcast is always as simple as mounting a lens and powering your camera.

Attaching a Lens

URSA Broadcast is shipped with a B4 mount for attaching B4 mount lenses. These lenses typically have a built in handle and strap that lets you hold the camera securely on your shoulder, plus control the zoom rocker and iris controls.

URSA Broadcast's B4 mount features optics specifically designed to work with your camera's Ultra HD sensor to produce the same field of view and depth of field as traditional broadcast cameras with 2/3" sensors. This means that if you already have a broadcast background, you can be comfortable mounting your existing B4 lenses to URSA Broadcast and capture footage straight away.

To remove the protective dust cap from the camera, rotate the outer locking ring counterclockwise and pull the dust cap away from the mount.

To attach a B4 mount lens:
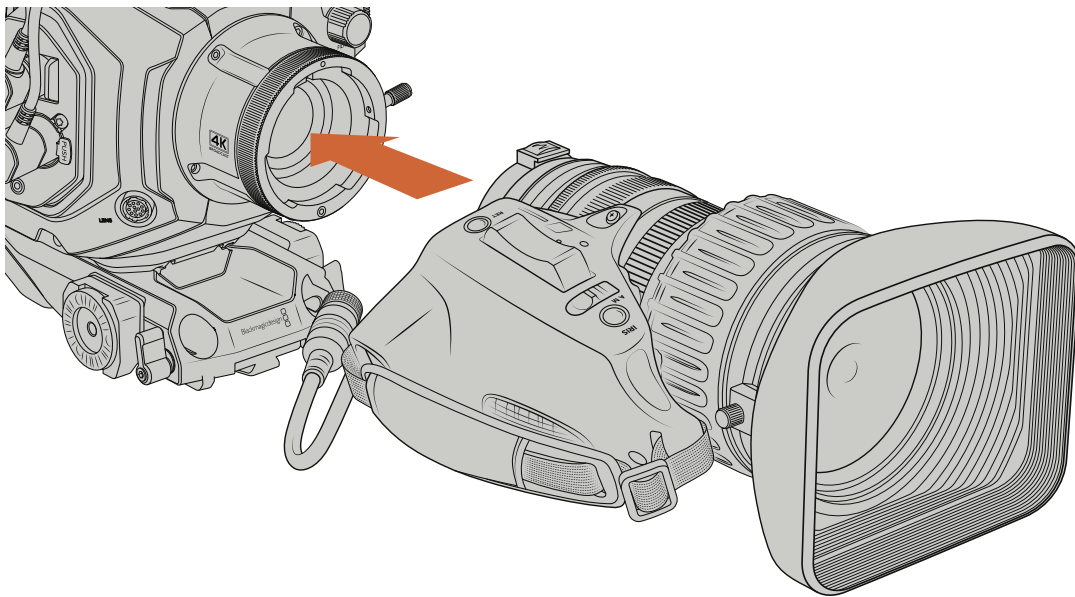
Attaching and removing a B4 lens on Blackmagic URSA Broadcast

1   Turn the B4 lens locking ring counterclockwise to reveal the alignment pin inside the top of the mount. Align the B4 lens to your URSA Broadcast's B4 mount so the registration slot on the lens mount matches the position of the alignment pin.

2   Hold the lens against the B4 mount so the mount plates are against each other.
    Make sure the alignment pin is secured inside the registration slot.

3   Turn the locking ring clockwise to tighten the lens against the mount and lock it into position.

4   To power the lens and provide lens control, simply plug the lens cable into the connector marked 'Lens' on the front of your URSA Broadcast's turret. Most B4 lenses will have the hirose 12 pin connector and cable built in. This will provide power and control signals from your URSA Broadcast to the lens.

For information on the types of B4 lenses and how to use them with your camera, refer to the 'Using Servo Zoom Lenses' section in this manual.

> **NOTE** When no lens is attached to the camera, the optical element of URSA Broadcast's B4 mount is exposed to dust and other debris. Ensure that you keep the dust cap on whenever possible.

Many B4 lenses can be quite long due to their extreme zoom range. When using URSA Broadcast with B4 lenses, your camera's center of gravity will move forward. Therefore we recommend using the URSA Mini Shoulder Mount Kit or mounting the camera to a tripod head to help stabilize the camera before attaching your lens.
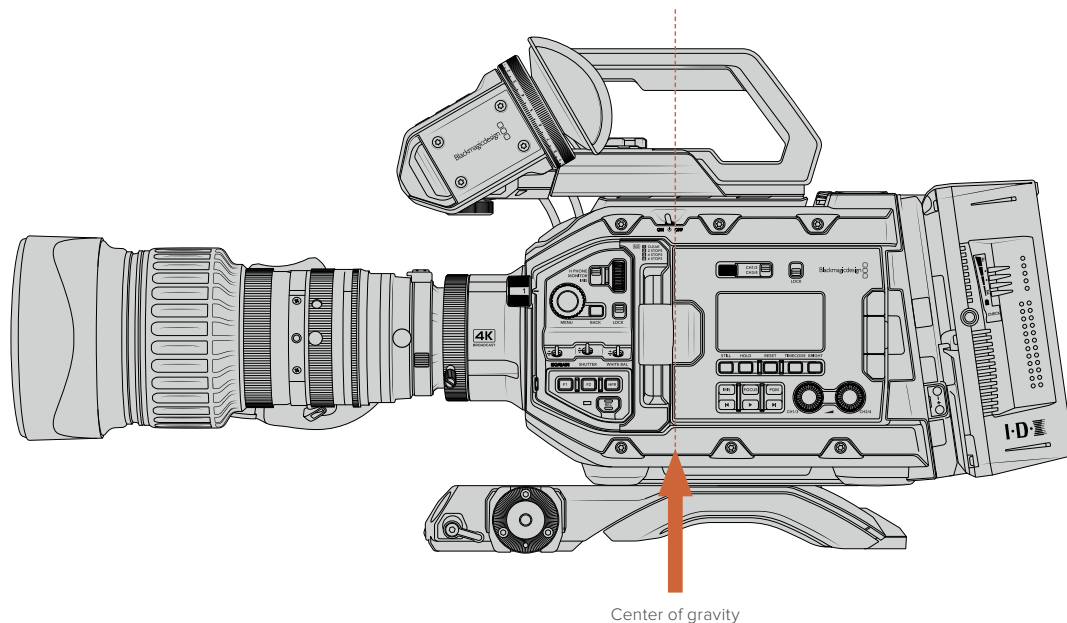
Center of gravity

When mounting URSA Broadcast on the URSA Mini Shoulder Mount kit, it's also a good idea to mount the camera towards the rear of the shoulder mount base. This moves your camera rig's center of gravity back over the middle of the mount, making it easier to balance on your shoulder and rest steadily when sitting on a desk or flat surface. See 'Blackmagic URSA Mini Shoulder Mount Kit' for more information on fitting the base.

> **NOTE** Blackmagic URSA Broadcast features an interchangeable lens mount, which is capable of accepting EF and PL lenses, as well as additional lens mounts with accessories. For more information on switching between mount types on URSA Broadcast, refer to the 'interchangeable lens mount' section in this manual.

Powering your Camera

Now that you've attached a lens, you will need to supply power. The quickest way to power your camera is to connect external power using the supplied AC to 12V DC adapter.

To plug in external power:

1 Connect the AC to 12V DC adapter plug to your mains power socket.

2 Connect the AC to 12V DC adapter's 4 pin XLR connector to the 12-20V DC power connector on the camera.

If you have both external and battery power connected, only external power will be used. If you remove external power while a charged battery is connected, your camera will switch to battery power without interruption.
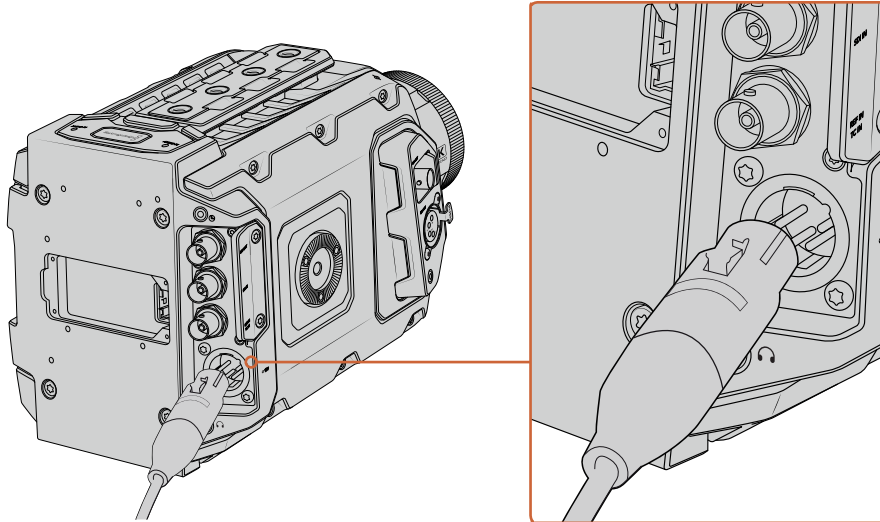
Use the supplied AC to 12V DC adapter to power your Blackmagic URSA Broadcast

You can use industry standard third party external batteries such as V mount or Gold Mount batteries with your URSA Broadcast. Refer to the 'mounting batteries' section for more information about mounting the different types of battery plates to support different batteries.

To turn on URSA Broadcast:

1 Move the power switch, located above the fold out LCD, to the 'on' position.

2 To turn the camera off, move the switch to the 'off' position.

You are now ready to insert CFast 2.0 cards and start recording!
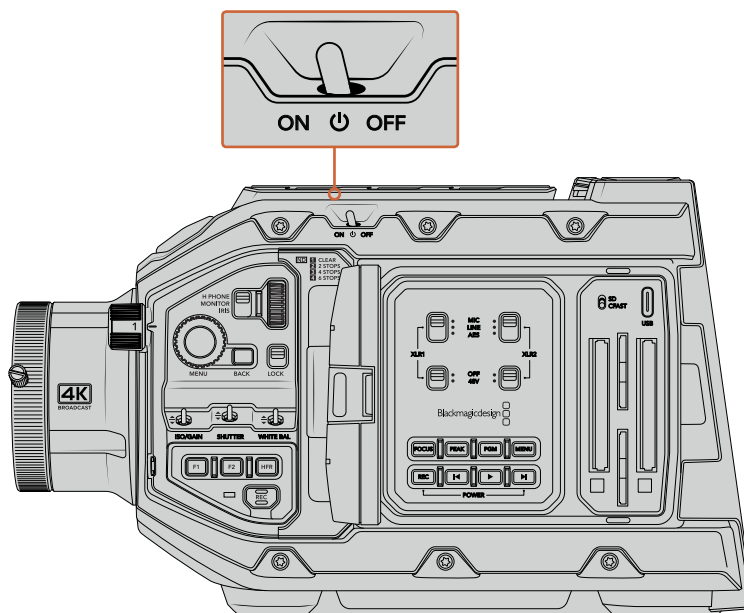
Move the power switch to 'on' to power your camera

URSA Broadcast also features a redundant power switch, which allows the camera to be turned on and off by holding down the 'rec' and 'forward skip' buttons on the inside control panel. While you wouldn't normally power your camera using this method, it is provided as a helpful alternative if the power switch along the top edge is obscured, for example when mounted on a custom rig.
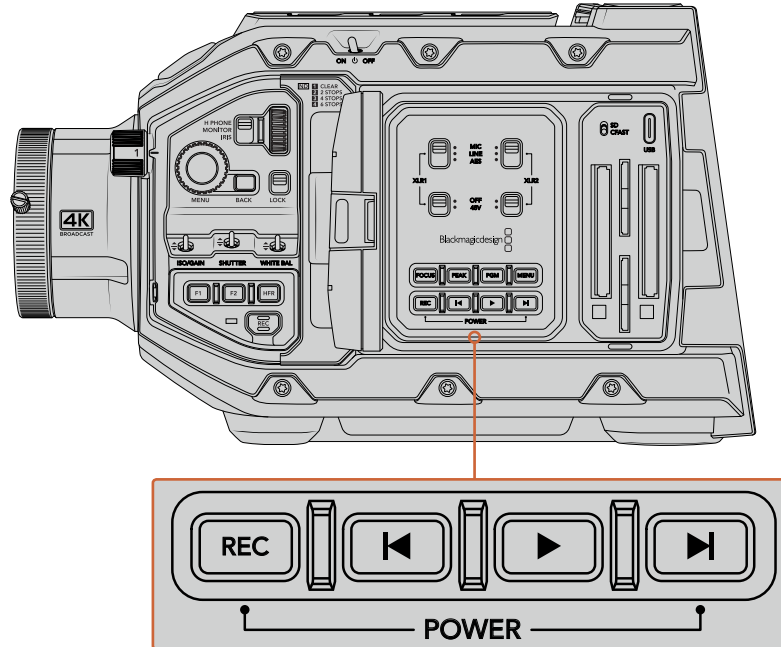
If you need to, you can also hold down the record and forward skip buttons on the control panel behind the LCD to power your camera on or off

TIP If your URSA Broadcast is turned off when the power switch is set to 'on', your camera may have been powered down via Bluetooth® control or by holding down the record and forward skip control panel buttons. Simply toggle the power switch 'off' and 'on,' or hold down the relevant control panel buttons to power the camera on.

Using Servo Zoom Lenses

Your URSA Broadcast camera natively supports servo driven B4 broadcast lenses.
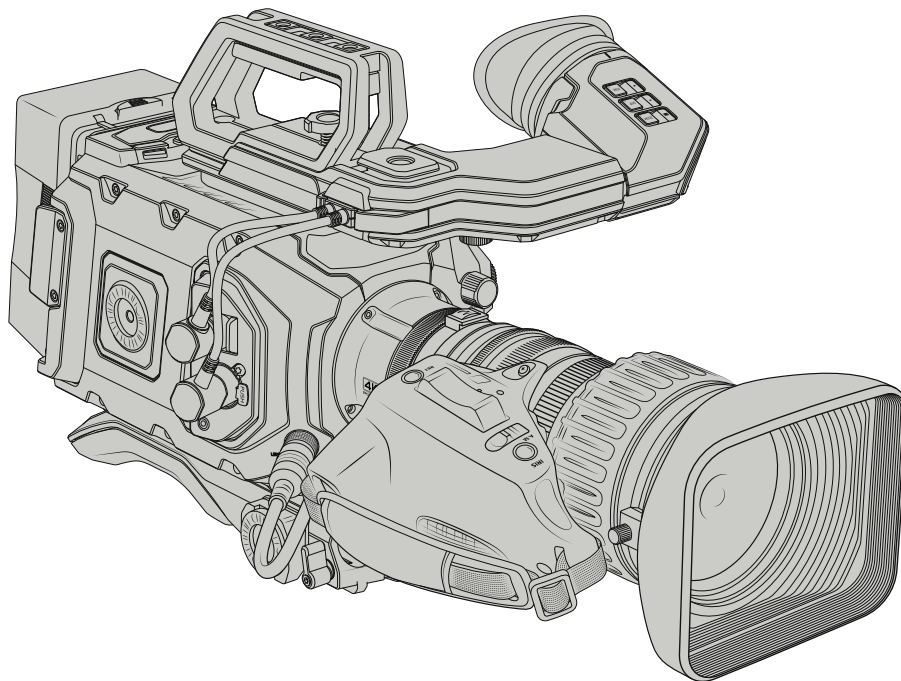
> **TIP** Using the optional URSA Mini Pro PL mount fitted, URSA Broadcast is also compatible with servo driven PL cine lenses.

B4 broadcast lenses offer several features that aren't typically present in still photography and cinema lenses. In addition to the ability to hold focus through a large zoom range, these lenses are distinguished by handgrip controls and servo driven iris and zoom functions. Some lenses also feature servo driven focus. With the 12 pin hirose connector fitted, iris and zoom can be controlled from the handgrip, from your camera or even remotely through an ATEM switcher. Lenses with servo focus can all accept auto focus commands from a camera or switcher.

B4 Lenses with iris and zoom control include:

- Fujinon B4 lens models with HA, ZA, XA and UA prefixes in their model name and RM in their suffix. For example, Fujinon **XA**20sxB**RM**.
- Canon B4 lens models with HJ, KJ and CJ prefixes and IRSE or IRSD in their suffix. For example for example Canon **KJ**20x8.2B **IRSD**.

B4 Lenses with full servo control for focus, iris and zoom include:

- Fujinon B4 lens models with HA, ZA and UA prefixes in their name and the letters RD or ZD in the suffix. For example, Fujinon **HA**22x7.8 BE**RD**.
- Canon B4 lens models with HJ, KJ..ex and CJ prefixes in their name and the letters IASE or IASD in the suffix. For example, Canon **HJ**24ex7.5B **IASE**.

It's important to set these functions properly so your URSA Broadcast operates as expected. Follow these simple steps to configure your B4 lens and start shooting.

B4 lens controls

Iris

On the top of most B4 handgrips, you'll find an 'auto/manual' or 'A/M' switch, and a 'push auto' or 'iris' switch. These control the your lenses' aperture ring.
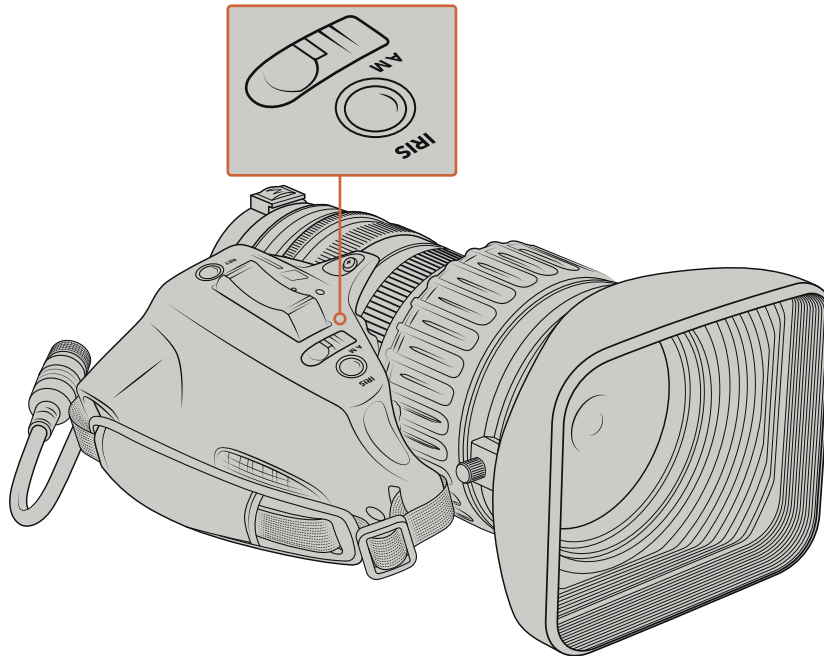
Auto

Set this switch to 'auto' or 'a' to adjust your lens aperture via your URSA Broadcast or an ATEM switcher. You can adjust lens aperture from URSA Broadcast using the iris wheel, internal control panel buttons, touchscreen controls, or iris based auto exposure modes. See the 'URSA Broadcast controls' and 'touchscreen controls' sections in this manual for more details. While in 'auto' mode, the aperture ring on your B4 lens cannot be moved manually.

Manual

Set this switch to 'manual' or 'm' to adjust your lens aperture by turning the iris ring on the lens barrel. In this mode, your lens will not accept aperture commands from your URSA Broadcast or ATEM switcher.

Push Auto / Iris

Use this button to momentarily activate 'auto' aperture control while in 'manual' mode. This can be combined with iris controls on your camera or ATEM switcher to great effect.

For example, with your camera set to an iris based auto exposure mode and your lens aperture set to 'manual,' you can freely adjust your lens iris by using the aperture ring on the lens barrel, however tapping the 'push auto' / 'iris' button will momentarily activate auto exposure, adjusting your iris for the current lighting conditions.

Alternatively, you can set an iris value using the controls on your URSA Broadcast's LCD touchscreen. While in 'manual' mode, you are free to adjust lens aperture using the aperture ring on the lens barrel, but tapping the 'push auto' / 'iris' button will return the lens to the preset value on your touchscreen.

Zoom

On the underside of most B4 handgrips, you'll find a 'zoom' switch that can be set to 'servo' or 'manual.' This controls zoom behavior.

Servo

Set this switch to 'servo' or 's' to enable servo zoom control. In this mode, the rocker switch on your handset can be used to zoom your lens in and out, as well as any other zoom related controls, such as zoom speed and quickzoom. Your lens will also accept zoom commands from URSA Broadcast and ATEM switchers, so long as it is connected to the camera via the 12 pin hirose connector. In this mode, you typically can't adjust your lens's manual zoom ring.

> **TIP** Handgrip zoom rockers are typically linked to zoom speed. Push the rocker down gently to zoom slowly, push down harder to zoom more rapidly.

Manual

Set this switch to 'manual' or 'm' to disable servo control and adjust zoom using the zoom ring on your lens barrel. In this mode, your lens will not accept zoom commands from the handgrip, URSA Broadcast, or ATEM switchers.
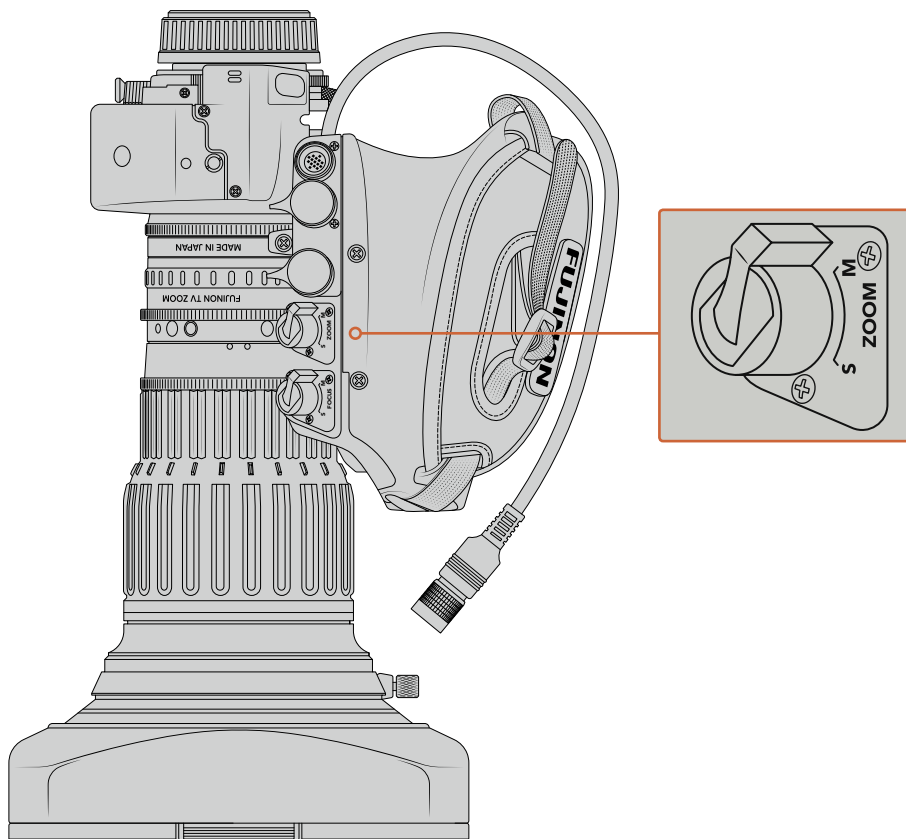
Focus

Some B4 lenses also have focus servo controls. If this control is present on your lens, you'll see a 'focus' switch on the underside of the handgrip with two settings, 'servo' and 'manual.'

Servo

Set this switch to 'servo' or 's' to enable servo focus control. In this mode, your lens can accept focus commands from URSA Broadcast or an ATEM switcher via the 12 pin hirose connector.

Manual

Set this switch to 'manual' to use the focus ring on the lens barrel to control focus. B4 lenses tend to autofocus quite slowly, so using manual control is more common.
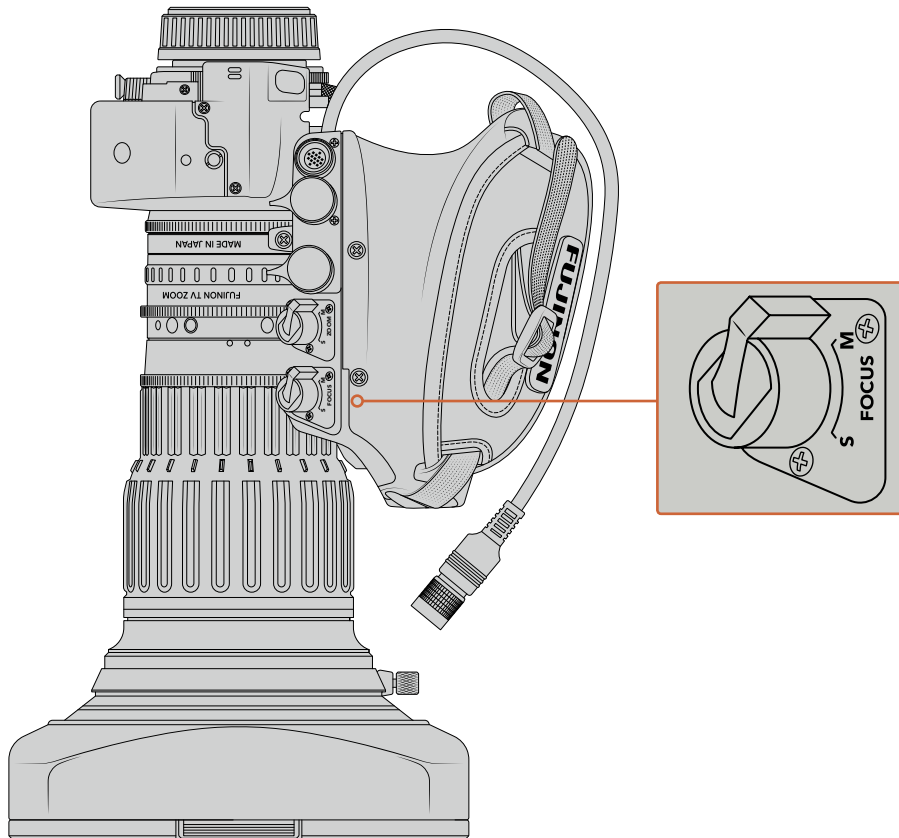
NOTE Analog B4 lenses with servos are also supported although the camera will only power the zoom servo and support electronic iris control. Many of them are standard definition and may not have the standard 12 pin Broadcast connector. If you are going to use an analog B4 lens, it's important to make sure it is compatible with your camera first as some have limited feature sets. It is also worth testing them for their image circle coverage as some of them may reveal resolution and light fall off towards the edge of the frame.

Setting the Back Focus on B4 Lenses

One of the huge advantages of B4 lenses is that they are designed to be 'parfocal' which means they hold focus all the way through the zoom range. This means you can zoom in, get focus on an object and then when you zoom out it will remain in focus.
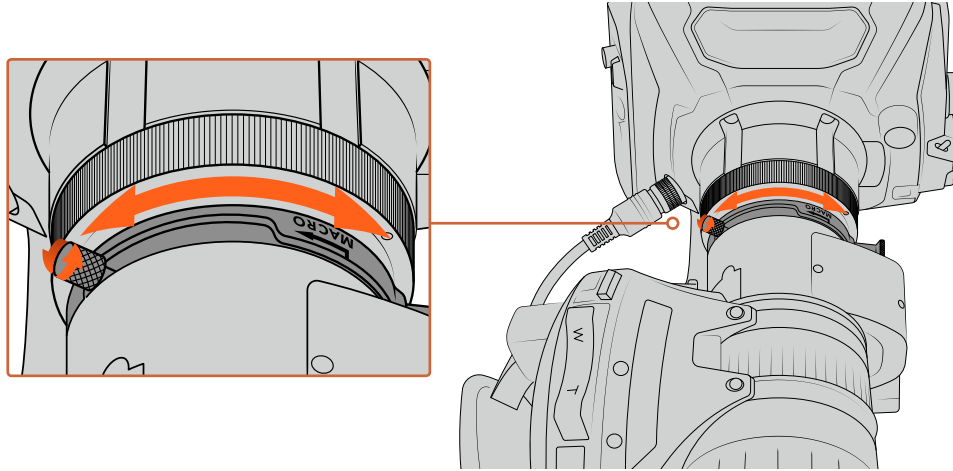
The back focus ring is typically located at the rear of the lens, close to the mount

Back focus is critical in ensuring that your HD or 4K B4 lenses retain focus right through the zoom range. When you first mount a B4 lens on your camera you should check that the back focus is correct. Back focus should also be checked when you swap lenses, and it's a good idea to periodically check back focus at the start of major projects.

To check the back focus of a B4 lens:

1   Place a focus test chart, or a flat white item with good high contrast detail, approximately seventy feet, or as far away as possible, from the camera.

2   Set the iris on the lens wide open and compensate for exposure by using the built in NDs if you need to. You'll want a shallow depth of field so you can exaggerate any focus issues.

3   Zoom into the chart and set focus.

4   Now zoom out. If you reach maximum wide and the focus remains sharp, then your back focus is correct and you don't need to make any adjustments.

    However, if you zoomed out and the chart drifted out of focus, the back focus is incorrect. Zoom all the way out and adjust the back focus ring on the rear of the lens close to the mount. The back focus ring typically has a twist knob used to loosen and tighten. Simply loosen the twist knob and rotate the ring until your chart is in focus.

5   Now zoom in and out slowly and check if your chart remains in focus all the way through the zoom.

6   Repeat steps 4 and 5, zooming in and out and making adjustments to the back focus ring. If your lens holds focus all the way through the zoom range your back focus is now set correctly.

TIP As temperature changes and wear over time can have subtle effects on the back focus, it's worth regularly checking the back focus on B4 lenses to ensure it stays accurate.

Using Box Lenses

Large studio box lenses like Fujinon's UA series and Canon's CJ series lenses can also be used with URSA Broadcast or URSA Mini Pro's B4 mount. These types of box lenses allow horizontal and vertical image stabilization on studio style 27x lenses, as well as extreme zoom ranges with 80x, 86x, 90x and even 107x magnification which are incredible for broadcasting sports and outdoor events.
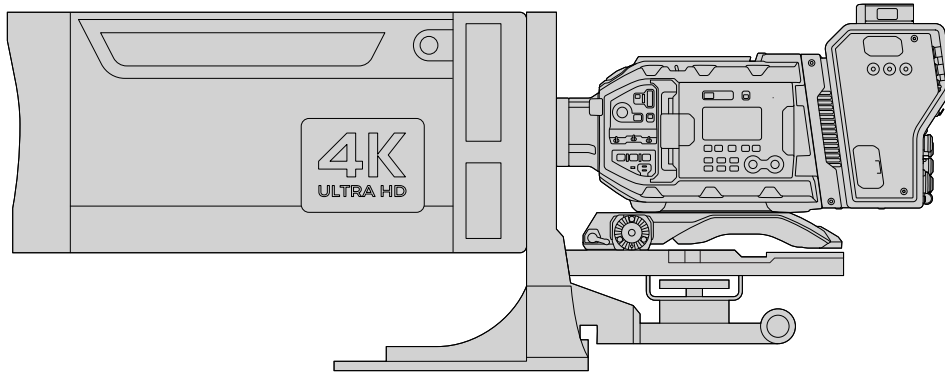
The large size and high power draw of box lenses means that you will need to setup your camera correctly on a heavy duty tripod or pedestal, with adequate spacing. This is possible with URSA Mini Shoulder Kit, a VCT-14 plate and a box lens adapter.

Plug the 12 pin Hirose connector from the lens into URSA Broadcast or URSA Mini Pro's 12 pin lens connector. Add additional power to the lens by using an URSA 12 volt power supply, or if you are using Blackmagic Camera Fiber Converter, you can run additional power from the 12 volt D-tap output on the side of the unit.
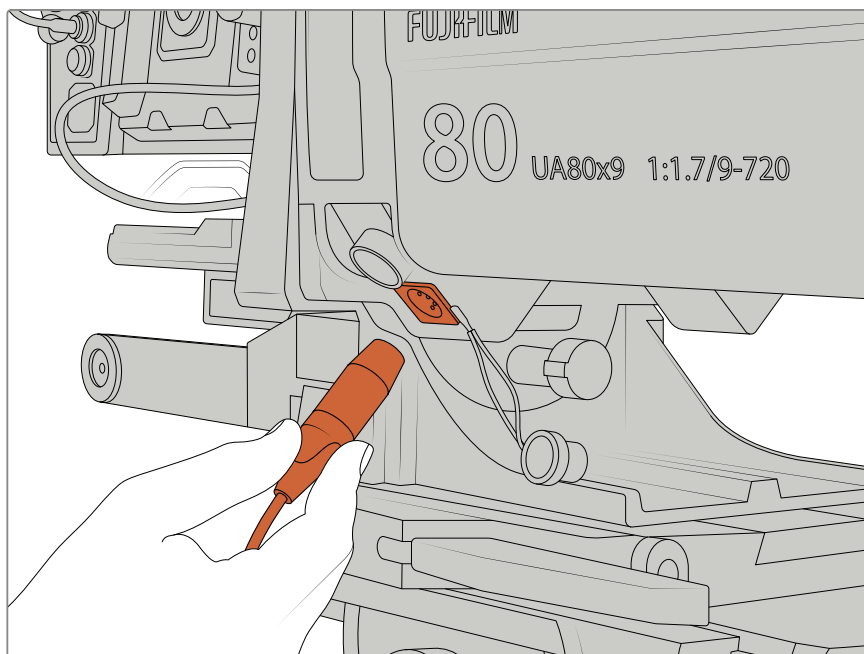
Add additional power to your box lens by plugging in a 4 pin XLR cable

Once additional power is connected, you can power up your camera and control the lens with your URSA Broadcast or URSA Mini Pro.

PL Servo Zoom Lenses

PL zoom lenses used for motion pictures can also be used with your URSA Broadcast. These lenses are designed for super 35mm which is a larger format compared to 2/3" sensors, so the image from the lens will have a narrower field of view to when it is used on a Super 35mm sensor camera. This can be effective as it decreases you field of view, so you get the effect of zooming in even tighter. If you need to go wider, you may need to compensate for the crop factor by using a shorter focal length lens.

Super 35mm PL lenses with full servo control of focus, iris and zoom include:

Brand	Series	Model	Range	Max. Aperture
Fujinon	Cabrio	ZK2.5x14-SAF	17-120mm	T2.9
Fujinon	Cabrio	ZK4.7x19-SAFB	19-90mm	T2.9
Fujinon	Cabrio	ZK3.5x85-SAF	85-300mm	T2.9-T4
Fujinon	Cabrio	XK6x20	20-120mm	T3.5
Fujinon	Cabrio	ZK12x25 with ESM-15A-SA	25-300mm	T3.5-3.85
Canon	Cine-servo	CN7x17KAS S	17-120mm	T2.9-3.9
Canon	Cine-servo	CN20x50	50-1000mm	T5-8.9

Focus and zoom controls can also be used to drive focus and zoom from the pan handles in a studio environment on all of the servo zoom lenses listed above.

Hybrid Compact Servo Zoom Lenses

Recently, a new category of lenses known as 'compact-servo' zoom lenses have been introduced. These are have some of the functionality of B4 and PL servo zoom lenses but use an EF mount. The zoom rocker for these lenses are able to be powered through the lens mount from URSA Broadcast and information such as lens name, iris, focus and zoom position values are all able to be read and recorded by URSA Broadcast's lens metadata system.

Electronic control of the focus, iris and zoom is available with these lenses. When connected to a switcher, these can also be controlled remotely via ATEM Software Control. If you are operating in a live broadcast or studio environment, use of Canon digital focus and zoom control is possible, but additional custom cables are required from 3rd party manufacturers for full functionality.

Lenses in this range include:
- Canon CN-E 18-80mm T4.4 Compact-servo
- Canon CN-E 70-200mm T4.4 Compact-servo

Storage Media

Ursa Broadcast uses CFast 2.0 cards or fast UHS-II and UHS-I SD cards to record Ultra HD, 2K or HD video.

CFast Cards

CFast 2.0 cards are capable of supporting very high data rates, so are perfect for recording HD and 4K video at high frame rates. Refer to the record duration table in the 'recording' section for details on the maximum frame rates that can be recorded in each format.

> **NOTE** While CFast 2.0 cards are generally high speed cards, some cards have slower write speeds compared to read speeds, and maximum data rates can differ between models. To ensure reliable recording in your chosen frame rates, use only the recommended cards listed in this section.

Inserting a CFast Card

To record using CFast cards you need to set your camera accordingly. To do this, set the storage media switch above the media slots to the 'CFAST' position.

To insert a CFast card.

1   Open the fold out monitor to access the CFast slots.

2   With the label on the CFast card facing the touchscreen, insert the card until you feel it lock into place. Push the CFast card ejector button to eject the card.

The storage information at the bottom of the LCD touchscreen will show the name and record time remaining of the detected CFast cards.
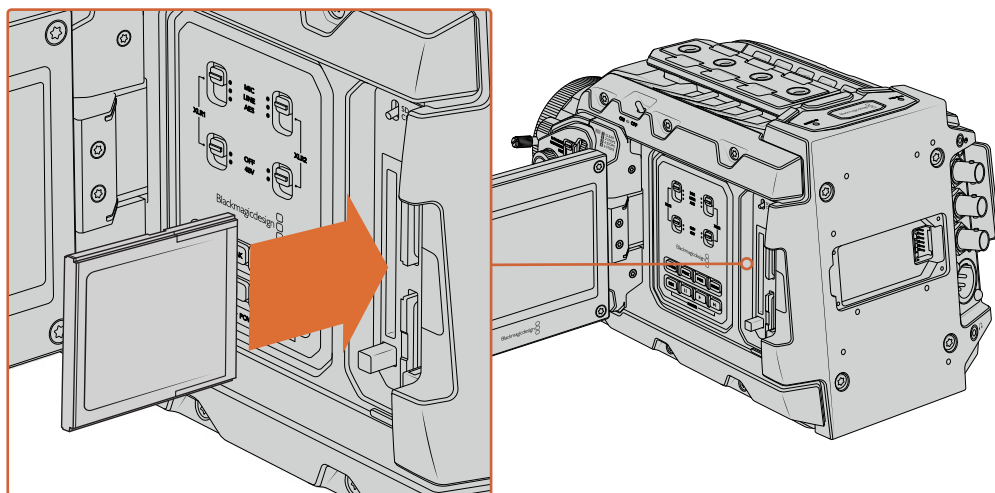
Blackmagic URSA Broadcast has two CFast slots for continuous recording

Choosing a CFast 2.0 Card

When working with high data rate video it's important to carefully check the CFast card you would like to use. This is because CFast 2.0 cards have different read and write speeds. Some cards can record sustained RAW video, and some are suited to compressed recording using ProRes and compressed RAW formats. The tables below identify the CFast cards recommended for use when shooting with Blackmagic URSA Broadcast.

Which CFast cards should I use with the Blackmagic URSA Broadcast?

The following CFast 2.0 cards are recommended for 2160p RAW up to 30 fps.

Brand	Card Name	Storage
Angelbird	AVpro CF	160GB
Angelbird	AVpro CF	240GB
KomputerBay	3400x CFast 2.0 Card	64GB
KomputerBay	3400x CFast 2.0 Card	128GB
KomputerBay	3600x CFast 2.0 Card	64GB
Lexar	Professional 3500x	128GB
Lexar	Professional 3500x	256GB
Lexar	Professional 3600x	128GB
Lexar	Professional 3600x	256GB
SanDisk	Extreme Pro. SDCFSP-128G-x46D	128GB
SanDisk	Extreme Pro. SDCFSP-256G-x46D	256GB
Transcend	CFX650. TS128GCFX650	128GB
Transcend	CFX650. TS256GCFX650	256GB
Transcend	CFX650. TS128GCFX650BM	128GB
Transcend	CFX650. TS256GCFX650BM	256GB
Wise	CFast 2.0 3400x	128GB
Wise	CFast 2.0 3400x	256GB

The following CFast 2.0 cards are recommended for 2160p RAW up to 30 fps but have been discontinued by the manufacturer.

Brand	Card Name	Storage
Lexar	Professional 3400x	128GB
Lexar	Professional 3400x	256GB

NOTE Only the 'D-series' of Sandisk CFast 2.0 cards have been certified for use with Blackmagic URSA Broadcast. These cards can be identified by a large 'D' printed on the back of the card in the lower left corner, and we have also listed the model numbers to make them easier to identify. This model number varies slightly from region to region, with the 'x' in the model number changing in different markets. For example, an 'A' in the United States and a 'G' in the Asia Pacific and Europe region.

The following CFast 2.0 cards are recommended for 2160p ProRes 422 HQ up to 60 fps.

Brand	Card Name	Storage
Angelbird	AVpro CF	160GB
Angelbird	AVpro CF	240GB
KomputerBay	3400x CFast 2.0 Card	64GB
KomputerBay	3400x CFast 2.0 Card	128GB
KomputerBay	3600x CFast 2.0 Card	64GB
Lexar Professional	3500x	64GB
Lexar Professional	3500x	128GB
Lexar Professional	3500x	256GB
Lexar Professional	3600x	128GB
Lexar Professional	3600x	256GB
SanDisk	Extreme Pro. SDCFSP-128G-x46D	128GB
SanDisk	Extreme Pro. SDCFSP-256G-x46D	256GB
Silicon Power	CFX310 CFast 2.0 Card	256GB
Transcend	CFX650. TS128GCFX650	128GB
Transcend	CFX650. TS256GCFX650	256GB
Transcend	CFX650. TS128GCFX650BM	128GB
Transcend	CFX650. TS256GCFX650BM	256GB
Wise	CFast 2.0 3400x	128GB
Wise	CFast 2.0 3400x	256GB
Wise	CFast 2.0 3500x	512GB

The following CFast 2.0 cards are recommended for 2160p ProRes 422 HQ up to 60 fps but have been discontinued by the manufacturer.

Brand	Card Name	Storage
Lexar	Professional 3400x	32GB
Lexar	Professional 3400x	64GB
Lexar	Professional 3400x	128GB
Lexar	Professional 3400x	256GB

For the most up to date information on supported CFast cards for Blackmagic URSA Broadcast please refer to the Blackmagic Design support center at www.blackmagicdesign.com/support.

SD Cards

In addition to CFast 2.0 cards, Blackmagic URSA Broadcast can record on high speed UHS-I and UHS-II type SD cards. Using high end SDXC UHS-II cards, you can even record ProRes HQ footage in 2160p for Ultra HD content!

With SD cards, you can use more affordable storage media when shooting compressed video formats in HD. SDXC and SDHC are a very common media storage format for consumer still and video cameras.

If you've ever shot video using a DSLR, or use a Blackmagic Micro Cinema Camera, Pocket Cinema Camera or Blackmagic Video Assist, you probably already have compatible SD cards to use.

For projects that don't require the highest resolution RAW files, or for when long recording durations are needed, using SD cards can be very economical. Lower capacity and lower speed SD cards can also be used for storing and loading LUTs and Presets.

Inserting an SD Card

To insert an SD Card.

1   Open the fold out monitor to access the SD card slots. These are the smaller slots located between the CFast slots.

2   Set the storage media toggle switch above the slots to 'SD'.

3   With the label on the SD card card facing away from the touchscreen, insert the card until you feel it lock into place. To remove an SD card, push the SD card in to eject it.

4   The storage indicator at the bottom of the LCD touchscreen will show the name and record time remaining of detected cards.
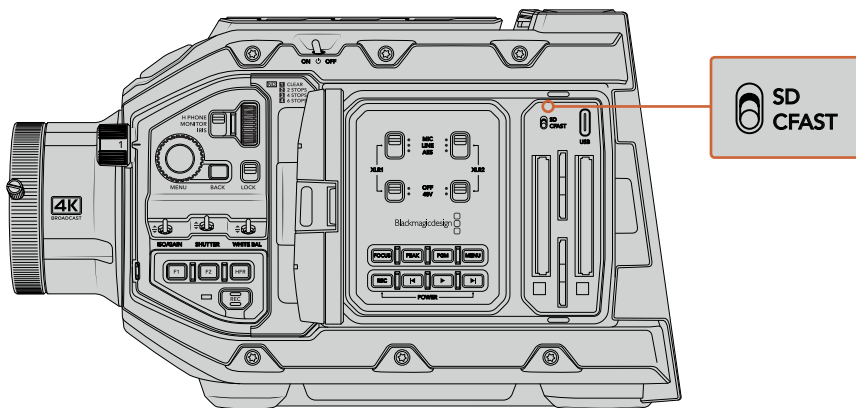
When recording to SD cards on URSA Broadcast make sure the storage media selection switch is set to 'SD'

Choosing a fast SD Card

If you are recording Ultra HD, then we recommend using the fastest high speed UHS-II type SD cards available. It's important to use high speed UHS-II SD cards for Ultra HD and HD recording, or UHS-1 cards for HD recording. These cards are rated for fast data speeds and support larger storage sizes. Generally the faster the cards, the better. Refer to the recommended SD cards table earlier in this section for more information.

Before using your cards, you will need to format them to either HFS+ or exFAT formats. You can format your media via your camera's 'storage' settings. Refer to the 'settings' section for more information on storage settings.

If you want to, you can format your cards using a Mac or Windows computer. When using your media on Mac OS, you can use HFS+ which is the Mac disk format. If you are using Windows then you should use exFAT format, which is the Windows disk format that Mac computers can also read.

The tables below identify the SD cards recommended for use when shooting with Blackmagic URSA Broadcast. It's worth regularly checking the latest version of this manual for more up to date information. Updated manuals are available for download from the Blackmagic Design website at www.blackmagicdesign.com/support

> **NOTE** For high resolution, high frame rate and RAW recording, we recommend using CFast 2.0 media, which is typically faster and is available in higher storage capacities.

Which SD cards should I use with URSA Broadcast?

The following SD cards are recommended for recording up to 2160p30 ProRes HQ.

Brand	Card Name	Storage
Angelbird	AV Pro 300MB/s UHS-II	64GB
Angelbird	AV Pro 300MB/s UHS-II	128GB
Delkin Devices	UHS-II 250MB/s SDHC	32GB
SanDisk	Extreme Pro UHS-II 280MB/s SDHC	32GB
SanDisk	Extreme Pro UHS-II 280MB/s SDXC	64GB
SanDisk	Extreme Pro UHS-II 300MB/s SDHC	32GB
SanDisk	Extreme Pro UHS-II 300MB/s SDXC	128GB
Sony	SF-G64 300MB/s UHS-II	64GB
Sony	SF-G128 300MB/s UHS-II	128GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	64GB
Transcend	Ultimate UHS-II 180MB/s SDXC	64GB
Wise	285MB/s UHS-II SDXC	64GB

The following SD cards are recommended for RAW Lossless recording up to 1080p30

Brand	Card Name	Storage
Angelbird	AV Pro 300MB/s UHS-II	64GB
Angelbird	AV Pro 300MB/s UHS-II	128GB
Delkin Devices	UHS-II 250MB/s SDHC	32GB
Lexar	Professional 2000x UHS-II 300MB/s SDHC	32GB
Lexar	Professional 2000x UHS-II 300MB/s SDXC	64GB
SanDisk	Extreme Pro UHS-I 95MB/s SDXC	64GB

Brand	Card Name	Storage
SanDisk	Extreme Pro UHS-I 95MB/s SDXC	128GB
SanDisk	Extreme Pro UHS-II 280MB/s SDXC	64GB
Sony	SF-G64 300MB/s UHS-II	64GB
Sony	SF-G128 300MB/s UHS-II	128GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	64GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	128GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	256GB
Transcend	Ultimate UHS-II 180MB/s SDXC	64GB

The following SD cards are recommended for recording up to 1080p60 ProRes HQ

Brand	Card Name	Storage
Angelbird	AV Pro 300MB/s UHS-II	64GB
Angelbird	AV Pro 300MB/s UHS-II	128GB
Delkin Devices	UHS-II 250MB/s SDHC	32GB
Lexar	Professional 2000x UHS-II 300MB/s SDHC	32GB
Lexar	Professional 2000x UHS-II 300MB/s SDXC	64GB
Lexar	Professional 1000x UHS-II 150MB/s SDXC	64GB
SanDisk	Extreme Pro UHS-I 95MB/s SDXC	64GB
SanDisk	Extreme Pro UHS-I 95MB/s SDXC	128GB
SanDisk	Extreme Pro UHS-II 280MB/s SDHC	32GB
SanDisk	Extreme Pro UHS-II 280MB/s SDXC	64GB
SanDisk	Extreme Pro UHS-II 300MB/s SDXC	64GB
SanDisk	Extreme Pro UHS-II 300MB/s SDXC	128GB
Sony	SF-G64 300MB/s UHS-II	64GB
Sony	SF-G128 300MB/s UHS-II	128GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	64GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	128GB
Toshiba	Exercia Pro UHS-II 270MB/s SDXC	256GB
Transcend	Ultimate UHS-II 180MB/s SDXC	64GB
Wise	285MB/s UHS-II SDXC	64GB

For the most up to date information on supported SD cards please refer to the Blackmagic Design support center at www.blackmagicdesign.com/support.

Locking and Unlocking SD Cards

SD cards can be write protected, or 'locked', to prevent data from being overwritten.

When inserting an SD card, make sure the card is not write protected. Write protection is disabled by moving the plastic switch on the left side of the card to the position closest to the connectors. After recording, you can then write protect the card by sliding the switch back down to the bottom position.
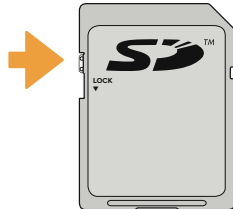
Move the lock tab up or down
to lock or unlock an SD card

Your URSA Broadcast will let you know if you've inserted a locked SD card by displaying a 'locked' icon on the LCD touchscreen and storage menu. If the card is locked, you won't be able to record video, capture stills, or export LUTs and presets until it is unlocked.
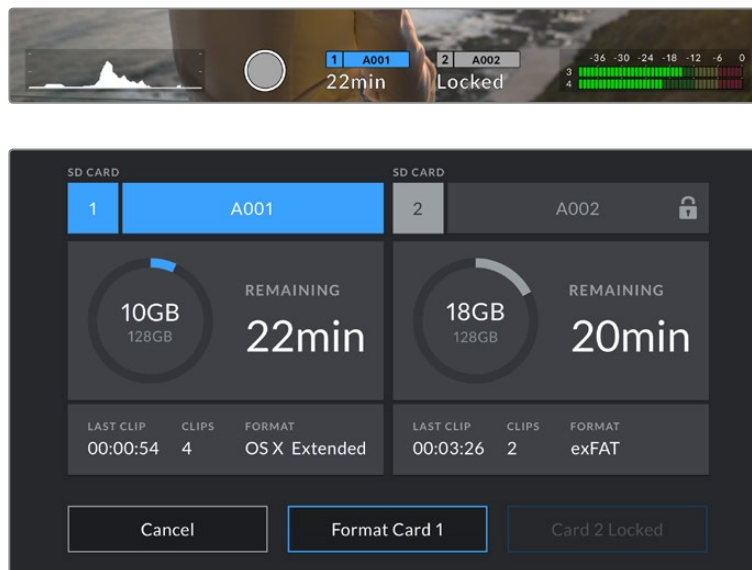
Your URSA Broadcast will indicate when locked SD storage media is inserted

Preparing Media for Recording

You can format your CFast or SD cards using the 'format card' feature on URSA Broadcast's storage and formatting screen, or via a Mac or Windows computer. We recommend formatting storage media using URSA Broadcast for best performance.

HFS+ is also known as Mac OS extended and is the recommended format as it supports 'journaling'. Data on journaled media is more likely to be recovered in the rare event that your CFast card becomes corrupted. HFS+ is natively supported by Mac OS.

ExFAT is supported natively by Mac OS and Windows without needing to purchase any additional software. However, exFAT does not support journaling.

NOTE Before formatting your media, it's important to make sure the media storage switch has been set correctly to either SD card or CFast card. Always check the settings carefully before formatting.

Preparing Media on Blackmagic URSA Broadcast

1 Tap either storage indicator at the bottom of the LCD touchscreen to enter the storage manager.

2 Tap 'Format Card 1' or 'Format Card 2' to format the CFast card in slot 1 or 2, respectively.
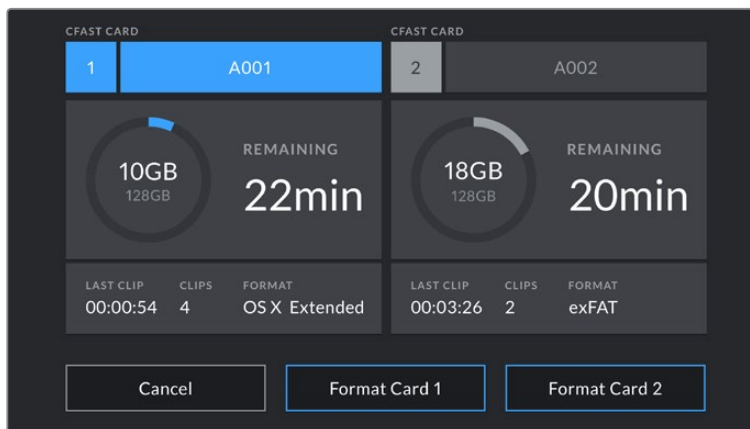
Use your URSA Broadcast's storage manager to format your camera's CFast cards

3 Tap 'edit reel number' if you would like to manually change the reel number.

4 Choose OS X Extended or exFAT format and tap the 'format card' button.
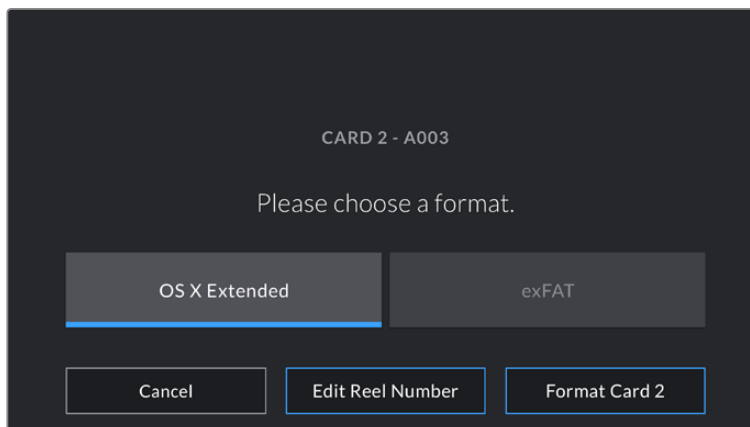
Tap 'edit reel number' to manually edit the reel number

5 You will be asked to confirm your selection. Tap 'format card' again to continue or 'cancel' to cancel the format.

CARD 2 - A003

Format Card 2 to exFAT?
This will erase all data from your card.

Cancel   Format Card 2
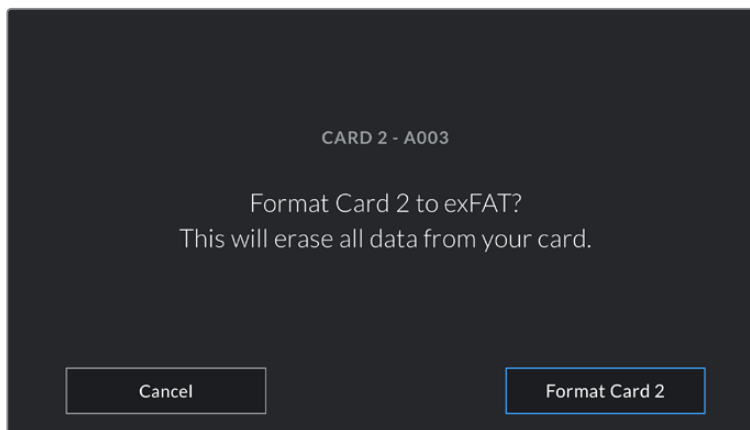
Check that you have selected the correct card before formatting

6 You will be notified when the format is complete.

7 Tap 'ok' to return to the storage manager.

8 Tap 'exit' to leave the storage manager.

When formatting CFast or SD cards using the storage manager, your URSA Broadcast will use the Camera ID from the slate and reel number to name the card. Your camera automatically increments reel numbers each time you format. If you need to manually enter a specific reel number, tap the 'edit reel number' and enter the number you want to format the card as.

When you start a new project, reel numbering will reset to 1 when you tap on 'reset project data' in the 'project' tab of the slate.

TIP If your URSA Broadcast is set to record to SD cards and you have inserted a locked card, you will be unable to format that card. A padlock icon will appear next to the card's name in the storage manager. Simply unlock the card to format and record. For more information on locking SD cards, see the 'SD cards' section of this manual.

It's worth mentioning that if your camera's media storage switch is set to SD or CFast, only the selected card type will be formatted when you tap 'format card'.

CFAST CARD   CFAST CARD
1   A001   2   A001

SD CARD   SD CARD
1   A001   2   A001
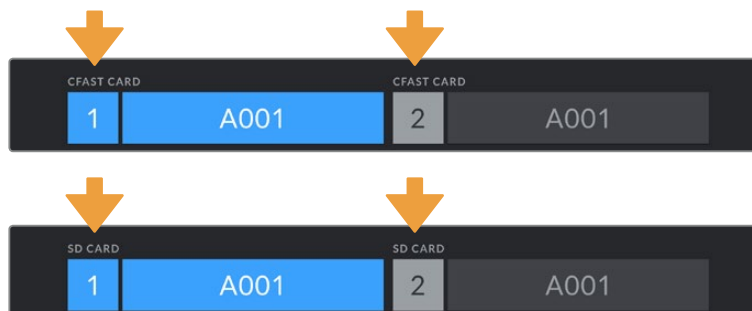
The storage manager on your URSA Broadcast will indicate whether you are currently managing CFast or SD media

For information on switching between CFast and SD storage see the 'SD Cards' section earlier in this manual.

Preparing Media on Mac

Use the Disk Utility application included with Mac OS to format your card in the HFS+ or exFAT formats. Remember to back up anything important from your CFast or SD card as all data will be lost when it is formatted.

1   Connect the CFast or SD card to your computer using a CFast 2.0 or SD reader/ writer or CFast drive, and dismiss any message offering to use your card for Time Machine backups.

2   Go to applications/utilities and launch Disk Utility.

3   Click on the disk icon of your CFast or SD card and then click the 'erase' tab.

4   Set the 'format' to 'Mac OS extended (journaled)' or 'exFAT'.

5   Type a 'name' for the new volume and then click 'erase'. Your CFast or SD card will quickly be formatted and made ready for use.
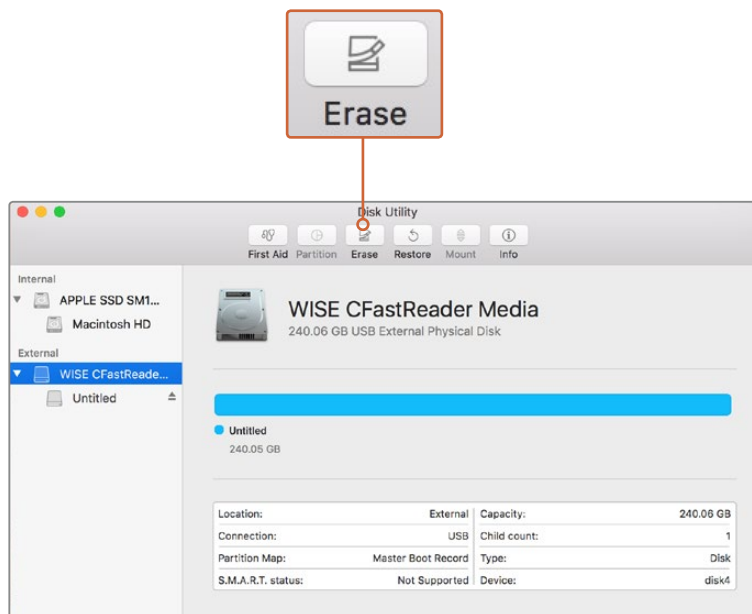
Use Disk Utility on Mac OS to erase your CFast card in the Mac OS extended (journaled) or exFAT format

Preparing Media on Windows

The 'format' dialog box can format a drive in the exFAT format on a Windows PC. Remember to back up anything important from your card as all data will be lost when it is formatted.

1   Connect the CFast or SD card to your computer using an external reader/writer or CFast drive.

2   Open the 'start' menu or 'start' screen and choose 'computer'. Right click on your CFast or SD card.

3   From the contextual menu, choose 'format'.

4   Set the file system to 'exFAT' and the allocation unit size to 128 kilobytes.

5   Type a volume label, select 'quick format' and click 'start'.

6   Your storage media will quickly be formatted and made ready for use.
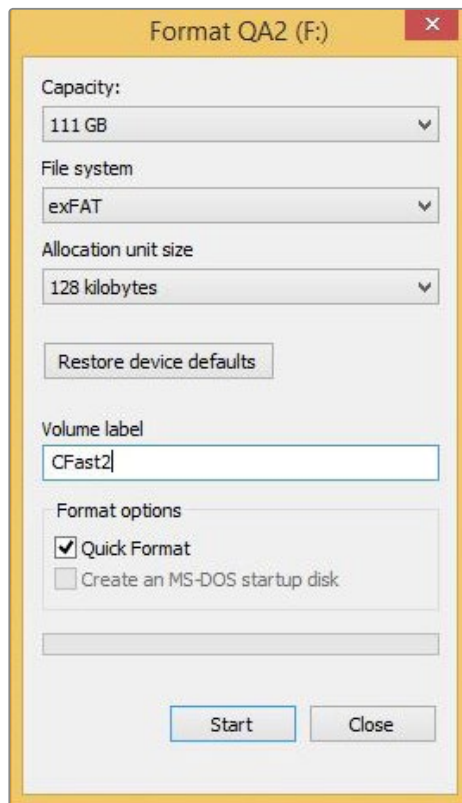
Use the 'format' dialog box feature in Windows to format your CFast or SD card in the exFAT format

NOTE If your recordings are dropping frames, check that your card is on our list of recommended media for the codec and frame size you are using. For lower data rates try lowering your frame rate, resolution, or try a compressed codec such as ProRes. Check the Blackmagic Design website for the latest information at www.blackmagicdesign.com

Recording

Recording Clips

B4 broadcast lenses typically have a record button positioned on the lens handle where your thumb would be when shooting from the shoulder. Simply press the record button on the handle to start recording. Press again to stop recording.

Your camera has record buttons built into the camera itself. A record button is located on the inside control panel, and on the forward control panel for convenient access when shooting from the shoulder.

TIP Blackmagic URSA Broadcast has a LANC input so you can easily attach an external LANC controller and trigger the record externally. For example, you may want to attach a LANC controller to your tripod so you can trigger the recording without taking your hands off the focus ring and tripod handle.

NOTE If you toggle the 'storage media selection' switch mid-recording, the camera will complete the current recording before switching to the other type of media. This ensures that you can not damage your recording if the switch is adjusted during a take.

Choosing the Codec, Resolution and Sensor Area

Your Blackmagic URSA Broadcast records using Apple ProRes and Avid DNx codecs, as well as CinemaDNG RAW. Sensor frame rate options will vary depending on the codec and resolution you choose.

It's worth noting that clips recorded using RAW 4:1 and RAW 3:1 compression are compatible with DaVinci Resolve, but may be incompatible with other software applications. If you plan on using other editing software, you should check its compatability with compressed RAW formats before filming.

TIP When shooting with SD cards, it's best to choose a lower resolution and quality such as Ultra HD ProRes HQ, DNxHD or lower.

Maximum Sensor Frame Rates

The tables below contain available codecs, resolutions and their maxiumum sensor frame rates.

	Resolution	Codec	Max Frame Rate
URSA Broadcast Maximum Frame Rates			
Ultra HD	3840x2160	ProRes 444XQ	40
	3840x2160	ProRes 444	40
	3840x2160	ProRes HQ	60
	3840x2160	ProRes 422	60
	3840x2160	ProRes LT	60
	3840x2160	ProRes Proxy	60
HD	1920x1080	ProRes 444XQ	60
	1920x1080	ProRes 444	60
	1920x1080	ProRes HQ	60
	1920x1080	ProRes 422	60
	1920x1080	ProRes LT	60
	1920x1080	ProRes Proxy	60
	1920x1080 (progressive)	DNxHD 220x	60
	1920x1080 (progressive)	DNxHD 145	60
	1920x1080 (interlaced)	DNxHD 220x	30 (60i)
	1920x1080 (interlaced)	DNxHD 145	30 (60i)

NOTE Off speed frame rates are not available when using interlaced formats.

To select your desired codec and resolution:

1   Press the 'menu' button on the control panel.
2   Navigate to the first page of the 'record' tab.
3   Tap your desired combination of codec, quality, and resolution.
4   Press 'menu' to exit.

Recording Formats and Project Frame Rates

After setting your codec and resolution, you should set your 'project' and 'sensor' frame rates. Refer to the 'recording' section in this manual for more information about frame rates.

The project frame rates available are:

23.98, 24, 25, 29.97, 30, 50, 59.94, and 60 frames per second.

The only exception is ProRes 444XQ or ProRes 444, which offers project frame rates of 23.98, 24, 25, 29.97 and 30 when shooting higher than HD resolution. For lossless Ultra HD RAW, frame rates above 30 fps use dual card mode.

Trigger Record

Your URSA Broadcast automatically sends a signal via the SDI outputs that will trigger recording when connected to equipment that supports the SDI trigger record feature, such as Blackmagic Video Assist. This means when you press record on your camera, your external SDI equipment will also start recording, and will stop recording when you press record again.

You will also need to set your equipment to enable SDI trigger recording to make sure it responds to the trigger signal from your URSA Broadcast. If your SDI equipment supports SDI trigger recording, it can usually be enabled using your SDI equipment's settings menu.
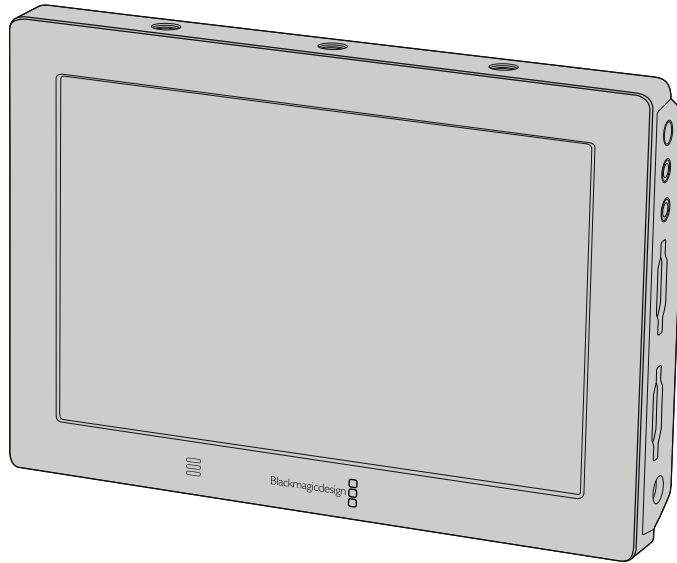
You can trigger recording on other SDI video equipment, for example Blackmagic Video Assist 4K, using the trigger record feature on your camera

Record Duration Table

Tables are provided showing approximate record duration in minutes and seconds compared to format, project frame rate and media size. The maximum recording time for your storage media will vary depending on the data size of the CFast or SD card and the recording format and frame rate you choose. For example, the storage rate for Apple ProRes 422 HQ at 3840 x 2160 is approximately 880 Mbps. At 24 frames per second, you can record approximately 47 minutes of video on a 256GB CFast 2.0 or SD card. At the same settings you can record approximately 23 minutes of video on a 128GB CFast 2.0 or SD card, which is approximately half the record duration of the 256GB card.

It should be noted that record duration on CFast 2.0 and SD cards can also vary slightly between cards from different manufacturers. It can also vary depending on whether the storage media is formatted as ExFat or Mac OS Extended.

Simple scenes containing less detail tend to require less data than more dense compositions. The values in these tables assume shots with a high complexity, which means you may get slightly longer record times depending on the nature of your shoot.

HD Progressive

CFast Card	Frame Rate	DNxHD 220x	DNxHD 145"	ProRes 444 XQ	ProRes 444	ProRes 422 HQ	ProRes 422	ProRes 422 LT	ProRes 422 Proxy
		Duration	Duration	Duration	Duration	Duration	Duration	Duration	Duration
	23.98	190 mins	285 mins	84 mins	127 mins	189 mins	283 mins	403 mins	877 mins
	24	189 mins	285 mins	84 mins	127 mins	189 mins	283 mins	403 mins	877 mins
	25	182 mins	274 mins	81 mins	122 mins	182 mins	271 mins	387 mins	843 mins
	29.97	152 mins	229 mins	–	–	–	–	–	–
256GB	30	152 mins	229 mins	67 mins	101 mins	152 mins	227 mins	324 mins	710 mins
	50	91 mins	138 mins	40 mins	61 mins	91 mins	137 mins	196 mins	434 mins
	59.94	76 mins	115 mins	–	–	–	–	–	–
	60	76 mins	115 mins	33 mins	50 mins	76 mins	114 mins	163 mins	363 mins

HD Interlaced

| CFast Card	Frame Rate	DNxHD 220x (1080i)	DNxHD 145 (1080i)
		Duration	Duration
	50i	182 mins	274 mins
256GB	59.94i	152 mins	229 mins
	60i	152 mins	229 mins

ULTRA HD

CFast Card	Frame Rate	CinemaDNG RAW	CinemaDNG RAW 3:1	CinemaDNG RAW 4:1	ProRes 444 XQ	ProRes 444	ProRes 422 HQ	ProRes 422	ProRes 422 LT	ProRes 422 Proxy
		Duration	Duration	Duration	Duration	Duration	Duration	Duration	Duration	Duration
	23.98	19 mins	37 mins	45 mins	21 mins	31 mins	47 mins	71 mins	101 mins	230 mins
	24	19 mins	37 mins	45 mins	21 mins	31 mins	47 mins	71 mins	101 mins	230 mins
	25	18 mins	35 mins	43 mins	20 mins	30 mins	45 mins	68 mins	97 mins	221 mins
256GB	30	15 mins	29 mins	36 mins	16 mins	25 mins	38 mins	57 mins	81 mins	184 mins
	50	9 mins	17 mins	21 mins	–	–	22 mins	34 mins	48 mins	111 mins
	60	7 mins	14 mins	18 mins	–	–	18 mins	28 mins	40 mins	92 mins

Playback

Playing Back Clips

Once you have recorded your video, you can use the transport control buttons to play back your clips.

Press the 'play' button once for instant playback and you'll see your recorded video on URSA Broadcast's LCD touchscreen. Your clips can also be viewed on any display connected to your URSA Broadcast's SDI outputs.
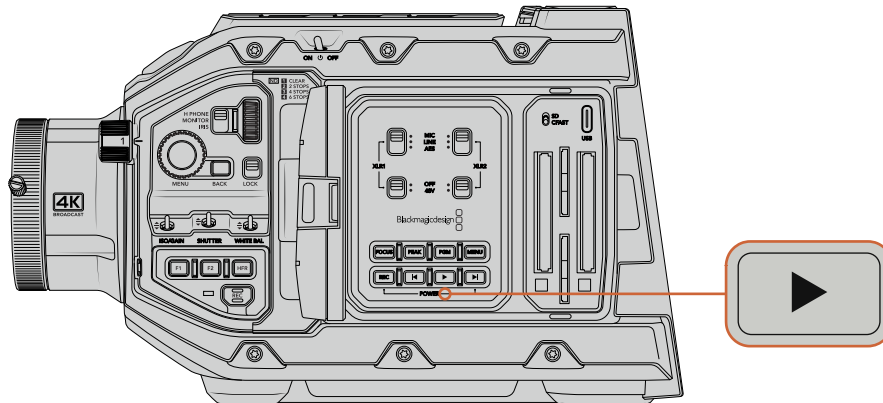
URSA Broadcast

> **TIP** Blackmagic URSA Broadcast has playback and transport controls buttons on both the internal and ergonomic control panels.

> **NOTE** Blackmagic URSA Broadcast will play back clips sharing the same codec family, frame rate and resolution. For example, if you want to play back HD clips recorded using ProRes 422 HQ at 29.97 fps, make sure your camera is set to the same frame rate and resolution, and a ProRes codec.

The controls of your camera work just like a CD player, so pressing the 'forward skip' button will skip to the start of the next clip. Press the 'reverse skip' button once to go to the start of the current clip or press twice to skip back to the start of the previous clip. Hold the 'forward' or 'reverse skip' button to play or reverse at 2x speed. Once shuttling forward or backwards, press the 'fast forward' or 'reverse skip' buttons twice for 4x, three times for x8 and four times for x16. You can also use the forward and reverse skip buttons to open or close the iris on compatible lenses while recording clips.

When recording a clip using a sensor frame rate that differs from your project frame rate, your clip's playback speed will also differ. For example, imagine you have set your camera's project frame rate to match your post production timeline of 24 frames per second. If you record a clip with your sensor frame rate set to 60 frames per second, your clips will play back in slow motion on both the camera and on your post production timeline.

> **TIP** Refer to the 'recording' section of this manual for more information about frame rate.

Operating URSA Broadcast

Industry standard BNC connectors are located on the right and rear panel of your URSA Broadcast for SDI connections. There are also two separate LANC inputs, one for the optional URSA side handle and one at the rear of the camera for an external LANC controller.

XLR inputs are on the top panel behind the mounting points for professional balanced analog audio and AES digital audio. A 4 pin XLR connector is provided on the rear panel for external power input, and an output is available on the right side for powering accessories such as Blackmagic URSA Viewfinder.

The USB port above the storage media slots is for connecting to a computer when updating your camera's internal software.

> **NOTE** Your camera has additional ergonomic controls that make it easy to quickly access the camera's essential settings and functions without opening the foldout touchscreen.

Camera Front
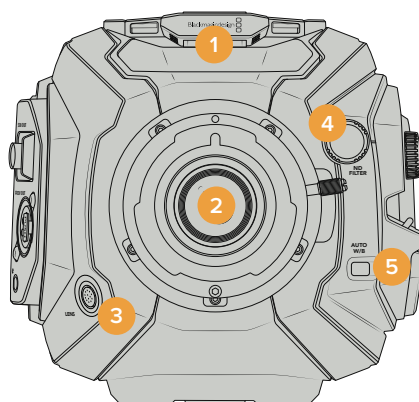
URSA Broadcast with B4 mount

1   **Stereo Microphone**
Built in high quality stereo microphone. Refer to the 'settings' section for information on microphone audio settings.

2   **Lens Mount**
URSA Broadcast is shipped with a B4 mount, however the mount is interchangeable and compatible with URSA Mini Pro 4.6K EF, PL and F mounts. Refer to the 'interchangeable lens mount' section for more information.

3   **Broadcast Lens Connector**
This connector provides power and control to compatible PL and B4 mount lenses with 12 pin connections. Refer to the 'using servo zoom lenses' section in this manual for a list of compatible lenses, including PL and B4 models.

4   **ND Filters**
Use this wheel to cycle through three built in neutral density filters, as well as a clear setting. See the section 'URSA Broadcast Controls' for more information.

5   **Auto White Balance**
The auto white balance button is marked 'Auto W/B' and is used when you want to set the white balance based on the what is currently in the center of the screen. For example, setting auto white balance on a gray card placed in front of the lens. See the section 'URSA Broadcast Controls' for more information.

Left Side

URSA Broadcast's left side panel lets you insert CFast cards, access the control panel and change settings. The USB-C port is located just above the CFast slots so you can easily plug into a computer when updating your URSA Broadcast's internal software.

Left Side Controls

The left side panel features additional controls for easy access to all of your camera's essential functions. These controls are split between the forward control panel, the ergonomic control panel located on the outside of the foldout touchscreen monitor, and a control panel on the inside of the foldout monitor.
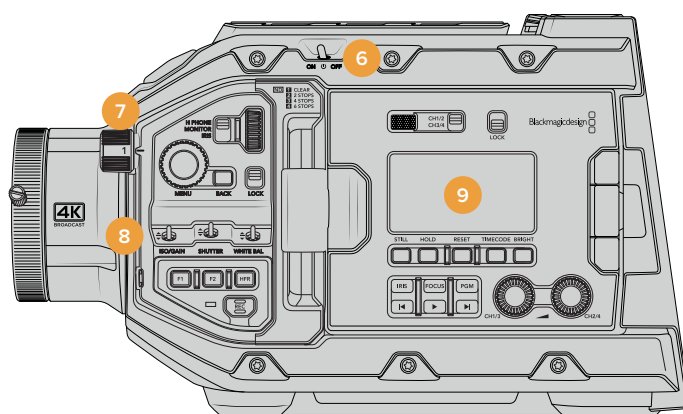
URSA Broadcast with touchscreen closed

6　Power Switch
Power switch for turning on the camera. There is also a backup power switch inside the fold out monitor that allows the camera to be powered on by pressing both the record and forward clip buttons at the same time.

7　ND Filters
Your URSA Broadcast has three internal neutral density filters to adjust the amount of light reaching the sensor. Four settings are available, ranging from clear to six stops of light reduction. Simply turn this wheel to move through the available settings. The filter will click into place for each setting. For more information see the section 'URSA Broadcast control buttons' in this manual.

8　Forward Control Panel
The forward control panel provides quick access to all of your URSA Broadcast's essential functions. These controls are located for easy access when shooting on a tripod or on the shoulder, and you can use them to adjust settings such as ISO, shutter speed, iris, white balance, frame rate, and more. See the section 'URSA Broadcast control buttons' for more information.

9　Ergonomic Control Panel
On the outside of your URSA Broadcast's foldout touchscreen monitor, you'll find an LCD status monitor and a variety of controls for fast, powerful monitoring control. Here you can see all of your camera's status information at a glance, as well as controlling a variety of powerful monitoring functions. See the section 'URSA Broadcast control buttons' for more information.

10   Storage Media Selection Switch
Use this switch to choose between CFast and SD storage media.

11   USB Port
USB-C port for updating internal software. See the section 'Blackmagic Camera Setup Utility' for more information.
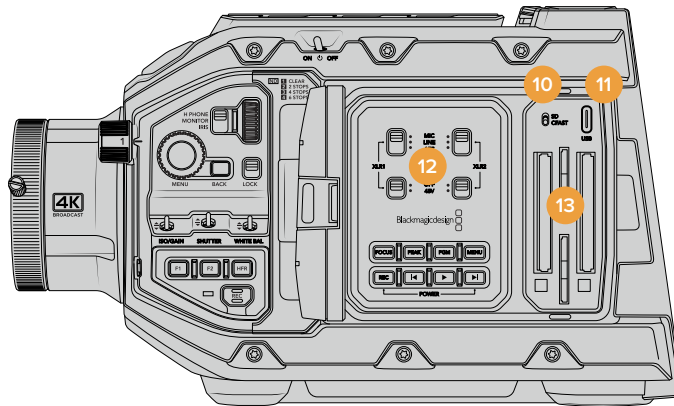
URSA Broadcast with touchscreen open

12   Internal Control Panel
When your URSA Broadcast's foldout monitor is open, you have access to the internal control panel. Use the controls here to set your audio inputs as well as phantom power settings. You can also access iris, focus, menu and playback controls and more. See the section 'URSA Broadcast control buttons' for more information.

13   Memory Card Slots
Insert CFast 2.0 cards, SDXC or SDHC cards for record and playback. Please note that you should check the list of certified cards in this manual or on our website. See the section 'storage media' for more information.

Right Side

URSA Broadcast's right side panel gives you access to all the video, audio and power connectors plus the side handle rosette mount.

14   Side Rosette Mount
Standard rosette mount for the side handle. Refer to the 'Getting Started' and 'Blackmagic URSA Mini Shoulder Mount Kit' sections.
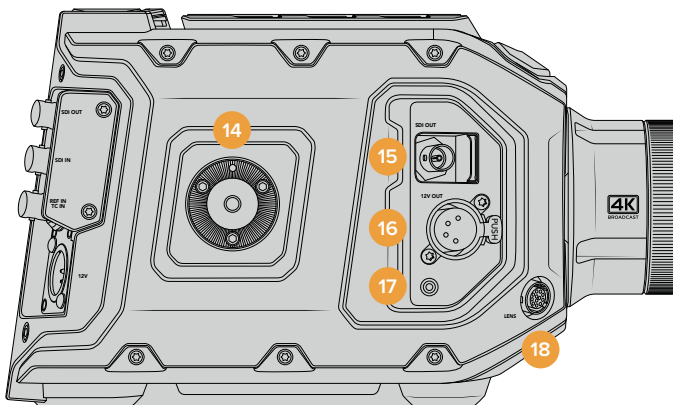
URSA Broadcast has a rosette mount built into the right side if you need to attach an optional URSA Mini side handle

15 HD Monitoring Output

3G-SDI connector for down converted 1080HD output. Use with Blackmagic URSA Viewfinder or external monitors. Refer to the 'camera video output' and 'Blackmagic URSA Viewfinder' sections for more information.

16 +12V Power Output

4 pin XLR connector for powering Blackmagic URSA Viewfinder, Blackmagic URSA Studio Viewfinder or external monitors and accessories. Refer to the 'Blackmagic URSA Viewfinder' and 'Blackmagic URSA Studio Viewfinder' sections for more information.

17 LANC Input

Dedicated 2.5mm TRS LANC connector for Blackmagic URSA Mini side handle. Refer to the 'getting started' section for more information on connecting the side handle.

18 Broadcast Lens Control Connector

Provides power and control to compatible PL and B4 mount lenses with 12 pin connections.

Rear Panel

19 Battery Mount Plate

Your Blackmagic URSA Broadcast has 4 mounting points and a molex connector for attaching the optional V mount or gold mount battery plate. Refer to the 'mounting batteries' section for more information.

20 LANC

This 2.5mm jack is used for external LANC remote control, such as an external record start stop control mounted to a tripod arm. LANC supports record start and stop, plus iris and focus control using compatible EF lenses.
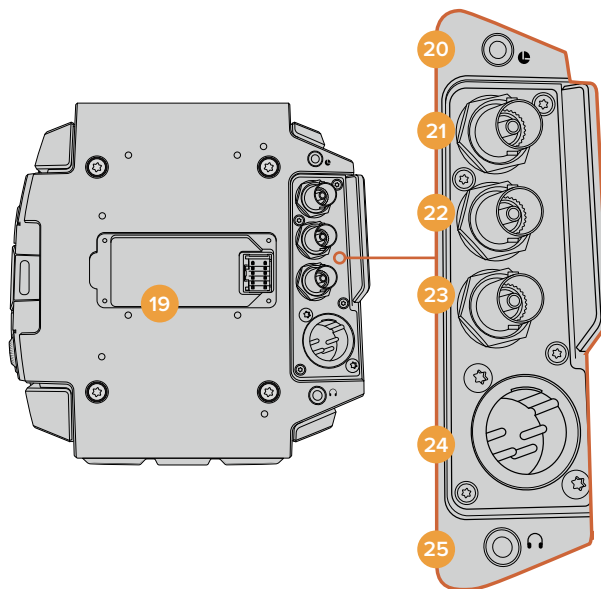
21 12G-SDI Out

Blackmagic URSA Broadcast's 12G-SDI output is used to send HD and Ultra HD video to SDI equipment such as routers, monitors, SDI capture devices, and broadcast switchers. You can also connect the 12G-SDI output to an external recorder such as the Blackmagic Video Assist for backup recording.

22 12G-SDI In

The 12G-SDI input is used for connecting to a switcher or external recorder. This means if you're using URSA Broadcast in a live broadcast, you can plug in the switcher's program output and monitor it during the shoot, or check playback from an external recorder. Press and hold the program button to see your program feed.

For more information, refer to the 'Ergonomic Control Panel' section in this manual.

You can also use an ATEM switcher's 'camera control' feature to remotely adjust many URSA Broadcast functions. See the section 'Understanding Studio Camera Control' for more information. The Blackmagic 3G-SDI Arduino Shield can also be used to provide custom control of the camera over SDI.

23 Reference and Timecode In

This input automatically recognizes and switches between timecode and reference input signals. Synchronize Blackmagic URSA Broadcast to a common reference signal, such as tri-level sync, by connecting to the 'reference' BNC input marked 'REF In'. This lets you sync URSA Broadcast to other SDI video equipment, for example, when using multiple cameras connected to a switcher. You can also use this connector to match an external timecode source to sync up multiple cameras, or audio and picture when shooting dual-system. This ensures audio and picture, or video from multiple cameras, can be easily synchronized during post production. It's worth noting that to use a reference signal through this input, you must set your reference source to 'external' in your URSA Broadcast's setup menu.

You can also set your camera to use the reference signal from an ATEM switcher via the Program SDI Input. This is helpful when working with ATEM switchers because all cameras can receive program return, camera control and be referenced together using a single SDI signal. See the 'setup settings' section in this manual for more information.

24 12V+ Power Input

Use the 4 pin 12-20 Volt DC XLR connector to plug in power from external sources such as the supplied power adapter, or portable batteries.

25 Headphone/Headset

The 3.5mm jack output is used for headphone monitoring and talkback. You can plug in iPhone and Android compatible headsets that have a built in microphone for quick and easy talkback. Talkback audio is embedded in channels 15 and 16 of the SDI output.

Top Panel
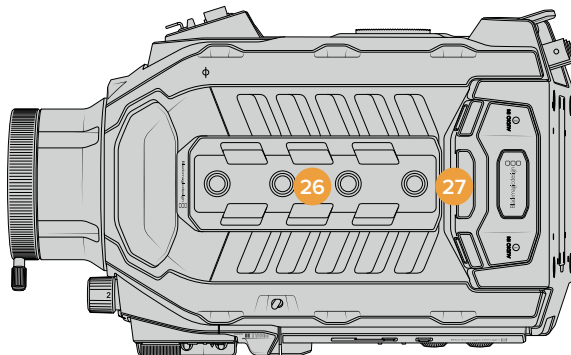
External analog audio can be plugged into the balanced XLR connectors on the top panel

26 1/4 Inch Mounting Points

Your camera's top panel contains 4 strong mounting points for attaching the top handle and accessories.

27 XLR Audio In

Use the balanced XLR inputs to plug in external analog audio from professional equipment such as audio mixers, PA systems or external microphones. The XLR connectors supply 48V phantom power so you can use microphones that aren't self powered. To enable phantom power select 'inputs' on the 'audio input' setting, plus 'mic low' or 'mic high' on the audio 'input levels' settings. Scroll the menu to reveal the 'phantom power' setting and select 'on'. To disable phantom power, select 'off'. Phantom power is active only when external audio inputs are selected in the audio settings.

## Underside
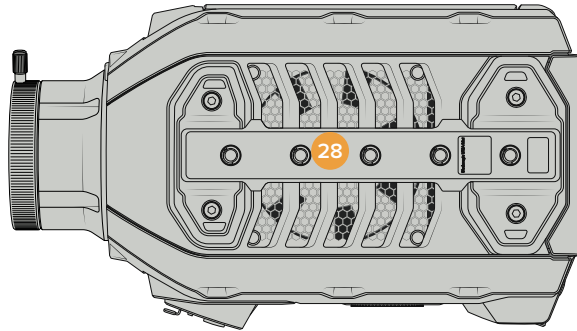
28 1/4 Inch Mounting Points

The 5 mounting points on the underside are used for attaching tripod heads, the optional URSA Mini shoulder mount kit and other accessories.

URSA Broadcast Controls

Blackmagic URSA Broadcast has control panels on the chassis, outside and inside of the foldout touchscreen monitor to give you quick, easy access to all of its essential functions as well as powerful monitoring tools. These panels are designed to be close to hand whether shooting from a tripod, handheld or with the shoulder mount kit.

Forward Control Panel

Your camera's forward control panel groups together all of the controls you might need to adjust when setting up a shot and recording. These are all designed for easy access while shooting with the foldout monitor closed, such as when using the shoulder mount kit.
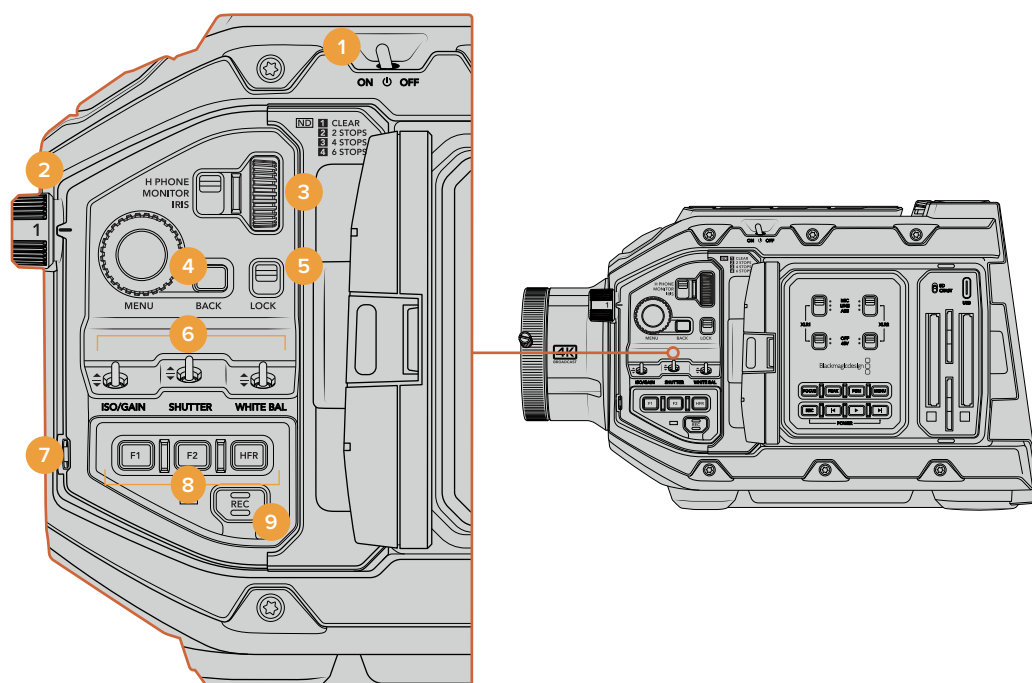
URSA Broadcast forward control panel

1   Power Switch

Power your URSA Broadcast by moving this switch to the 'on' position. Power off by moving the switch to the 'off' position.

> **TIP** You can also power your URSA Broadcast on or off via a combination of control panel switches. Holding the 'rec' and 'forward skip' buttons will power up the camera if it is turned off, or power it off if it is turned on. If your camera's power switch is set to 'on' but your camera is powered down, it may have been powered down via the control panel. Toggle the power switch to return it to normal operation.

2 ND Filters

Your URSA Broadcast has three internal neutral density filters. Together with a clear filter, the available settings are '2,' '4' and '6' stops. These filters allow you to reduce the amount of light reaching your URSA Broadcast's sensor by a preset number of exposure 'stops'. By reducing the exposure, you can continue shooting at wide apertures in bright conditions such as outdoors on sunny days.

To adjust your neutral density setting, rotate the wheel upwards or downwards. The 'clear' setting means there is no ND filter being used. From settings 2 to 4, the ND filters gradually increase in density so you can decrease light if you need to.

Because different people prefer to use different terms for each ND filter, the measurement of your ND settings can be customized in the LCD menu. You can identify the ND filter number, amount of stops in light reduction, or the fraction representing the amount of light reduced for the filters to suit your preference.

Neutral Density Filter Settings

Wheel position	ND number	Stops	Fraction
1	clear	0	all
2	0.6	2	1/4
3	1.2	4	1/16
4	1.8	6	1/64

3 Settings Wheel

Set this wheel's function by adjusting the adjacent three position switch next to the wheel. The options are 'headphone,' 'monitor' and 'iris'.

· **Headphone**
When set to 'headphone', the settings wheel will adjust headphone audio levels. Rotate the wheel upwards to increase volume, and downwards to decrease.

· **Monitor**
When set to 'monitor', the settings wheel adjusts audio levels on your camera's built in monitor speaker. The speaker is located on the outside of the LCD monitor door and can be used to monitor audio without headphones. Rotate the wheel upwards to increase volume, and downwards to decrease. This function is disabled while recording from the camera's internal microphone to prevent unwanted feedback.

· **Iris**
When set to 'iris', the settings wheel is used to adjust the aperture of compatible lenses mounted to your URSA Broadcast. Rotating the wheel downwards opens the iris, and turning the wheel upwards closes the iris. These directions mimic the operation of aperture on adjustable still and cinema lenses.

> **TIP** To change aperture settings via the settings wheel, URSA Broadcast must be fitted with a lens that supports changing aperture via the camera. If you are using a B4 or PL lens connected via the broadcast 12 pin connector, make sure that the lens iris switch on the handgrip is set to 'A' or 'auto'.

4   Menu Wheel

When 'status text' is turned on for your camera's front SDI output, you can use the menu wheel to navigate many of the head up display features usually accessed via the LCD touchscreen.

Simply press the menu wheel as you would a button to access your URSA Broadcast's head up display on an external monitor such as Blackmagic SmartView, Video Assist or URSA Viewfinder. While the menu wheel is active, turn the wheel to select features such as LCD monitor options, frame rate, ISO, white balance and tint. Press the wheel to confirm selections and make additional changes, and use the 'back' button next to the wheel to cancel. You can also use the back button to move up a menu level, or exit the menu completely if you're at the top level. The menu will automatically close after one minute of inactivity.

For more information on setting status text and the controls available, see the 'touchscreen controls' and 'monitor settings' sections of this manual.

5   Lock

Toggle this switch to lock all of the controls on the forward control panel to prevent them from being accidentally adjusted while shooting. Move this switch to the lower position to lock, and the upper position to unlock.

> **TIP** When shooting in busy or uncontrolled environments, you can lock your URSA Broadcast's forward control panel when you leave your camera unattended. This ensures that your settings are not changed unintentionally by others.

6   ISO, Shutter and White Balance Switches

These small switches are used to adjust your gain/ISO, white balance, and shutter settings. They are helpful when you want to make fast adjustments without taking your eyes off the shot. Gently push the switches up or down to make setting adjustments. The switches are spring loaded so they always return to a neutral position.

- **Gain/ISO**
  Push this switch up or down to adjust your camera's gain setting. Pushing up will increase the setting one interval, and pushing down will decrease one interval. The available settings are -6dB, 0dB, +6dB, +12dB.

- **Shutter**
  Use this switch to adjust the camera's shutter speed. Pushing up will increase the shutter speed to the next available preset, and pushing down will decrease to the next available preset. Holding the switch up or down will move more quickly through available values. There are twelve shutter speed presets between 1/24 and 1/2000.

> **TIP** Your URSA Broadcast can also suggest flicker free shutter speeds based on the power frequency in your region. These must be selected through the LCD touchscreen menu. For more information see the 'touchscreen controls' section in this manual.

- **White Balance**
  This switch is used to adjust the camera's white balance. Pushing up will increase the color temperature by 50K, and pushing down will decrease it by 50K. Holding the switch up or down will move more quickly through available values.

7   Auto White Balance

Pressing this button will reveal a white 'auto white balance' box in the center of the LCD for five seconds. This box will also appear on any SDI output that has 'status text' enabled in the menu settings. The white box indicates the specific area of your image where the white balance will be calculated from, so your gray card should be positioned within this box. Pressing and holding the 'Auto W/B' button for three seconds will perform an 'auto white balance', and the square will change from white to green to confirm that this has been performed successfully.

For more information on enabling status text for your URSA Broadcast's front or main SDI outputs, see the 'monitor settings' section in this manual.

8   F1 and F2

The F1 and F2 keys are 'function' keys that can be programmed to a variety of commonly used functions using your URSA Broadcast's 'setup' menu. By default, F1 is set to 'false color' while F2 is set to 'display LUT'.

For more information, see the 'touchscreen controls' section of this manual.

·   HFR

Use the HFR or 'high frame rate' button to toggle off speed frame rates. To use this button, simply set the off speed frame rate you'd like to use in your URSA Broadcast's 'frame rate' menu. Pressing this button will toggle between your chosen off speed frame rate and project frame rate. It's worth mentioning that this setting can only be adjusted when the recording is stopped.

For more information on project and off speed frame rates, see the 'touchscreen controls' section in this manual.

9   Record

The 'record' button is marked REC on your Blackmagic URSA Broadcast's left side. Press the record button to start and stop recording. Refer to the 'recording' section for more information.

Ergonomic Control Panel

On the outside of your URSA Broadcast's touchscreen monitor, you'll find an LCD status monitor and a variety of monitoring controls. This panel lets you see all of your camera's status information at a glance, as well as monitoring and adjusting audio levels. Automatic focus can be set using compatible lenses and the transport controls let you playback clips.
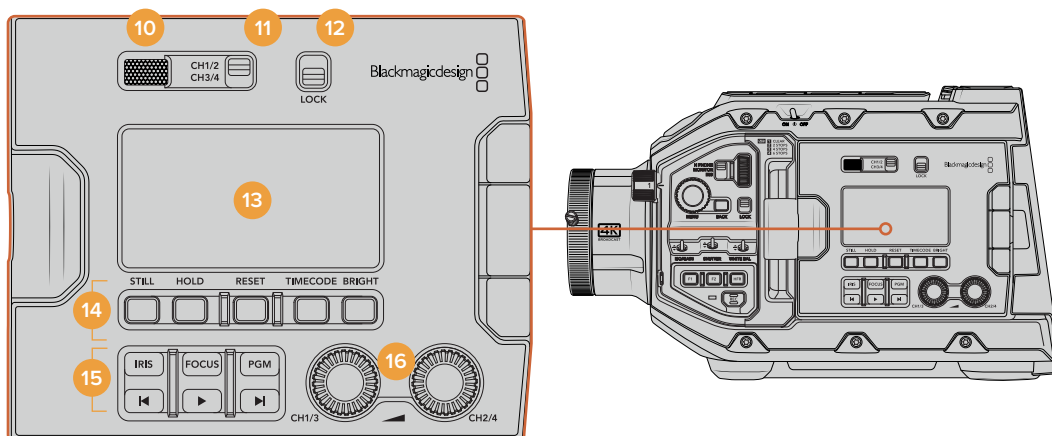
URSA Broadcast ergonomic control panel

10 Monitor Speaker

The small speaker built into the outside control panel lets you listen to the audio while shooting. It is located where your ear would normally be when shooting with the camera on your shoulder.

To adjust the volume of the speaker, simply rotate the settings wheel as described in the 'URSA Broadcast Controls' section.
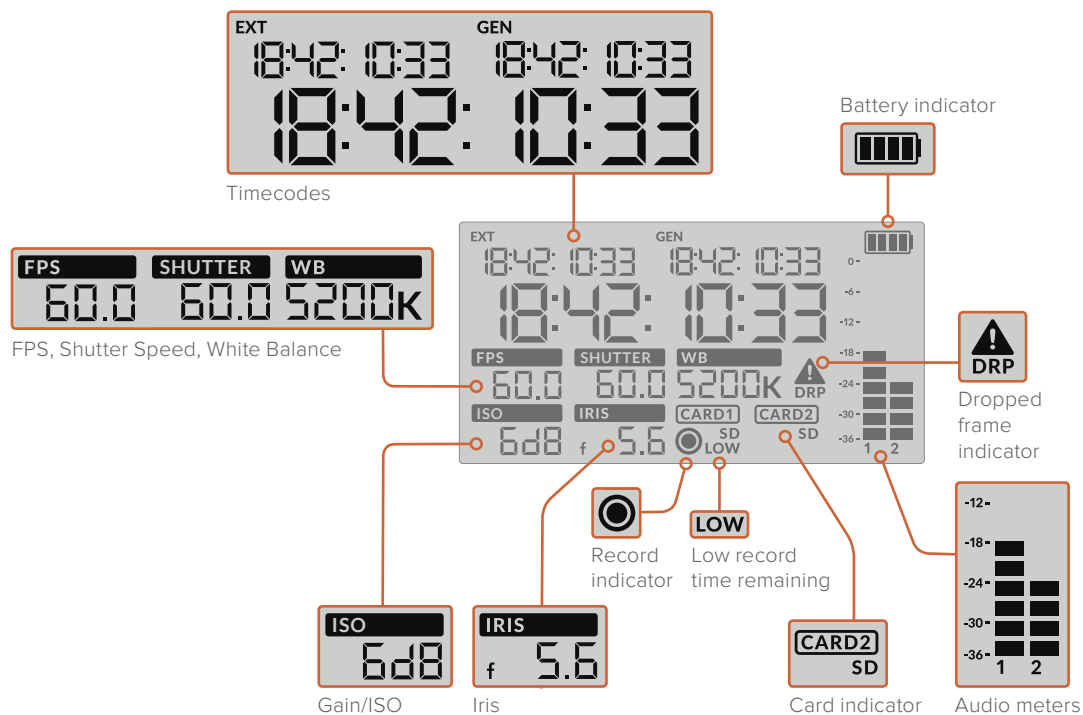
11 Monitor Channel Select

Your URSA Broadcast currently supports two channels of audio. In a future software update, up to four channels will be available, divided into pairs. You will be able to choose the pair monitored by your LCD status display and monitor speaker by using this switch.

12 Lock

Use this switch to lock all of the settings on your URSA Broadcast's ergonomic control panel. The only controls that will remain active while the lock switch is 'on' are the monitor channel select switches.

13 Status LCD

This display shows you your URSA Broadcast's essential settings at a glance, without needing to open the internal touchscreen. This screen is designed to be visible even in bright daylight. The following information is available:

Timecodes

FPS, Shutter Speed, White Balance

Battery indicator

Dropped frame indicator

Record indicator Low record time remaining

Gain/ISO Iris Card indicator Audio meters

- **Timecodes**

  Your URSA Broadcast displays three timecodes. If you have an external timecode connected, this will be shown under the 'ext' indicator in the top left of the status LCD. Your camera's internally generated timecode is shown next to this under the 'gen' indicator. Both the external and generated timecodes are shown in hours, minutes, seconds and frames.

  The larger, main timecode indicator displays your current timecode as either clip duration or timecode. You can switch between these two display modes by pressing the 'timecode' button underneath the status LCD.

- **Battery indicator**
  If your URSA Broadcast is running on battery power, this indicator displays remaining battery life in 25% increments. Each of the battery indicator's four bars corresponds to 25% battery life remaining. When your battery drops below 20% charge, the colour of the status LED, near the record button begins to flash. It will alternate slowly between red and orange during recording and alternate between white and orange during standby mode.

  This indicator is not shown when your camera is running off mains power.

- **FPS, Shutter Angle, White Balance**
  The 'FPS,' 'shutter,' and 'WB' indicators display your camera's current frame rate, Shutter angle and white balance. The 'fps' indicator shows the current sensor frame rate.

  For more information on sensor and project frame rates, see the 'touchscreen controls' section in this manual.

- **Gain/ISO**
  Displays your camera's currently set gain.

- **Iris**
  Displays your current lens aperture. Depending on your lens type, this will be displayed as an 'f' or 'T' stop.

- **Card Information**
  The 'card 1' and 'card 2' indicators will appear on your URSA Broadcast's status LCD when these slots are occupied.

  The 'SD' indicator appears if you are recording on SD cards, and disappears if you are recording on CFast cards.

- **Record Indicator**
  While recording, a circular indicator will appear under the card or cards being currently written to.

- **Low Time Remaining**
  A 'low' indicator will appear under the relevant card when you have approximately 5 minutes of record time remaining.

- **Audio Meters**
  The peak audio meters display audio levels when using the internal microphone, or via external audio when connected. The display is calibrated to dBFS units and features peak hold indicators which stay visible for a short time so you can clearly see the maximum levels reached.

  To achieve optimum audio quality, ensure your audio levels do not reach 0 dBFS. This is the maximum level that your camera can record, meaning that any audio that exceeds this level will be clipped, resulting in distortion.

- **Dropped Frame Indicator**
  This indicator will flash when your camera detects dropped frames. Once you stop recording, the indicator will remain on the screen to let you know that the previous clip detected dropped frames. This warning disappears the next time you start recording, or if you power cycle the camera. For more information on avoiding dropped frames, see the 'storage media' section in this manual.

> **NOTE** You can set your URSA Broadcast to stop recording if dropped frames are detected. See the 'record settings' section in this manual for more information. This feature is user selectable as you may be able to get away with brief periods of 'burst' recording at higher frame rates or resolutions when shooting to slower media.

14 Status LCD Controls
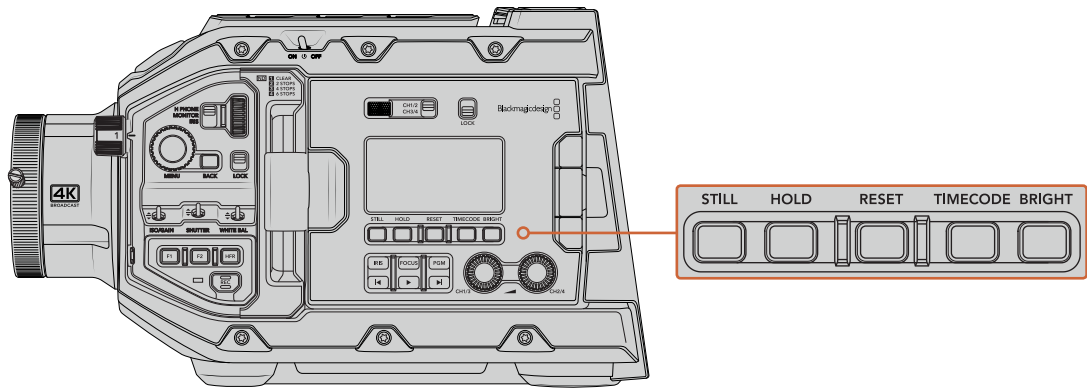
URSA Broadcast status LCD controls

- **Still**
  Press this button to capture a still image as a single uncompressed DNG frame. Image files will be saved to the 'stills' folder in the root directory of the media you are currently recording to. These will follow the file naming convention for video clips but the filename will have an 'S001' representing the 'still number' as the last four digits of the filename. To confirm you have successfully saved a still, an image of a camera will show in the top right corner of the URSA Broadcast touchscreen and the record indicator on the Status LCD will flash three times.

- **Hold**
  Use this button to temporarily hold the main status LCD timecode when the timecode is in free running time of day code. The timecode will continue to run in the background and return to its actual position when you release the 'hold' button. While holding you can take note of the timecode for a particular event. This can be useful in electronic news gathering or documentary situations for noting key timecode points.

- **Reset**
  The reset button allows you to reset the timecode to 00:00:00:00 when you are setting your preset timecode.

- **Timecode**
  Press the 'timecode' button to toggle the main timecode display's format between clip duration and timecode. By default the timecode will be free running time of day code as this is the most frequently used. If you press and hold the 'timecode' button for five seconds it will switch the camera into record run timecode and the timecode generator will flash as well as the first two digits of the large timecode display. This indicates that you are now editing your preset timecode and allows you to set a specific timecode number for your preset timecode.

  Pressing 'reset' at this stage will zero the timecode and then you can turn and press the menu wheel to set the desired value starting with hours, minutes, seconds and then frames. When you are happy with the timecode, press and hold the 'timecode' button again for three seconds to set this as your preset timecode point. You will notice that the timecode generator now shows this value and will only increment when the camera is recording giving you continuous ascending timecode values. To switch your timecode back to free running time of day code, press the 'timecode' and 'hold' buttons simultaneously for three seconds.

- **Bright**
  Press the 'bright' button to cycle through four brightness settings for your URSA Broadcast's LCD status display. The settings are 'off,' 'low,' 'medium' and 'high.'

15   Control and Playback Buttons
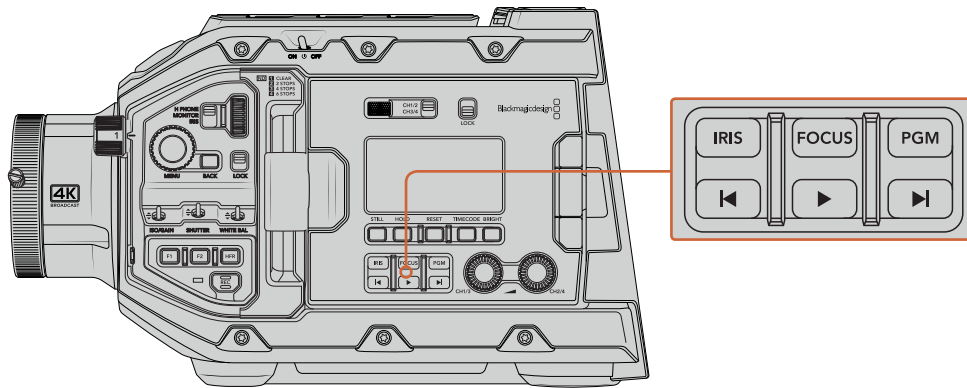
URSA Broadcast control and playback buttons

- **Iris**
  The 'iris' button activates the automatic aperture setting on compatible lenses. When using video dynamic range settings, a single press of the iris button will set an average exposure based on the highlights or shadows in your shot. When using film dynamic range settings, pressing the iris button sets your exposure to the brightest highlight in your shot. This button works with compatible EF lenses and PL lenses connected with a compatible broadcast lens controller.

  To set your aperture manually, press the forward and reverse skip transport buttons.

- **Focus**
  When using a B4 or EF that supports electronic focus adjustments, press the 'focus' button to activate auto focus. A white focus square will appear on any viewfinder or monitor connected to your URSA Broadcast. Anything within the square will be correctly focused. When the lens is focused, the square will disappear.

  > **NOTE** To use the 'focus' button, your B4 lens must have servo focus control, with the servo activated. See the 'getting started' section for more information. Some EF lenses have both manual and auto focus modes. If using the optional EF lens mount, in order for URSA Broadcast to be able to auto focus with your lens, you need to ensure that your lens is set to auto focus mode.

- **Program**
  The program button is marked PGM and lets you switch the LCD between the camera view and any signal plugged into the 12G-SDI input on the rear panel. This means if you're using the camera in a live broadcast, you can plug in the switcher's program output and monitor it during the shoot. Press and hold the program button to see your program feed. The program feed will continue to display whilst the program button is being held.

  If you want to lock the monitor to display the program input feed, then double press the program button to lock the display to the program feed. Pressing the program button again will exit the program feed and return to the camera view.

- **Playback Control Buttons**
  The playback buttons let you start and stop playback, plus skip to the next or previous clip. When using an EF lens, the forward and reverse skip buttons can also be used to open or close the iris when using compatible lenses. Refer to the 'playback' section for more information on how to use the playback buttons.

**16   Audio Level Adjustment Knobs**
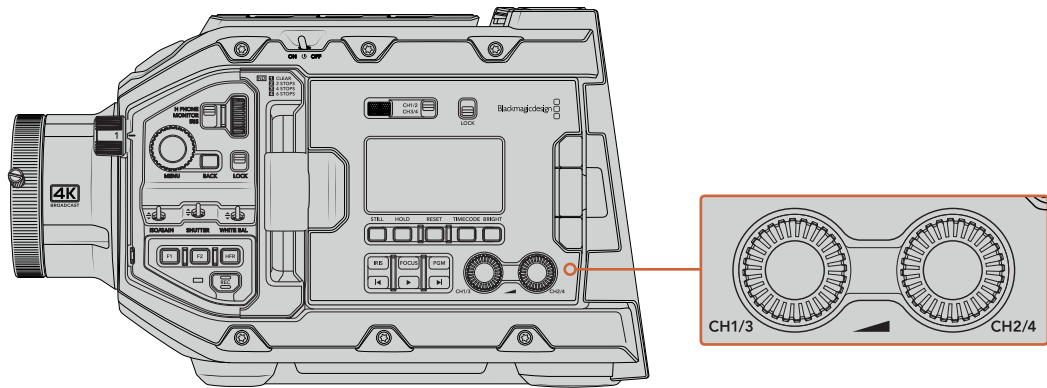
URSA Broadcast audio adjustment knobs

Use the built in adjustment knobs to set the recording levels for audio channels 1 and 2. Turn each knob clockwise or counterclockwise to increase or decrease the recording level for each channel of audio. Monitor the corresponding on screen audio meters as you adjust each knob so you can see the best level to set it to.

Internal Control Panel

With your URSA Broadcast's foldout monitor open, you can access the internal control panel. Use the controls here to set your audio inputs as well as phantom power settings, iris, focus, menu and playback controls and more.
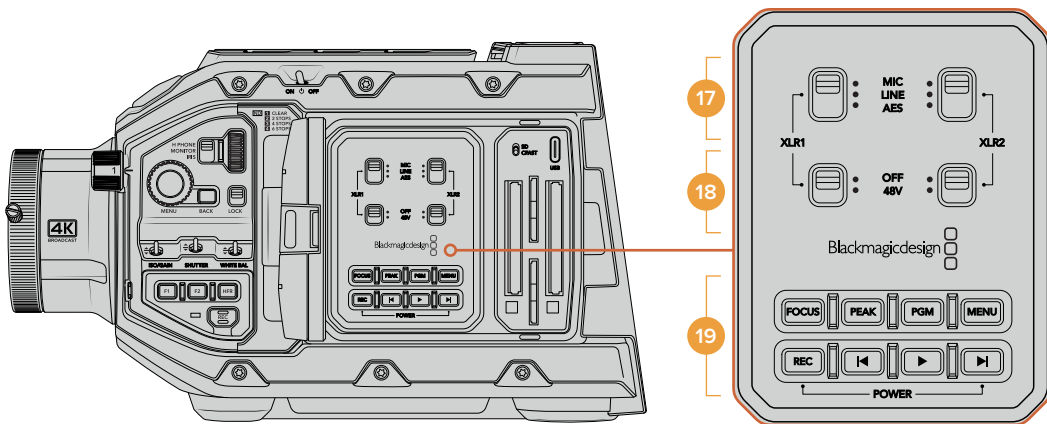
URSA Broadcast internal control panel

17   XLR1 / XLR2

Use these switches to set how your URSA Broadcast's XLR inputs behave when selected as an input source. The options available are mic audio, line level audio and AES digital audio.

18   Phantom Power

The camera's XLR inputs can provide 48V phantom power so you can use microphones that aren't self powered. Move this switch to '48V' to enable phantom power for any microphone connected to the XLR above, or 'off' to disable phantom power.

> **NOTE** It is standard practice to plug in your XLR cable before switching phantom power on. It is also important to switch phantom power to 'off' when you no longer have a phantom powered microphone connected. Connecting devices that don't have phantom power protection built into their AES XLR outputs whilst still sending phantom power from the camera's XLR audio inputs may damage your equipment. Always ensure that the +48V switch is turned 'off' when you disconnect your microphone.

19 Control and Playback Buttons

- **Focus**

    When using a B4 or EF lens supports electronic focus adjustments, press the 'focus' button to activate auto focus. A white focus square will appear on the fold out monitor. Anything within the square will be correctly focused. When the lens is focused, the square will disappear.

    > **NOTE** To use the 'focus' button, your B4 lens must have servo focus control, with the servo activated. See the 'getting started' section for more information. Some EF lenses also have both manual and auto focus modes. In order for URSA Broadcast to be able to auto focus with your lens, you need to ensure that your lens is set to auto focus mode.

- **Peak**

    Press the 'Peak' button to activate focus peaking. Your camera has two focus peaking modes, traditional focus peaking, which artificially sharpens areas of the image that are in focus, and 'colored lines' with overlays the sharp areas of your image with black, white, red, green or blue colored lines. See the 'monitor settings' section of this manual for more information.

    > **TIP** If you are recording your video output to a Blackmagic Video Assist or Hyperdeck Studio Mini, you may want to ensure that you don't have peaking switched on for that output. This can be done by using our 'clean feed' feature on your front SDI or main SDI.
    >
    > For more information on outputting a 'clean feed' see the 'monitor settings' section in this manual.

- **Program**

    The program button is marked PGM and lets you switch the LCD between the camera view and any signal plugged into the camera's 12G-SDI input. This means if you're using your camera in a live broadcast, you can plug in the switcher's program output and monitor it during the shoot. Press and hold the program button to see your program feed. Double press the button to lock the program feed on. Press again to turn the program feed off.

    To display a switcher's program output, your camera and switcher must be set to the same resolution and frame rate.

- **Menu**
  Press the 'menu' button to open the dashboard. Refer to the 'settings' section for more information about the dashboard feature and how to adjust settings.

- **Record**
  Press any of the record buttons marked REC to start and stop recording. Refer to the 'recording' section for more information.

- **Playback Control Buttons**
  The playback buttons let you start and stop playback, plus skip to the next or previous clip. When using the EF mount, the forward and reverse skip buttons can also be used to open or close the iris when using compatible lenses. Refer to the 'playback' section for more information on how to use the playback buttons.

> **NOTE** You can power your URSA Broadcast on or off via a combination of internal control panel buttons. Holding the 'rec' and 'forward skip' buttons will power up the camera if it is turned off, or power it off if it is turned on. If your camera's power switch is set to 'on' but your camera is powered down, it may have been powered down via the control panel. Toggle the power switch to return it to normal operation.
>
>
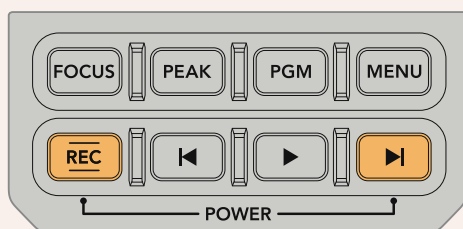
Touchscreen Controls

Touchscreen

Your Blackmagic URSA Broadcast's fold out LCD touchscreen pivots for shooting high and low angles. Buttons on the outside of the LCD panel let you control your URSA Broadcast when mounted on your shoulder using the URSA Viewfinder and the LCD closed.

Touchscreen Features

The LCD touchscreen features a touch and gesture based interface that is specifically designed for fast and intuitive user operation. By touching and swiping on different areas of URSA Broadcast's LCD touchscreen, you can quickly access the camera's functions while shooting.

Your URSA Broadcast's LCD touchscreen has a comprehensive head up display and gives you easy access to your camera's most used settings

LCD Monitor Options

Tap the 'monitor' icon at the top left of your URSA Broadcast's LCD touchscreen to access the LCD monitor settings. These settings let you toggle and adjust the appearance of your URSA Broadcast's monitoring features, including zebra, focus assist, frame guide, and grids. When accessing LCD monitor options, the controls for these features appear in a tabbed menu along the bottom edge of the LCD touchscreen.
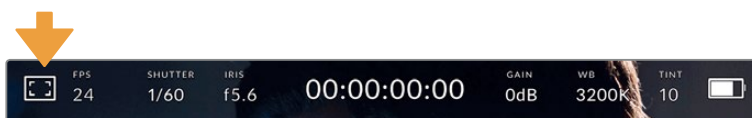
Tap the icon at the top left of your URSA Broadcast's LCD touchscreen to access LCD monitor options

Zebra

The 'zebra' setting toggles the appearance of zebra on the LCD touchscreen, as well as setting the zebra level for all URSA Broadcast's outputs.

Zebra displays diagonal lines over areas of your image that exceed a set exposure level. For example, setting zebra to 100% shows which areas are completely overexposed. This is useful for achieving optimum exposure in fixed lighting conditions.
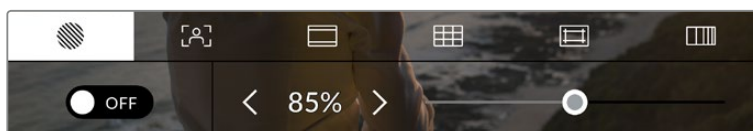
Tap the 'zebra' icon while accessing 'LCD monitor options' to access your URSA Broadcast's zebra settings

To toggle zebra for the LCD touchscreen, tap the switch icon in the bottom left of the screen while in the 'zebra' tab.

Set the exposure level that zebra appears at by dragging the slider left and right, or tapping the arrow buttons next to the zebra level percentage. Zebra level is adjustable in five percent increments between 75 and 100 percent exposure.

For information on enabling zebra on your camera's front and main SDI outputs, see the 'monitor settings' section in this manual.

> **TIP** If you're shooting in variable light such as outdoors on a partly overcast day, setting your zebra level lower than 100 can warn you of potential overexposure.

Focus Assist

The 'focus assist' setting toggles the appearance of focus assist on the LCD touchscreen, as well as setting the level of focus assistance for all outputs on your URSA Broadcast.
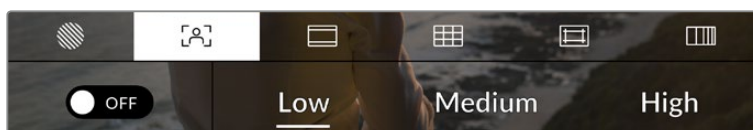
Tap the 'focus assist' icon while accessing 'LCD monitor options' to access your URSA Broadcast's focus assist settings

To toggle focus assistance for the LCD touchscreen, tap the switch icon in the bottom left of the screen while in the 'focus assist' tab.

To set the level of focus assistance for all outputs on your URSA Broadcast, tap the 'low,' 'medium' or 'high' titles along the bottom of your touchscreen.

The optimum level of focus assistance varies shot by shot. When focusing on actors, for example, a higher level of focus assistance can help resolve edge detail in faces. A shot of foliage or brickwork, on the other hand, may show distracting amounts of focus information at higher settings.

For information on enabling focus assist on your camera's front and main SDI outputs, see the 'monitor settings' section in this manual.

> **TIP** Your URSA Broadcast has two focus assist modes. You can switch between 'peaking' and 'colored lines' focus assistance in the 'monitor' settings menu. For more information, see the 'monitor settings' section in this manual.

Frame Guides

The 'frame guide' setting toggles the appearance of frame guides on the LCD touchscreen. You can also choose from seven frame guide options for all outputs on your URSA Broadcast.

Frame guides include aspect ratios for various cinema, television and online standards.

Tap the 'frame guides' icon while accessing 'LCD monitor options' to access your URSA Broadcast's frame guide settings

To toggle the appearance of frame guides on your URSA Broadcast's LCD touchscreen, tap the switch icon in the bottom left of the screen.

Choose the frame guide you want to use by dragging the slider left and right, or tapping the arrow buttons on either side of the currently selected aspect ratio.

The available guides are:

- **16:9**
  Displays a 1.78:1 aspect ratio compatible with 16:9 HD television and computer screens.

  This ratio is most commonly used for HD broadcasting and online videos. The same aspect ratio has also been adopted for Ultra HD broadcasting.

- **14:9**
  Displays a 14:9 aspect ratio used by some television broadcasters as a compromise between 16:9 and 4:3 television sets. Ideally, both 16:9 and 4:3 footage remains legible when center cropped to fit 14:9. You can use this as a compositional guide if you know your project may be broadcast by a television station that uses 14:9 cropping.

URSA Broadcast LCD touchscreen with 14:9 frame guides enabled

- **4:3**
  Displays the 4:3 aspect ratio compatible with SD television screens, or to help with framing when using 2x anamorphic adapters.

- **2.35:1, 2.39:1 and 2.40:1**
  Displays the broad widescreen aspect ratio compatible with anamorphic or flat widescreen cinema presentation. The three widescreen settings differ slightly based on the changing cinema standards over time. 2.39:1 is one of the most prominent cinema widescreen standards in use today.

- **1.85:1**
  Displays another common flat widescreen cinema aspect ratio. This ratio is slightly wider than HDTV 1.78:1 but not as wide as 2.39:1.

Grids

The 'grids' setting toggles the appearance of a rule of thirds grid, crosshair or center dot on the LCD touchscreen, as well as setting the overlay that will be visible on all URSA Broadcast's outputs.


Tap the 'grids' icon while accessing 'LCD monitor options' to access your URSA Broadcast's grid settings

Grids and crosshairs are overlays that can help with image composition. When 'grids' are enabled, your URSA Broadcast can show a rule of thirds grid, crosshairs, or center dot.

To toggle the appearance of grids on your URSA Broadcast touchscreen, tap the switch icon in the bottom left of the screen while in the 'frame guides' tab.

When your URSA Broadcast is set up and connected to an ATEM switcher as the current program source, and 'grids' are set to 'on', the red 'program' tally outline will automatically illuminate on the LCD.
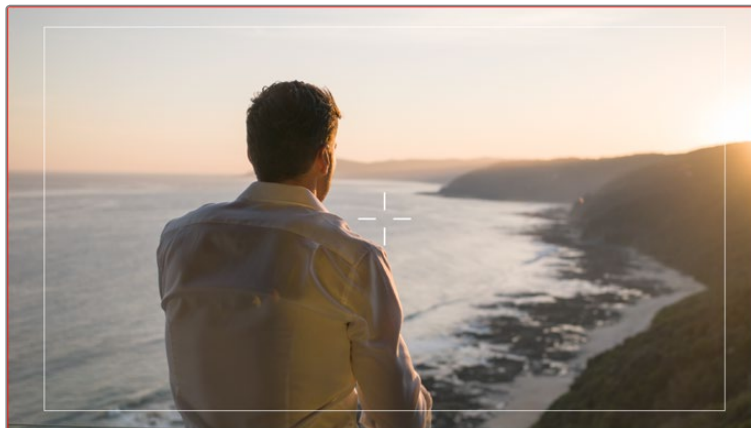
When connected to an ATEM switcher sending a tally signal, a red border will appear around your camera's image preview when grids are set to 'on'

To set which overlay you want to display on all URSA Broadcast outputs, tap the 'thirds,' 'crosshairs,' or 'center dot' options.
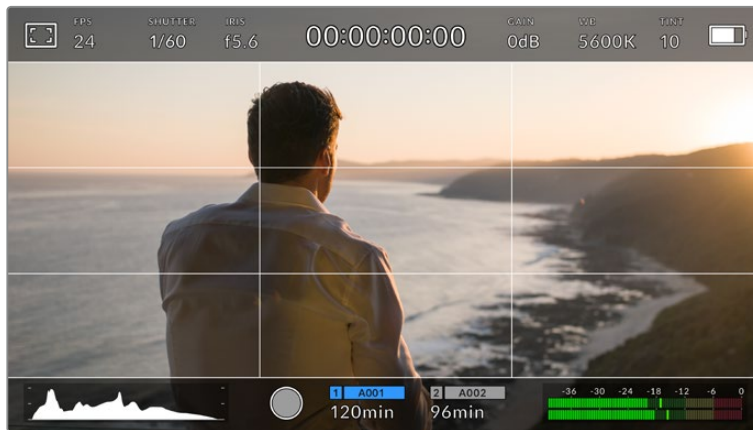
The rule of thirds grid automatically scales to any on screen frame guides

- **Thirds**
The 'thirds' setting displays a grid with two vertical and horizontal lines placed in each third of the image. Thirds are an extremely powerful tool to help compose your shots. For example, the human eye typically looks for action near the points where the lines intersect, so it's helpful to frame key points of interest in these zones. An actor's eyeline is commonly framed along the top third of the screen, so you can use the top horizontal third to guide your framing. Thirds are also useful to maintain framing consistency between shots.

- **Crosshairs**
The 'crosshair' setting places a crosshair in the center of the frame. Like thirds, the crosshair is a very useful compositional tool, making it easy to frame the subject of a shot in the very center of a frame. This is sometimes used when filming scenes that will be assembled using very fast cuts. Keeping viewers' eyes focused on the center of a frame can make rapid editing easier to follow.

- **Center Dot**
The 'center dot' setting places a dot in the center of the frame. This works in exactly the same way as the 'crosshair' setting, albeit with a smaller overlay that you may find less intrusive.

    You can enable a combination of 'thirds' and 'crosshairs' or 'thirds' and 'center dot' by tapping both options in the 'grids' menu. 'Crosshairs' and 'center dot' cannot be selected together.

> **TIP** For information on enabling grids on your URSA Broadcast's front and main SDI outputs, see the 'monitor settings' section in this manual.

Safe Area Guides

The 'safe area guides' setting toggles the safe area guides on or off the LCD touchscreen, as well as setting the size of safe area guides for all outputs on your URSA Broadcast.

Safe areas can be used in broadcast production to ensure that the most important parts of a shot can be seen by viewers. By keeping the most important parts of your shot within a central 'safe area,' you can avoid cropping on some televisions, as well as leaving space for a broadcaster to add bugs, news tickers and other overlays along the edges of the screen. Many broadcasters require footage to be submitted within a 90% safe area.

Safe area guides can also be used to assist with framing your shot where you know that the shot will be stabilised in post production, which can crop the edges of the image. They can also be used to indicate a specific crop. For example by setting it to 50% whilst recording at Ultra HD 3840x2160 you can see what a 1920x1080 crop of the frame would look like. The safe area guides also scale to your frame guides, so they will adjust to indicate the chosen percentage of your target frame.
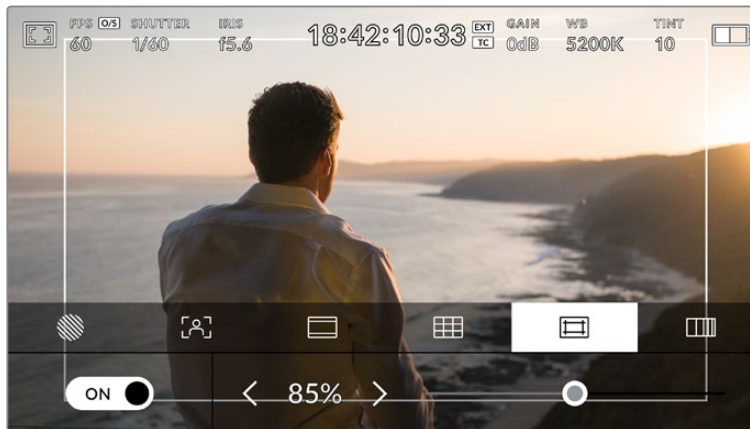
The 'safe area' indicator set to 85%

To toggle safe area guides for the LCD touchscreen, tap the switch icon in the bottom left of the screen while in the 'safe area guides' tab. To set the level of safe area guides for all outputs on your URSA Broadcast, tap the left or right arrows on either side of the current numerical value at the bottom of your touchscreen. Alternatively, you can drag the slider left or right.

False Color

The 'false color' setting toggles the appearance of false color exposure assistance on the LCD touchscreen.

False color overlays different colors onto your image that represent exposure values for different elements in your image. For example, pink represents optimum exposure for caucasian skin tones, while green is a good match to darker skin tones. By monitoring the pink or green false color when recording people, you can maintain consistent exposure for their skin tones.

Similarly, when elements in your image change from yellow to red, that means they are now over exposed.
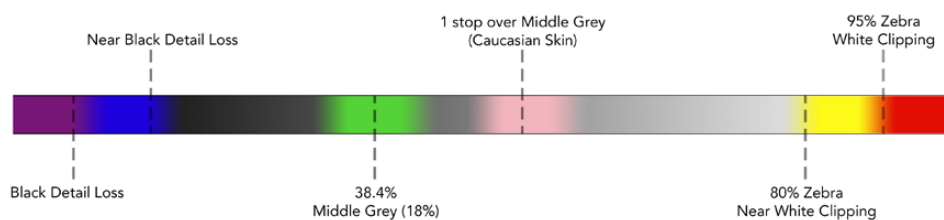

False Color Chart

To toggle false color for the LCD touchscreen, tap the switch icon in the bottom left of the screen while in the 'false color' tab.

The 'false color' exposure assistance tab

ND Filter indicator

Adjusting your URSA Broadcast's ND filter will display the ND filter indicator in the top left of the LCD touchscreen and any SDI outputs set to show status text. This indicator will be shown for four seconds and use the format you've selected in your URSA Broadcast's setup menu.
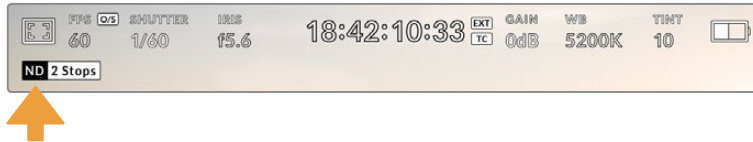

Adjusting your URSA Broadcast's ND filter setting will reveal the ND filter indicator

> **NOTE** You can adjust the terminology used by the ND filter indicator to reflect the conventions you're used to. The options are ND number, stops and fractions. You can set your preferred format in your URSA Broadcast's 'setup' menu.

Frames Per Second

The 'FPS' indicator displays your currently selected frames per second.
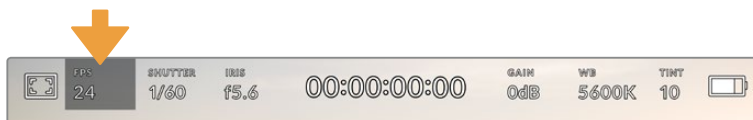
URSA Broadcast's frames per second indicator. Tap this to access frame rate settings

Tapping the 'FPS' indicator lets you change your camera's sensor and project frame rates via a menu at the bottom of your LCD touchscreen.

Project frame rate

The project frame rate is URSA Broadcast's recording format frame rate and provides a selection of common frame rates used in the film and television industry. This frame rate is normally set to match your playback speed used in your post production workflow.

Your Blackmagic URSA Broadcast has 8 project frame rate settings including 23.98, 24, 25, 29.97, 30, 50, 59.94 and 60 frames per second.

To adjust your URSA Broadcast's project frame rate while in the 'FPS' menu, tap the left or right arrows next to the current frame rate at the bottom left of your touchscreen. Alternatively, you can drag the slider left or right.
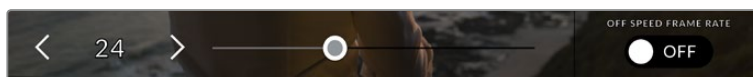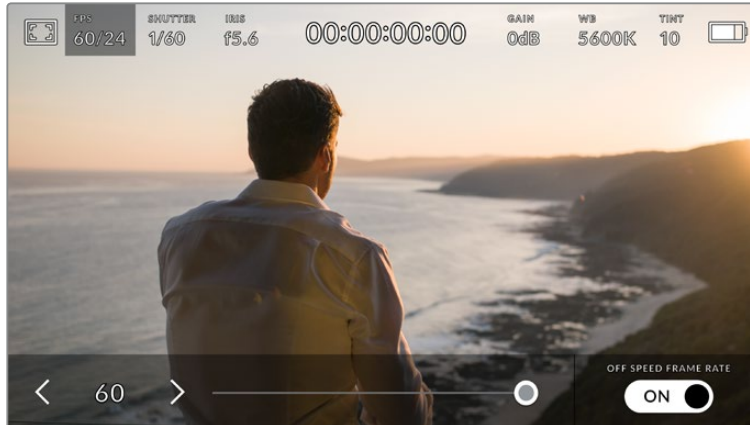

Tap the arrows on either side of the project frame rate or move the slider to make adjustments

> **TIP** Your URSA Broadcast's project frame rate also sets the frame rate of the front and main SDI outputs.

Sensor frame rate

The sensor frame rate sets how many actual frames from the sensor are recorded every second. This frame rate will affect how fast or slow your video will play back at your set project frame rate.

With 'off speed frame rate' enabled, tap the arrows on either side of the sensor frame rate or move the slider to make adjustments

By default, your URSA Broadcast's project and sensor frame rates are matched for a natural playback speed. However, by tapping the 'off speed frame rate' switch icon in the bottom right hand side of your URSA Broadcast's 'FPS' menu, you can independently set your sensor frame rate.

To change your sensor frame rate, tap the arrows next to the sensor frame rate indicator in the lower left of your touchscreen. You can also drag the slider left or right to increase or decrease the frame rate. Once you release the slider, the sensor frame rate will be selected.

You can create dynamic and interesting speed effects in your clips by varying the sensor frame rate. Setting the sensor frame rate higher than your project frame rate will create slow motion during playback. Alternatively, the lower your sensor frame rate, the faster your clips will appear. The principle is similar to overcranking and undercranking a film camera. Overcranking speeds up the sensor frame rate so you can stretch out moments in time during playback to enhance emotion. Undercranking slows down the sensor frame rate so you can increase the action in fast moving scenes. The creative possibilities are endless and entirely up to you!

For information on the maximum frame rates available for each recording format and codec, refer to the table in the 'recording' section of this manual.

NOTE When 'off speed frame rate' is selected your URSA Broadcast's audio and video are no longer synced. This is true even if you set the same project and sensor frame rate. For this reason, 'off speed frame rate' should never be selected if you want to guarantee audio syncing.

Shutter

The 'Shutter' indicator displays your shutter speed. By tapping this indicator, you can manually change your URSA Broadcast's shutter speed or configure shutter priority auto exposure modes.
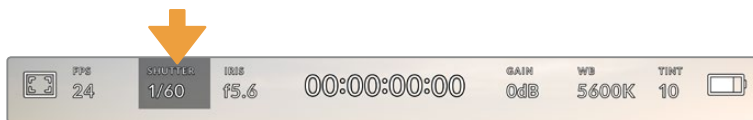
URSA Broadcast's shutter indicator. Tap this to access shutter settings

Shutter speed defines the level of motion blur in your video, and can be used to compensate for varying light conditions. The shutter speed setting for natural motion blur, and the settings available, depend on the frame rate you are using. For example, when shooting at 30p, a 1/60 of a second shutter speed is is the equivalent of a 180 degree shutter angle, a very common setting for film projects. However if you are shooting at 25p, you will need to set the shutter to 1/50 for the same look.

For natural motion blur you can calculate the shutter speed by doubling your frame rate. So at 30p, set your shutter speed to 1/60 of a second for natural motion blur.

If you need more light on the sensor, you can set the shutter at the slowest setting corresponding with your frame rate. For example, 1/25 for 25p, or 1/30 for 30p. At the slowest shutter speed, your motion blur will appear slightly exaggerated.

If you want to reduce the motion blur so action appears sharper and more defined, set the shutter to a faster speed, such as 1/120 of a second for 30p, or 1/100 of a second for 25p. If you are familiar with shutter angles, this equates to a shutter angle of 90 degrees.

It's worth experimenting with different shutter speeds to see how this setting can provide different levels of motion blur to your image.

NOTE When shooting under lights, your shutter speed can affect the visibility of flicker. Your URSA Broadcast will automatically calculate flicker free shutter speeds for your current frame rate. These speeds are effected by mains power frequency in your region. You can set your local power frequency to 50Hz or 60Hz in your URSA Broadcast's setup menu. See the 'setup settings' section in this manual for more information.

Tapping the 'shutter' indicator brings up the shutter speed menu along the bottom of your URSA Broadcast's touch screen. If you have auto exposure set to 'off,' this screen will show you your currently selected shutter speed, as well as the available flicker free shutter speeds, based on the mains power frequency you have selected in your URSA Broadcast's 'setup' menu. For more information, see the 'setup settings' section in this manual.

NOTE The characteristics of different light sources may still cause flicker even when using flicker free shutter speeds. We recommend always performing a test shoot when not using continuous lights.

To select one of the flicker free shutter speeds, simply tap it or use the arrows on either side of the current shutter speed indicator to cycle through available speeds.

Your URSA Broadcast will suggest flicker free shutter speeds based on the mains power frequency you choose in the 'setup' menu

If you are shooting outside, or using flicker free lights, you can also manually select a shutter speed by double tapping the current shutter indicator at the bottom left of your screen. This will bring up a keypad which you can use to set any shutter speed for your chosen frame rate.
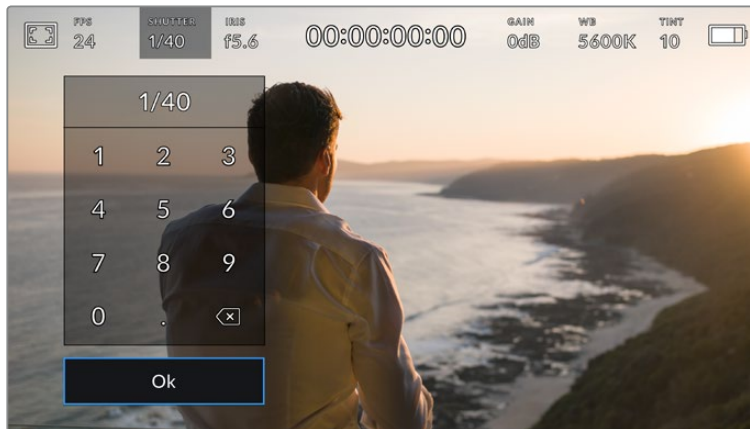
Use the manual shutter keypad to enter your shutter speed of choice when shooting outdoors or under flicker free lights

Your URSA Broadcast has three shutter based auto exposure modes. To select one of these, tap the 'auto exposure' button in the far right of the shutter menu.

Shutter
This setting automatically adjusts shutter speed to maintain a constant exposure while keeping iris aperture constant. If you want to maintain a fixed depth of field, this is the setting to choose. It's worth mentioning that the subtle automatic adjustments of the shutter may have an effect on motion blur. It's also worth keeping an eye out for any flicker that may be introduced from various light fixtures on indoor shoots. URSA Broadcast's auto iris feature is not available when the 'shutter' auto exposure mode is selected.

Shutter + Iris
Maintains the correct exposure levels by adjusting the shutter, then the aperture. If the maximum or minimum available shutter speed is reached and exposure still cannot be maintained, URSA Broadcast will begin adjusting the aperture to keep exposure constant.

Iris + Shutter
Maintains the correct exposure levels by adjusting the aperture, then the shutter speed. If the maximum or minimum available aperture is reached and exposure still cannot be maintained, URSA Broadcast will begin adjusting the shutter speed to keep exposure constant.
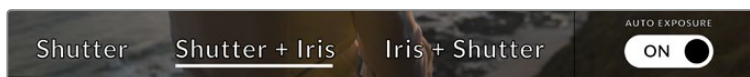

While in the shutter menu, tap 'auto exposure' to access shutter based auto exposure modes

TIP When an auto exposure mode that effects the shutter is enabled, a small "A" will appear next to the shutter speed indicator at the top of your URSA Broadcast touchscreen.
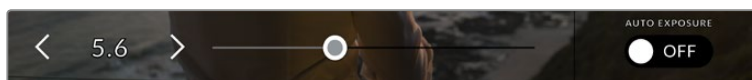
Iris

The 'Iris' indicator displays your current lens aperture. By tapping this indicator, you can change the aperture of compatible lenses and configure iris based auto exposure modes.
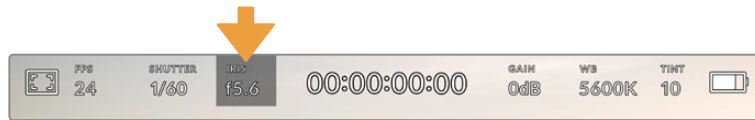
Your URSA Broadcast's iris indicator. Tap this to access iris settings

NOTE To adjust your iris from the LCD touchscreen, your URSA Broadcast must be fitted with a lens that supports changing aperture via the camera. If you are using a B4 or PL lens connected via the broadcast 12 pin connector, make sure that the lens iris switch on the handgrip is set to 'A' or 'auto.'

Tapping the 'iris' indicator once brings up the iris menu along the bottom of your URSA Broadcast touchscreen. You'll see your current lens aperture at the far left of this menu. You can change the aperture by tapping the left and right arrows on either side of the current aperture, or moving the slider left or right.

While in the 'iris' menu, tap the arrows on either side of the iris indicator or use the slider to adjust iris settings

Tapping the 'auto exposure' switch icon at the far right of the iris menu opens the iris auto exposure menu.

This gives you the following auto exposure options.

Iris
This setting automatically adjusts the aperture to maintain a constant exposure, while keeping shutter speed constant. This will keep motion blur constant, but may affect your depth of field.

Iris + Shutter
Maintains the correct exposure levels by adjusting the aperture, then the shutter speed. If the maximum or minimum available aperture is reached and exposure still cannot be maintained, URSA Broadcast will begin adjusting the shutter speed to keep exposure constant.

Shutter + Iris
Maintains the correct exposure levels by adjusting the shutter, then the aperture. If the maximum or minimum available shutter speed is reached and exposure still cannot be maintained, URSA Broadcast will begin adjusting the aperture to keep exposure constant.
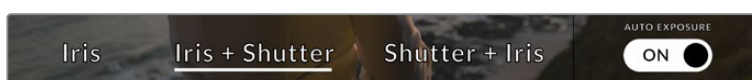
While in the iris menu, tap 'auto exposure' to access iris based auto exposure modes

When an auto exposure mode that effects the iris is enabled, a small "A" will appear next to the iris indicator at the top of your URSA Broadcast touchscreen.

> **TIP** Automatic exposure works smoothly with compatible B4 or PL lenses which are designed for video or film production. EF lenses may produce noticeable 'steps' in exposure when changing aperture. For this reason, we recommend using only 'shutter' auto exposure mode if shooting with EF lenses.

Duration Display

At the top of your URSA Broadcast LCD touchscreen, you'll see your camera's duration display.

Your URSA Broadcast's duration display. This will turn red while recording

The duration display provides a timecode counter for checking the duration of your clips and monitoring timecode during recording and playback. The counter displays a time sequence showing Hours:Minutes:Seconds:Frames and will progress through the sequence as you record or play back clips. The timecode will turn red during recording.

The displayed duration of each clip starts from 00:00:00:00 for each clip. The clip duration of the current, or last recorded, clip is displayed on the touchscreen. Time of day timecode is embedded into clips for easier post production.

To see the timecode, simply tap the duration display. Tap the duration display again to return to clip duration.

Additional status indicators may appear around the duration display:

|	
W	Appears to the left of the duration display when your URSA Broadcast is using a windowed sensor mode.
TC	Appears to the right of the duration display when showing timecode.
EXT	Appears to the right of the duration display if an external timecode is connected and valid.
INT	Appears to the right of the duration display if the camera is running off an internal timecode after being 'jam synced' and disconnected.
REF	Appears when a valid reference source is connected and locked, based on the reference input settings.

Gain

The 'Gain' indicator displays your URSA Broadcast's current gain setting, or light sensitivity. Tapping this indicator lets you adjust your gain to suit varying lighting conditions.

The optimum setting for URSA Broadcast is 0dB.
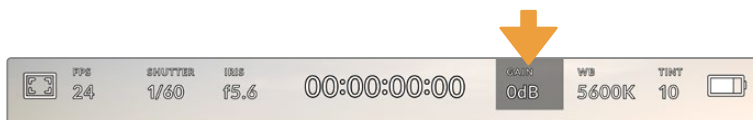
Your URSA Broadcast's gain indicator. Tap the indicator to access gain settings

o

While in the 'gain' menu, your URSA Broadcast's gain settings
appear along the bottom of the LCD touchscreen

Depending on your situation, you may choose a lower or higher gain setting. For example, in low light conditions +12dB can be suitable but may introduce some visible noise. In bright conditions -6dB can provide richer colors.

White Balance

The 'WB' and 'TINT' indicators display your camera's current white balance and tint. Tapping these indicators lets you adjust your camera's white balance and tint to suit varying lighting conditions.
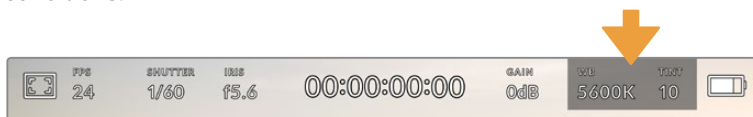
Your URSA Broadcast's white balance and tint indicators.
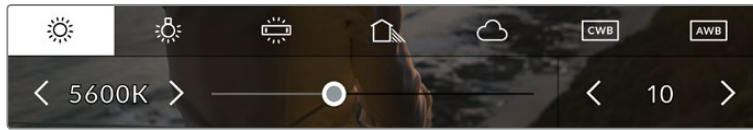Tap these to access white balance and tint settings

Every light source emits a color. For example, a candle flame emits a warm color, and an overcast sky emits a cool color. White balance settings are used to color balance your image so white stays white by adjusting the mix of orange and blue in your image. For example, when shooting under tungsten lamps which emit a warm, orange light, selecting 3200K adds some blue to the image. This balances the color so white is accurately recorded.

Your URSA Broadcast comes with white balance presets for a variety of color temperature conditions.These are:

☀	**Bright sunlight**	(5600K)
💡	**Incandescent bulbs**	(3200K)
	Fluorescent bulbs	(4000K)
	Mixed light	(4500K)
☁	**Cloud**	(6500K)

You can customize any of these presets by tapping or holding the arrow icons to the left and right of the temperature indicator in the bottom left of the 'white balance' menu. Each tap moves the color temperature up or down 50K, but holding the arrow icons down will increase these increments for faster changes. Alternatively, you can move the temperature slider in the middle of the 'white balance' menu.

To further dial in your image, you can adjust the 'tint.' This adjusts the mix of green and magenta in your image. For example, adding some magenta can compensate for the green cast of many fluorescent lights. Many of your URSA Broadcast's white balance presets include some tint.

Tapping the white balance and tint indicator on your URSA Broadcast
gives you access to five presets, as well as a white balance indicator
and slider on the left, and a tint indicator on the right. Adjust
these to set a custom white balance for your lighting conditions

While in the 'white balance' menu, your camera's current tint setting is shown at the bottom right of the screen. To adjust the tint, simply tap or hold the arrows to the left and right of the tint indicator. The available range is -50 to +50 in one unit increments. Holding down on the arrows speeds up adjustment.

NOTE Customizing the white balance or tint will change your preset to 'CWB,' or custom white balance. Custom white balances are persistent; your CWB settings will stay configured between power cycles, and when switching to a preset and back to CWB. This makes it easy to compare a custom white balance to the last preset used.

Auto White Balance

Your URSA Broadcast can set white balance automatically. Tapping 'AWB' will bring up the white balance screen.

When setting white balance automatically, a square will be overlaid on the center of your image. Fill this square with a neutral surface such as a white or gray card and tap 'update.' Your URSA Broadcast will automatically adjust its white balance and tint values to ensure that the average of the white or grey within the white balance square is as neutral as possible. Once updated, this will be set as your camera's custom white balance.


Tapping the 'AWB' icon in the white balance menu will bring
up the auto white balance screen. Use this with a white or
neutral grey surface to automatically set a neutral white balance

Power

Your URSA Broadcast's power status is displayed in the top right of the LCD screen. There are four possible indicators:
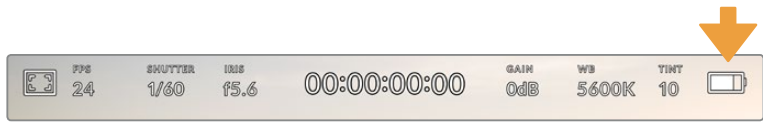
Your URSA Broadcast's power indicator is at the top right of the LCD touchscreen. While using battery power, tapping this toggles between 'voltage' and 'percentage' displays

AC	**AC**	Displayed when your URSA Broadcast is plugged into mains power.
80%	**Percentage**	If you are using a percentage accurate battery and plate combination and have your battery display set to 'percentage,' the indicator will display your battery level as a percentage. At 20% charge remaining, the indicator will turn red.
	Battery bars	If your battery display is set to 'percentage' but your battery plate and battery combination does not support percentage accurate battery information, your URSA Broadcast will display a battery icon that drains in 25% increments. At 20% charge remaining, the battery bar will turn red.
16.4v	**Voltage**	When your battery display is set to 'voltage,' this indicator will display your battery's remaining voltage. When your battery drops below 12.5 volts, this indicator will turn red. Your URSA Broadcast will automatically shut down once the battery reaches 11.9 volts.

When using battery power, you can switch between 'voltage' and 'percentage' or 'battery bars' power indicators by tapping the power indicator.

TIP A list of batteries that support percentage accurate power information is provided in the 'mounting batteries' section of this manual.

Histogram

At the bottom left of your URSA Broadcast touchscreen, you'll see the histogram. The histogram shows the contrast between whites and blacks along a horizontal scale.


The histogram gives you an indication of the tonal range between shadows and highlights in your clip. It is also a helpful tool for checking the balance of your exposure and to prevent your highlights from clipping

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. You can use this to check 'clipping' in your image shadows and highlights. If the left and right of your edges of the histogram come to an abrupt stop rather than falling off gradually, you may be losing highlight or shadow detail.

> **NOTE** If you don't see a histogram in the bottom left of your touchscreen, your LCD monitor settings may be set to display 'codec and resolution.' See the 'monitor settings' section in this manual for more information.

Record button

Next to the histogram at the bottom of your URSA Broadcast's touchscreen, you'll see a round grey button. This is the 'record' button. Tap this once to begin recording, and tap it again to stop. While recording, the button and the timecode at the top of your URSA Broadcast touchscreen will turn red.
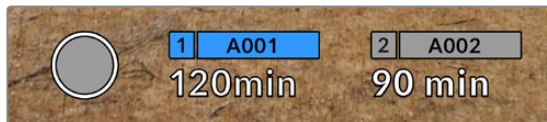

Your URSA Broadcast's 'record' button, next to the storage indicators at the bottom of the LCD touchscreen
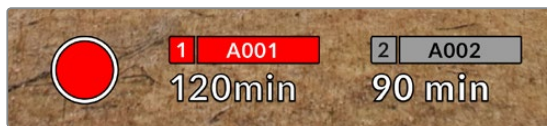
The 'record' button turns red when recording

Dropped Frame Indicator

The 'record' button will be overlaid with a flashing '!' indicator if your URSA Broadcast begins dropping frames while recording. The time remaining indicator for the affected card or cards will also turn red. For example, if you are recording in dual card mode and card 1 is dropping frames, the '!' indicator will appear over the 'record' button, and the time remaining indicator on card 1 will turn red. This lets you know if a particular card is too slow for your currently selected codec and resolution. The 'dropped frame indicator' will also display if you have dropped a frame on the previously recorded clip. This indicator will continue to display until another clip is recorded, or the camera is power cycled. Refer to 'Choosing a CFast 2.0 card' section in this manual, for more information on how to avoid dropping frames.
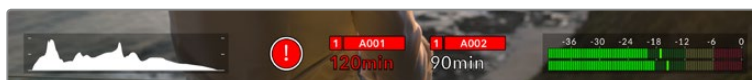
Dropped frame indicator for CFast card 1 dropping frames

> **TIP** If you have the your URSA Broadcast's door LED enabled, this will rapidly flash red when dropped frames are detected. For more information, see the 'setup settings' section in this manual.

NOTE You can set your URSA Broadcast to stop recording if dropped frames are detected to prevent a situation where you waste time shooting unusable footage if you don't notice the dropped frame indicator. See the 'record settings' section in this manual for more information.

Recording Time Remaining

At the bottom of your URSA Broadcast touchscreen, you'll see the CFast card indicators.

When a CFast card is inserted, the storage indicator at the bottom of the screen will show how much recording time is left on the card. The time is shown in minutes and will vary according to your selected frame rate and codec.

The indicator will automatically recalculate if either of these settings are changed. When there is approximately 5 minutes remaining on your card, the indicator text will turn red, and will blink intermittently when there is only 2 minutes remaining. The indicator displays FULL when a card reaches maximum capacity.
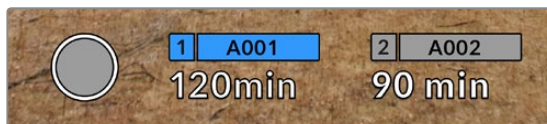
Your URSA Broadcast's storage indicator will display the name of your CFast card and the record time remaining in minutes

The card name will also be shown in a small bar above the time remaining. This bar will turn blue to indicate that it is the card that the camera will be recording to. While recording, the bar will turn red.

Tapping the CFast card indicators will bring up the storage and formatting menu.
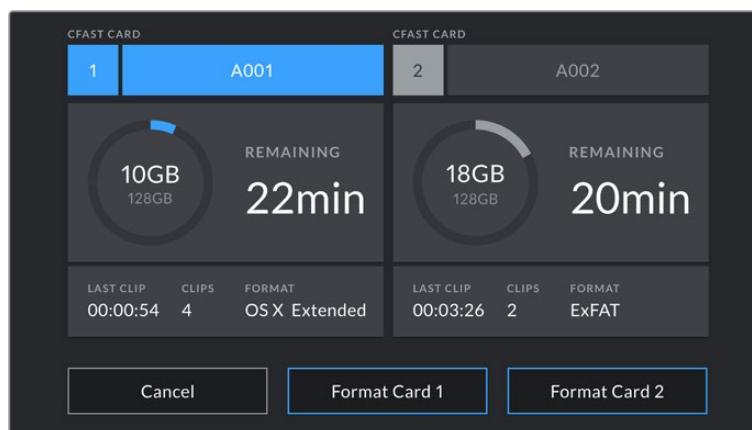
Tap the storage indicators on your URSA Broadcast's LCD touchscreen to access the storage manager

This menu displays the amount of free space on each CFast card currently in your URSA Broadcast, as well as the card name, length of the last clip, total number of clips per card, and each card's file format.

You can format CFast cards from this menu. For more information on formatting CFast cards using URSA Broadcast, see the 'preparing media on Blackmagic URSA Broadcast' section of this manual.

TIP Tapping the card name in the storage menu sets it as the active card. Your URSA Broadcast will fill this card first.

Audio Meter

The peak audio meters display audio levels for channels 1 and 2 when using the internal microphone, or via external audio when connected. The display is calibrated to dBFS units and features peak hold indicators which stay visible for a short time so you can clearly see the maximum levels reached.

To achieve optimum audio quality, ensure your audio levels do not reach 0 dBFS. This is the maximum level that your camera can record, meaning that any audio that exceeds this level will be clipped, resulting in distortion.

The colored bars on the audio meter represent peak audio levels. Ideally your peak audio levels should fall in the upper end of the green zone, between -18 and -12dBFS. If your peaks enter into the yellow or red zones, corresponding to -12 and -6dBFS your audio is in danger of clipping

You can tap the audio meter to bring up volume controls for audio input channels 1 and 2, as well as headset or speaker volume.

Tap the audio meters on your URSA Broadcast LCD touchscreen to easily access volume and headset or speaker settings

Double tap to zoom

You can magnify any part of your URSA Broadcast's preview image by double tapping the LCD touchscreen. The area you tap will be magnified, and you can move around the image by dragging your finger around the LCD touchscreen. This is very helpful when checking focus. To return to standard magnification, simply double tap your camera's touchscreen again.

While zoomed in, an indicator in the top left of your LCD touchscreen will show which part of the image you are viewing. You can move around the image by dragging your finger along the screen as you would on a smartphone or tablet

Full Screen Mode

It can be useful when framing or focusing a shot to temporarily hide your touchscreen's status text and meters. Simply swipe up or down on URSA Broadcast's LCD touchscreen to hide these. The record indicator, frame guides, grids, focus assist and zebra will remain visible.
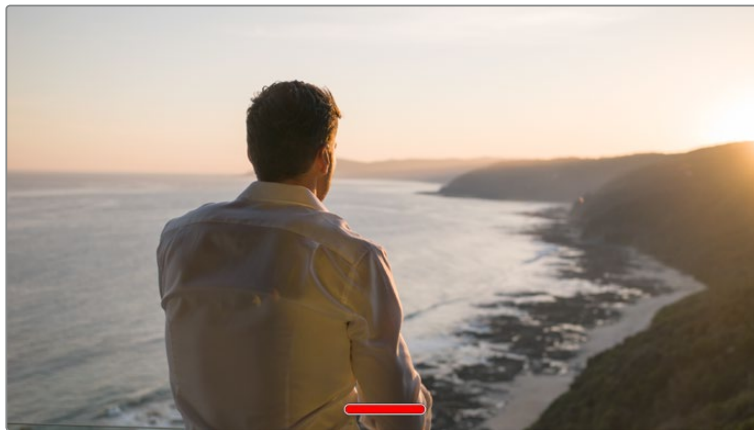
Swipe up or down to hide all status indicators on your URSA Broadcast LCD touchscreen

Playback Menu

Tap the 'play' control button on your URSA Broadcast to access the playback menu. You can control previously recorded clips with your camera's control buttons or the LCD touchscreen.

When using the LCD touchscreen, tap 'play' once to start playback and again to pause. Use the forward and reverse buttons just as you would on a CD player. Tapping 'forward' once will move you to the next clip, while tapping 'reverse' once will move you back to the beginning of the current clip. Tapping 'reverse' twice will move to the beginning of the previous clip. Playback of clips can also be looped by activating the loop icon.

The reverse, play, forward and loop icons

To shuttle, hold down either the forward or reverse transport buttons. This will play your footage back at twice regular speed in either forward or reverse, depending on which transport key you held.

Once shuttling, you can change the shuttle rate by tapping the transport keys again. Each time you tap the transport key in the same direction you will double the shuttle rate. The maximum shuttle rate is x16 normal speed. Tapping the transport key again at x16 speed will return you to x2 speed. Tapping the opposite direction will halve the current shuttle speed until you reach 2x speed. You can return to normal playback by tapping the 'play' button.
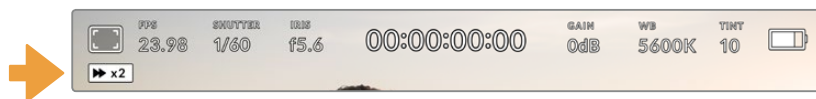
The shuttle speed indicator displays the speed and direction of footage being fast forwarded or reversed

Tapping the 'record' control button in playback mode will return your camera to 'standby' mode, ready to record.

> **TIP** Swipe up or down on your URSA Broadcast's touchscreen to hide status text while playing back footage. Entering the slate in playback mode will allow you to mark the current clip 'good take' in metadata. For more information, see the 'entering metadata' section in this manual.

Settings

Dashboard

Pressing the 'menu' control button on your URSA Broadcast will bring up your camera's dashboard. This is a tabbed menu containing the settings not available from your URSA Broadcast's head up display. Settings are divided by function into 'record,' 'monitor,' 'audio,' 'setup,' 'presets,' and 'LUTS' tabs. Some tabs, such as 'record,' 'monitor,' and 'setup' contain multiple pages. You can cycle between these pages by tapping the arrows on the left and right of the settings screen, or swiping left or right as you would on a smartphone or tablet.
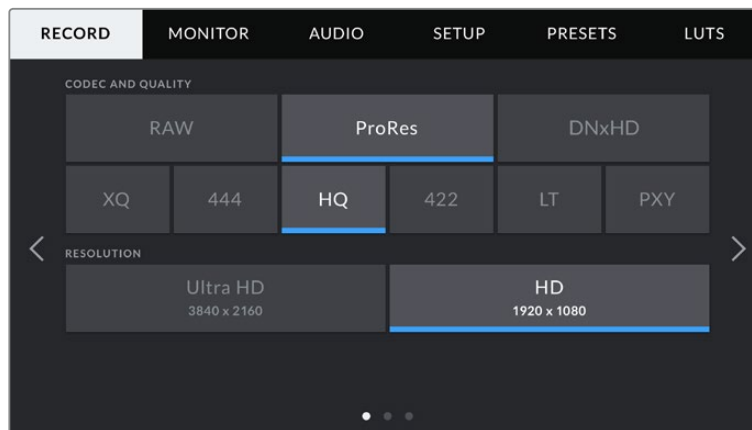

Tap the 'record,' 'monitor,' 'audio,' 'setup,' 'presets,' and 'LUTS' headings to move between your URSA Broadcast's dashboard tabs

Record Settings

The 'record' tab allows you to set your video format, codec, and resolution, as well as other settings which affect the footage saved by your URSA Broadcast, such as preferred card and detail sharpening. This menu has three pages, which you can cycle through by tapping the arrows at the edge of your camera's touchscreen, or swiping left or right.
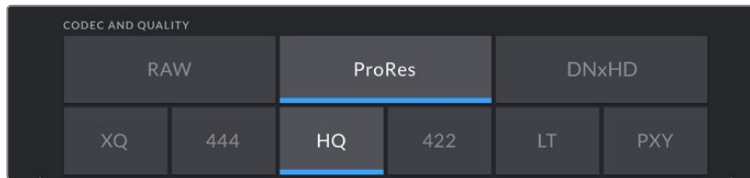
Record Settings 1

The first page of the 'record' settings tab contains the following settings.
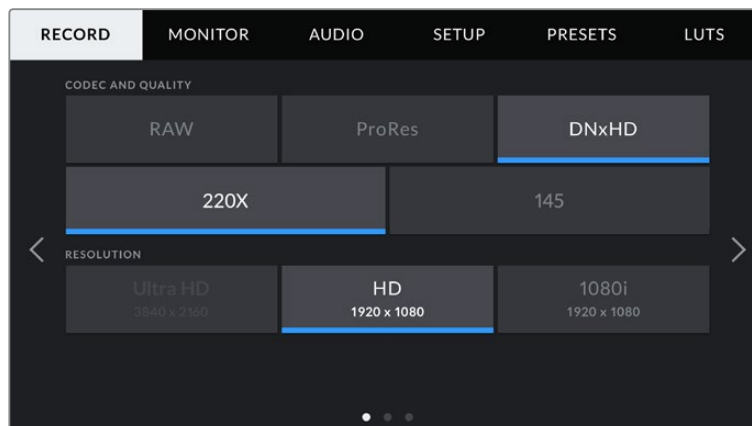
Codec and Quality

The 'codec and quality' menu is split into two rows. The top row lets you choose between three codec families, CinemaDNG RAW, Apple ProRes and Avid DNxHD, while the bottom row offers quality options within those families. For example, the quality options available within the RAW codec family are 'lossless', '3:1' and '4:1'.


> **TIP** The amount of video you can record on a CFast card, or SD card will increase when choosing codecs that utilize higher compression. Refer to the 'record duration table' in the 'recording' section for more information.

Resolution

This setting works in combination with the 'codec' setting. Use it to select the resolution for your desired recording format.

For example, if you want to record Ultra HD clips using ProRes HQ, select 'ProRes' and 'HQ' in the 'codec and quality' menu. Now choose 'Ultra HD' in the resolution menu.
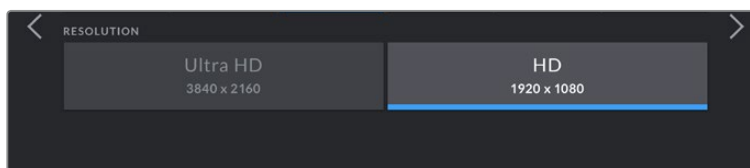
> **NOTE** Blackmagic URSA Broadcast supports Avid DNxHD and Apple ProRes codecs in HD, and CinemaDNG RAW and ProRes in Ultra HD.

Record Settings 2

The second page of the 'record' settings tab contains the following settings.
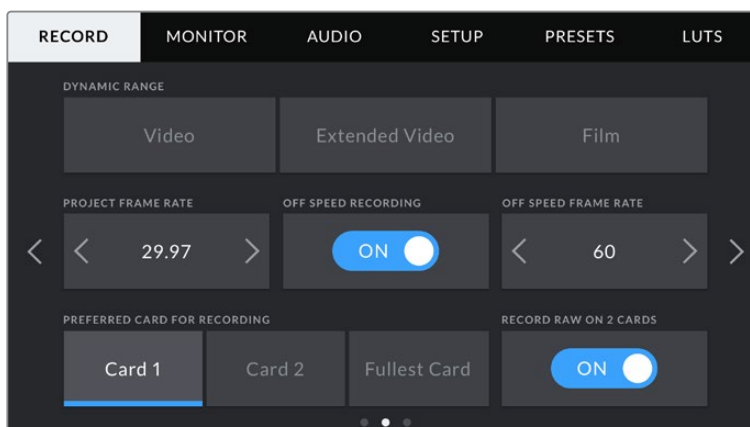
Dynamic Range

Adjust the 'dynamic range' setting by tapping the dynamic range icons. Blackmagic URSA Broadcast has three dynamic range settings:

- **Video**
  The 'video' setting is similar to the REC 709 color standard for high definition video. This setting reduces dynamic range, but lets you work faster by recording directly to the compressed video formats in a color space suitable for direct delivery or minimal post processing. You may find this setting useful when using URSA Broadcast alongside other broadcast cameras limited to the REC 709 color space.

- **Extended Video**
  The 'extended video' setting offers a good balance between 'video' and 'film' dynamic range settings. This setting offers a wider dynamic range than 'video,' while applying a mild contrast change with a smooth roll off in the highlights. 'Extended video' is suitable for use with standard broadcast monitors and is a helpful setting if you have limited time for post production and want to record your clips with a pleasing 'look' applied.

- **Film**
  The 'film' setting shoots video using a log curve giving you the most dynamic range and maximizes the information in your video signal to help you get the most out of color grading software, such as DaVinci Resolve.

> **NOTE** When recording in ProRes 'Film', Avid DNxHD or CinemaDNG RAW formats you can still monitor your footage using video, or extended video, dynamic range by loading the default Broadcast Film to Video, or Broadcast Film to Extended video LUT in your camera's LUTs menu. For more information, refer to the LUTS section in this manual.

Project Frame Rate

The project frame rate is URSA Broadcast's recording format frame rate and provides a selection of common frame rates used in the film and television industry. For example, Ultra HD at 29.97 frames per second using ProRes HQ. This frame rate is normally set to match your playback speed and audio sync used in your post production workflow and delivery requirements.

Your Blackmagic URSA Broadcast has 8 project frame rate settings including 23.98, 24, 25, 29.97, 30, 50, 59.94 and 60 frames per second.

> **NOTE** Your camera's project frame rate has a large impact on the 'look' of footage. In broadcast environments, frame rates are typically set to 50, 59.94, or 60 frames per second. These relatively high frame rates are great for capturing smooth motion and eliminate or minimize stutter while panning.
>
> Lower frame rates, such as 24 or 25 frames per second, are typically used for cinema production. These have a distinct filmic 'look,' but require much slower camera movement to avoid stutter.

Off Speed Recording

By default, your URSA Broadcast's project and sensor frame rates are matched for a natural playback speed. However, by tapping the 'off speed recording' switch icon you can set your sensor frame rate independently.

Off Speed Frame Rate

With 'off speed frame rate' enabled, tap the arrows next to the 'off speed frame rate' indicator to set your URSA Broadcast's sensor frame rate.

The sensor frame rate sets how many actual frames from the sensor are recorded every second. This frame rate will affect how fast or slow your video will play back at your set project frame rate.

For more information on off speed frame rates, see the 'frames per second' section in the 'touchscreen features' section of this manual.

> **NOTE** For information on the maximum frame rates available for each recording format and codec, refer to the 'maximum sensor frame rates' table in the 'recording' section of this manual.

Preferred Card for Recording

Use this setting to select which storage card your URSA Broadcast will record to first when both slots are in use. The options are 'card 1,' 'card 2,' and 'fullest card'. Picking either 'card 1' or 'card 2,' is a matter of personal preference, but using either consistently will let you know which card to swap out first as your storage fills up. 'fullest card' can help group files chronologically when shooting a single camera project.

The setting you choose is applied when a CFast card or SD card inserted. You can override this setting at any time by entering the storage manager and setting a different card as 'active.' It's important to note, however, that ejecting and reinserting cards will revert to the current 'preferred card for recording' setting.

> **TIP** The 'fullest card first' setting is based on the percentage that your storage cards are filled, rather than their sizes or the amount of data used.

Record RAW on 2 Cards

Blackmagic URSA Broadcast lets you record CinemaDNG RAW clips at higher frame rates by recording to both CFast cards simultaneously. When this setting is enabled your camera will record to both cards when available. If only one CFast card is inserted, your camera will attempt to record at the chosen frame rate to the single card. Turn 'record RAW on 2 cards' on or off by tapping the switch icon.

You can also enable 'record RAW on 2 cards' to increase the reliability of CFast cards if you find a single card is dropping frames while recording CinemaDNG RAW clips.

Record Settings 3

The third page of the 'record' settings tab contains the following settings.
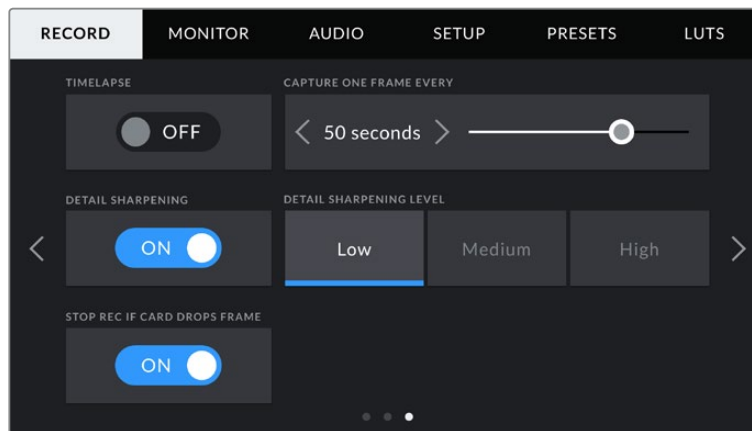
Timelapse

This setting activates the time lapse feature to automatically record a still frame at the following intervals:

- **Frames** 2 - 10
- **Seconds** 1 - 10, 20, 30, 40, 50
- **Minutes** 1 - 10

For example, you can set the camera to record a still frame every 10 frames, 5 seconds, 30 seconds, 5 minutes etc.

The time lapse feature offers many creative options. For example, setting a 2 frame time lapse interval will give your recorded video a high speed effect when played back.

The format of each still frame is based on your recording format, so if you set the camera to record Ultra HD using ProRes HQ, the time lapse setting will maintain this format. The frame rate will be based on your project frame rate. This is so your time lapse footage can be easily incorporated into your post production workflow.

Your URSA Broadcast will indicate it is in time lapse mode with an icon over the 'record' button

> **TIP** When you record footage in time lapse mode, the timecode counter updates when a frame of video is recorded.

Detail Sharpening

Use this setting to sharpen your URSA Broadcast's image. Sharpening is enabled by default and set to medium. To reduce or increase sharpening, select low, or high.

When sharpening is enabled, it will be applied to ProRes video recorded on camera as well as your URSA Broadcast's SDI output.

This setting is intended for live studio production where there is no time for post production and you want to output the image live to air. If you are doing extensive image manipulation and color correction in post production then we recommend leaving detail sharpening 'off'. For this reason sharpening is not applied to RAW files that are intended for significant post processing.

> **TIP** When post processing your RAW files, you can achieve a comparable level of sharpening to these settings by using the blur/sharpening tool in DaVinci Resolve's 'color' page.
>
> Set the tool to a radius of 0.48 and adjust the scaling to 0.6, 0.3 or 0.15 for comparable sharpening to 'high,' 'medium,' or 'low.'
>
> For detailed information on sharpening in post production, see the 'motion effects palette' section in the full DaVinci Resolve manual.

Stop Rec If Card Drops Frames

Use this setting to configure your URSA Broadcast's behavior when dropped frames are detected. When set to 'off,' recording will continue with dropped frames. When set to 'on,' your camera will stop recording if dropped frames are detected. This can prevent you wasting time shooting unusable footage if you don't spot the dropped frame indicator.

> **TIP** Refer to the 'Choosing a CFast 2.0 card' for more information on how to avoid dropping frames.

File Naming Convention

Clips are recorded in the CinemaDNG RAW format or to a ProRes QuickTime movie, depending upon which recording format you have chosen.

The table below shows an example of the file naming convention:

| A001_08151512_C001.mov	QuickTime Movie Filename
A001_08151512_C001.mov	**Camera index**
A**001**_08151512_C001.mov	**Reel Number**
A001_**08**151512_C001.mov	**Month**
A001_08**15**1512_C001.mov	**Day**
A001_0815**15**12_C001.mov	**Hour**
A001_081515**12**_C001.mov	**Minute**
A001_08151512_**C001**.mov	Clip Number

For CinemaDNG files, the folder of the image sequence will also be named the same way. Still image files captured using the still button will follow the file naming convention for video clips, however the filename will have an 'S001' representing the 'still number' as the last four digits of the filename in place of the clip number. For more information, refer to the 'Status LCD Controls' section in this manual.

Monitor Settings

The 'monitor' tab lets you adjust status text, overlays, and other monitoring options for your URSA Broadcast's LCD touchscreen, front and main SDI outputs. Options are arranged by output between 'LCD', 'front SDI' and 'main SDI', as well as 'all,' which covers monitor settings that affect all outputs on your URSA Broadcast. Each of these menus has two pages of options, which you can cycle through by tapping the arrows at the edge of your camera's touchscreen, or swiping left or right.

LCD, Front SDI, Main SDI Monitor Settings 1

The first page of the 'LCD,' 'front SDI,' and 'main SDI,' monitor tab contains identical settings for each output. For example, you can set 'zebra' on for the LCD touchscreen, but off the front or main SDI outputs.
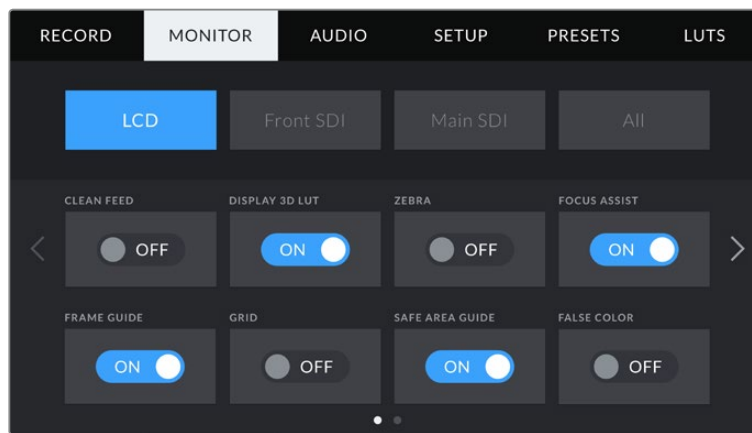
Clean Feed
Tap the 'clean feed' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to disable all status text and overlays for that output, except the record tally indicator.
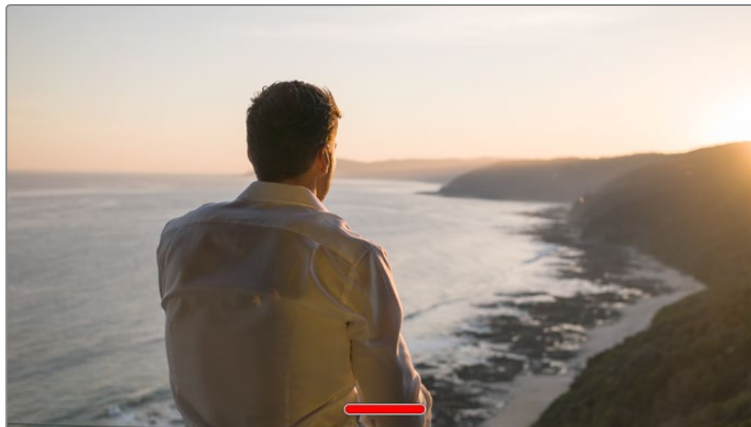
Your URSA Broadcast LCD touchscreen will still display a record tally in clean feed mode

NOTE LUTs will still be applied to outputs with 'clean feed' enabled. To disable LUTS, disable the 'display LUT' switch in the 'Monitor' menu for that output.

Display 3D LUT

Your URSA Broadcast can apply 3D LUTs to any output to approximate the look of color graded footage. This is especially useful when shooting RAW footage, or with 'film' dynamic range in ProRes or DNxHR, as these produce an intentionally 'flat' low contrast image.

If your URSA Broadcast has a 3D LUT active, use this setting to independently apply that LUT to your LCD touchscreen, front or main SDI output.

> **NOTE** For more information on loading and using 3D LUTs, see the 'LUTS' section of this manual.

Zebra

Tap the 'zebra' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to enable zebra guides for those outputs. For more information on zebra guides and setting zebra levels, see the 'touchscreen features' section in this manual.

Focus Assist

Tap the 'focus assist' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to enable focus assist for those outputs. For more information on focus assist and setting focus assist levels, see the 'touchscreen features' section in this manual.

Frame Guide

Tap the 'frame guide' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to enable frame guides for those outputs. For more information on frame guides and choosing different guides, see the 'touchscreen features' section in this manual.

Grid

Tap the 'grid' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to enable a rule of thirds grid for those outputs. For more information on the rule of thirds grid, see the 'touchscreen features' section in this manual.

Safe Area Guide

Tap the 'safe area' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to enable safe area overlay for those outputs.

For more information on safe area guides, and setting the level of safe area guides, see the 'touchscreen features' section in this manual.

> **NOTE** Use the 'safe area guide %' setting in your URSA Broadcast's 'all' monitoring settings to set the size of the safe area guide.

False Color

Tap the 'false color' switch in the 'LCD,' 'front SDI' and 'main SDI' menus to enable false color exposure assistance for those outputs.

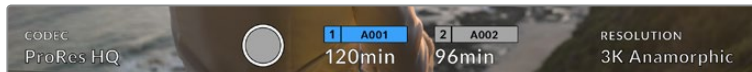For more information on false color, see the 'touchscreen features' section in this manual.

LCD Monitor Settings 2

The second page of your URSA Broadcast's 'LCD' monitor tab contains settings unique to your LCD touchscreen.

Display

Instead of a histogram and audio meters, your URSA Broadcast can display codec and resolution information at the left and right bottom edges of the LCD touchscreen. This can be useful if you prefer to use false color for dialling in exposure, or are recording audio separately and want to display additional information in the space normally used by the histogram and audio meter.

Simply tap 'meters' or 'codec and resolution' in the 'LCD' menu to select your preferred view.

Your URSA Broadcast can display codec and resolution information in place of the histogram and audio meters

Screen Brightness

Drag the 'screen brightness' slider in the 'LCD' menu left or right to adjust the brightness of your URSA Broadcast's LCD touchscreen.

Front SDI and Main SDI Monitor Settings 2

The second page of your URSA Broadcast's 'front SDI' and 'main SDI' monitor tab contains settings unique to your front and main SDI outputs.
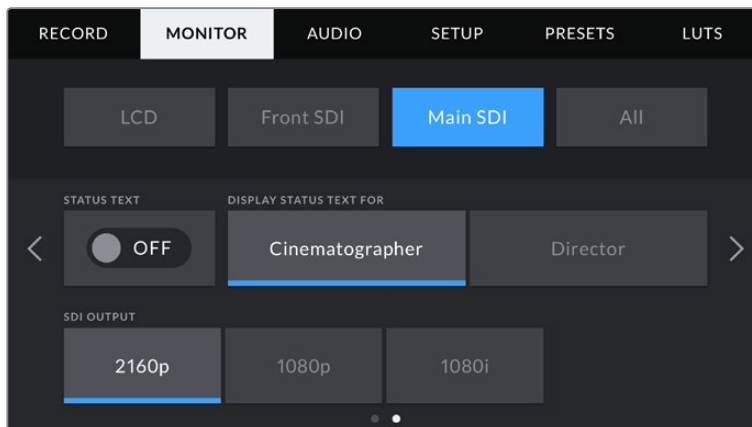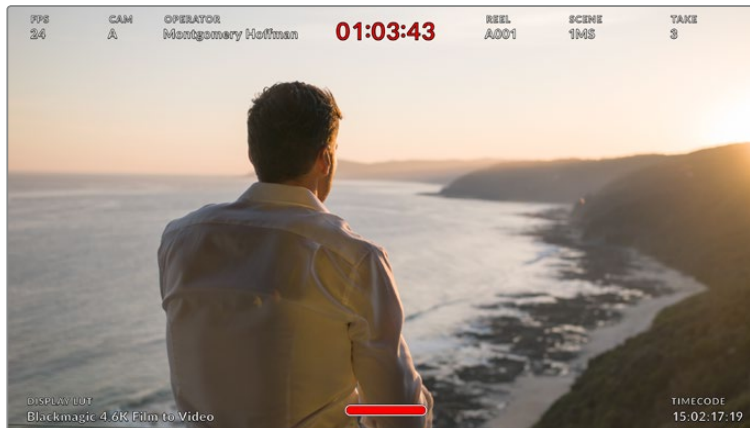

Status Text

It can be useful to hide the status text and meters on your front SDI or main SDI output, leaving only the information necessary to compose or direct a shot. Tap the 'status text' switch icon in the 'front SDI' or 'main SDI' monitor menus to toggle the appearance of status text and meters for that output. Overlays such as frame guides, grids, focus assist and zebra will remain visible, if enabled.

Swiping up or down on your URSA Broadcast's LCD touchscreen has the same effect for the touchscreen.

Display Status Text For Cinematographer or Director

Your URSA Broadcast's LCD touchscreen displays information such as ISO, white balance, and aperture that is useful to a camera operator or cinematographer setting up individual shots on that camera. URSA Broadcast's front and main SDI outputs, however, can also show information useful to a director or script supervisor who is keeping track of multiple shots or cameras.

Your URSA Broadcast can display director specific status text on its front and main SDI outputs

Setting the status text to 'director' in your URSA Broadcast's 'front SDI' or 'main SDI' monitor settings changes the status text for that output to show the following information.

FPS

Displays the currently selected frames per second. If off speed frame rate is disabled, only the project frame rate will be shown. If an off speed frame rate is being used, the sensor frame rate will be shown, followed by the project frame rate.

CAM

Displays the camera index as set in your URSA Broadcast's Slate. See the 'slate' section later in this manual for more information.

OPERATOR

Identifies the camera operator as set in your URSA Broadcast's Slate. See the 'slate' section later in this manual for more information.

DURATION DISPLAY

Displays the duration of the current clip, while recording, or the last recorded clip in the following format: hours:minutes:seconds

REEL, SCENE, TAKE

Displays the current reel, scene and take. For more information on reels, scenes, takes and their labelling conventions, refer to the 'slate' section later in this manual.

DYNAMIC RANGE

The bottom left hand corner of the monitor displays your URSA Broadcast's currently applied LUT, if applied to that output. If no LUT is applied, 'film' or 'video' dynamic range will be displayed.

TIMECODE

The bottom right of the monitor displays your URSA Broadcast's timecode, in the following format: hours:minutes:seconds:frames
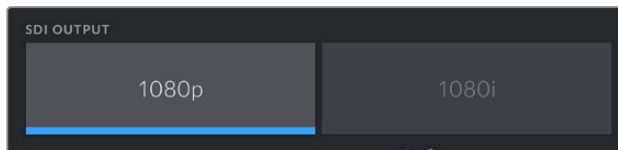
SDI Output

Both outputs allow you to choose between progressive and interlaced HD output, while your URSA Broadcast's main SDI output also has to option of progressive Ultra HD.

The options available in this setting depend on your camera's resolution and frame rate settings.

Progressive HD, or '1080p' is always available regardless of your recording resolution and frame rate, while interlaced HD, or '1080i' is available when your project frame rate is set to 50, 59.94 or 60.

Ultra HD SDI output, or '2160p' is available on your URSA Broadcast's main SDI when shooting at Ultra HD resolution.


SDI Output - front SDI
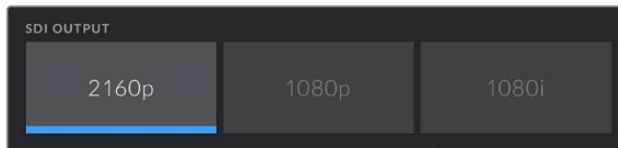
SDI Output - main SDI

All Monitor Settings 1

Monitor settings that affect all of your URSA Broadcast's outputs are grouped within the 'all' menu. For example, setting 'safe area guide %' to 90% in this menu will set the safe area guide to 90% for your camera's LCD, front SDI and main SDI outputs.

There are two pages of 'all' settings. The first page of your URSA Broadcast's 'all' monitor tab contains the following settings.
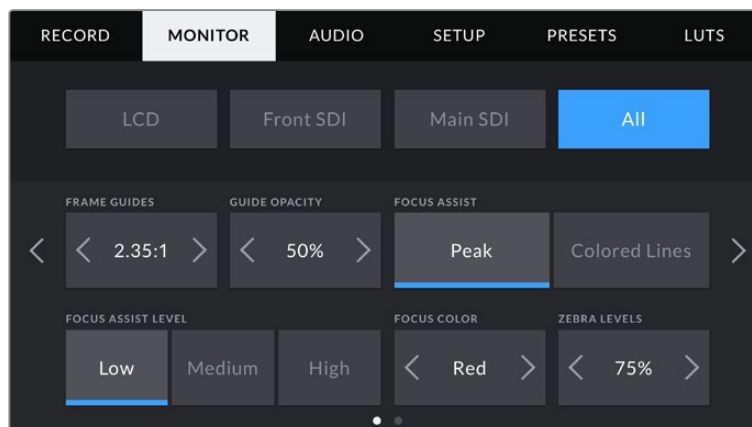
Frame Guides

Tap the left or right arrows in the 'frame guides' menu setting to cycle through seven frame guide options for all outputs on your URSA Broadcast, including EVFs such as Blackmagic URSA Viewfinder. The options are detailed in the 'touchscreen' section of this manual, and are also accessible from the LCD monitoring menu in your LCD touchscreen head up display. It's worth noting that you can individually select whether frame guides will appear on your LCD touchscreen, front SDI and main SDI output in their respective 'monitor' menus.

Guide Opacity

Tap the left or right arrows in the 'guide opacity' menu setting to choose the opacity of the areas blocked out by frame guides on your LCD touchscreen, front and main SDI outputs. The options are 25%, 50%, 75% and 100%.

Focus Assist

Your URSA Broadcast camera has two focus assist modes, 'peak' and 'colored lines.'

Peak

When 'peak' style focus assist is selected, areas of the shot that are in focus are heavily sharpened on your LCD touchscreen or SDI outputs, but not in the recorded image itself. This causes focused parts of your shot to 'pop' out of the softer background on screen. As no additional overlays are used, this can be a very intuitive way to tell when focus is dialled in, especially when the subject you're focusing on is physically well separated from other elements in shot.

Colored Lines

When 'colored lines' style focus assist is selected, a coloured line is superimposed around the parts of the image that are in focus. This can be a little more intrusive than 'peak' style focus assistance as the lines are drawn over your image, but especially in busy shots with a lot of visible elements, it can be a precise focus aid.

Focus Assist Intensity

To set the level of focus assistance for your LCD touchscreen, front SDI and main SDI, tap the 'low,' 'medium' or 'high' setting.

> **NOTE** Setting the focus assist intensity level does not effect whether focus assistance is enabled on your URSA Broadcast's LCD touchscreen or SDI outputs. You'll still need to turn focus assistance on individually for each output in the 'LCD,' 'front LCD, or 'main LCD' monitor menus.

> **TIP** The optimum level of focus assistance varies shot by shot. When focusing on actors, for example, a higher level of focus assistance can help resolve edge detail in faces. A shot of foliage or brickwork, on the other hand, may show distracting amounts focus information at higher settings.

Focus Color

Use this setting to change the color of focus line overlays when using 'colored lines' style focus assistance. Changing the focus line color can make it easier to tell focus assistance lines apart from your image. The available options are 'white,' 'red,' 'green,' 'blue' and 'black.'

Zebra Levels

Set the exposure level that zebra appears at by tapping the arrow icons on either side of this setting. Zebra level is adjustable in five percent increments between 75 and 100 percent exposure.

For more information, see the 'zebra' guide in the 'touchscreen features' section of this manual.

All Monitor Settings 2

The second page of your Ursa Broadcast's 'all' monitor tab contains the following options:
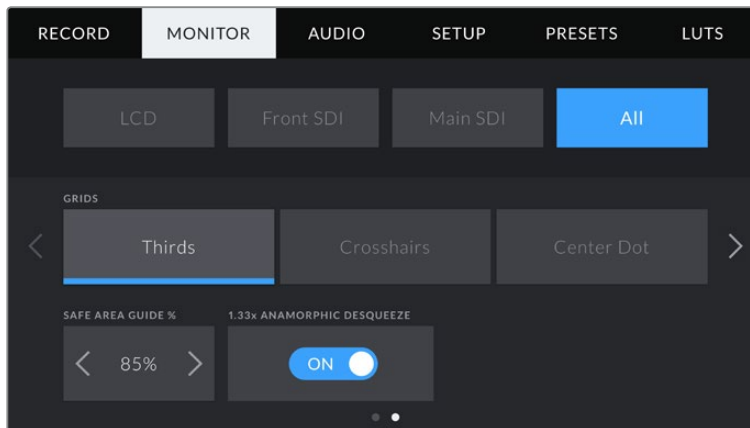
Grids

To set which combination of grids and crosshairs you want to display on your URSA Broadcast's LCD touchscreen, front and main SDI outputs, tap the 'thirds,' 'crosshairs,' or 'center dot' options in this setting.

For more information, see the 'grids' guide in the 'touchscreen features' section earlier in this manual.

Safe Area Guide %

To adjust the size of the safe area overlay on your URSA Broadcast's LCD touchscreen, front SDI and main SDI outputs, tap the arrows to the left and right of the percentage displayed in this setting. This percentage indicates the size of the safe area in relation to the image frame. Most broadcasters require a 90% safe area.

Anamorphic Desqueeze

When shooting with anamorphic lenses, the image will appear horizontally 'squeezed' on your URSA Broadcast's preview outputs and in recorded files. Enabling 'anamorphic desqueeze' will correct the preview image on your URSA Broadcast as well as recording the desqueeze amount used in the clip metadata for easy correction in post.

The desqueeze amount available will vary depending on what you've set your URSA Broadcast resolution to, but the resulting image will always be in the cinematic widescreen 2.4:1 aspect ratio.

Anamorphic lenses designed for film typically have a 2x squeeze factor. Your URSA Broadcast's '3K anamorphic' resolution is designed for use with these lenses and will perform a 2x desqueeze when set to this resolution with 'anamorphic desqueeze' enabled.

Anamorphic lenses designed for 16:9 digital image sensors often use a 1.33x squeeze factor to produce 2.4:1 cinematic widescreen images from the entire 16:9 sensor. Therefore, when your URSA Broadcast is set to 16:9 resolutions such as '4K 16:9' and 'HD 16:9,' the desqueeze ratio will be 1.33:1.

TIP If your image appears horizontally stretched when shooting with a standard spherical lens, make sure you don't have 'anamorphic desqueeze' enabled.

Audio Settings

The 'audio' tab lets you adjust the audio input and monitoring settings on your URSA Broadcast.

The settings are spread over two pages and divided between channels 1 and 2, while an upcoming software update will add two additional channels.

You can map each audio channel to a different source, as well as adjusting various settings such as padding and low cut filters.

These settings work together with the switches on your URSA Broadcast's internal control panel. So after you've set your audio source for a particular channel, you can use the internal control panel switches to set the signal type and whether phantom power is enabled for that channel.

Audio Settings 1

The first page of your URSA Broadcast's 'audio' tab contains the following settings.
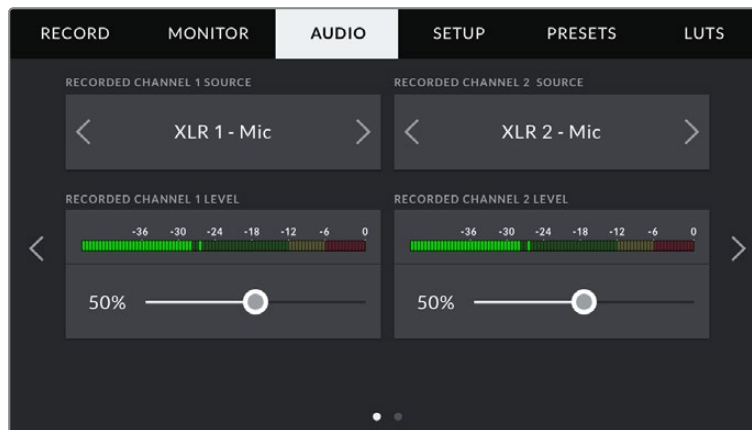
Channel Source

Use the 'record channel 1 source' and 'record channel 2 source' buttons to select your audio source for each audio channel. The options are

- **Camera Left or Right**
  Use this setting to record from your camera's internal microphones.
- **Camera Mono**
  Use this setting to record audio from your URSA Broadcast's built in microphone's left and right channels onto a single audio channel.
- **XLR 1 or 2**
  Use this setting to record from your camera's XLR inputs. Depending on which audio signal you've set on your URSA Broadcast's internal control panel switches, your XLR input may be listed as 'mic,' 'line,' or 'AES.' If phantom power is enabled and you have your XLR input set to 'mic' you'll also see a '+48V' indicator here. It it is important to ensure that the +48V switch gets turned 'off' when you disconnect your phantom powered microphone.
- **XLR 1 or 2 - Mic Backup**
  Use this setting to record audio from a microphone plugged into your URSA Broadcast XLR 1 or 2 input at a lower level than the standard 'mic' recording. This can be used to avoid audio clipping in the event of an unexpected increase in loudness. This feature will only be available as a selectable item if the XLR 1 or 2 input switch is set to 'mic'.
- **None**
 Use this setting to disable your audio channel.

Recorded Channel 1/2 Level
Use these sliders to adjust the recording levels of your chosen channel 1 and 2 sources. Audio meters are included with each slider to help you set the correct audio level. These levels will also update when you adjust the audio using the audio knobs on the ergonomic control panel.

To achieve optimum audio quality, ensure your audio levels do not reach 0 dBFS. This is the maximum level that your camera can record, meaning that any audio that exceeds this level will be clipped, resulting in distortion.

Audio Settings 2

The second page of your URSA Broadcast's 'Audio' tab contains the following settings
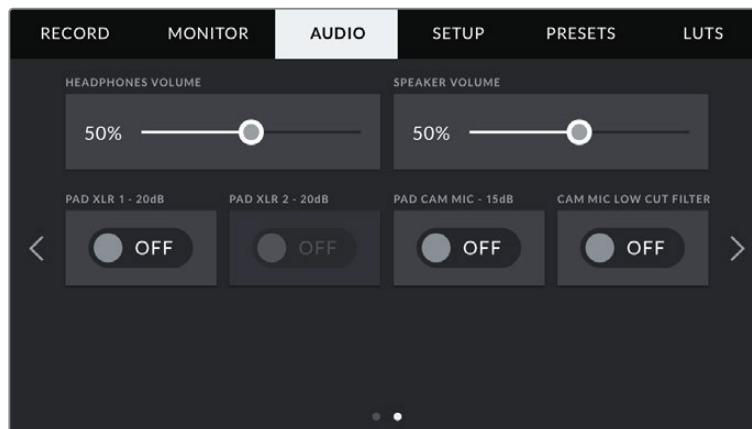
Headphones Volume
This slider adjusts the output levels for headphones attached to URSA Broadcast's 3.5mm headphone jack. Move the audio slider left or right to adjust levels. These levels will also update when you adjust the headphone volume using the settings wheel on the forward control panel.

Speaker Volume
This slider adjusts the output levels for your URSA Broadcast's built in speaker. Move the audio slider left or right to adjust levels. These levels will also update when you adjust the speaker volume using the settings wheel on the forward control panel.

Pad XLR -20dB
The -20dB pad option gives you added control to further reduce the input gain levels on your URSA Broadcast's XLR audio inputs when shooting in a loud environment even after your input levels are already turned down.

Pad Cam Mic - 15 dB
The -15dB pad option gives you added control to further reduce the microphone input gain levels on your URSA Broadcast's internal microphone when shooting in a loud environment even after your input levels are already turned down.

Cam Mic Low Cut Filter
Tap this switch icon to enable the low cut filter for your camera's internal microphones. This filter helps to reduce potential wind noise or low frequency rumbling that may occur in exterior shooting conditions. Note that the 'pad cam mic -15 dB' selector must be switched off for this function to work.

Setup Settings

The 'setup' tab contains your URSA Broadcast's identification settings, software version, function button settings and other camera settings not directly linked to recording or monitoring. This menu has four pages, which you can cycle through by tapping the arrows at the edge of the LCD touchscreen, or swiping left or right.

Setup Settings Page 1

The first page of your URSA Broadcast's 'setup' tab contains the following settings.
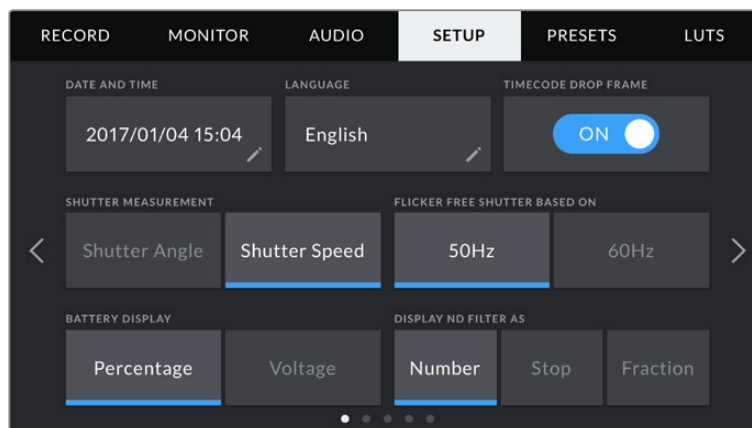
Setup menu on URSA Broadcast

Date and Time
Set your URSA Broadcast's date and time by tapping the 'date and time' setting. The date format is year, month, day and the time format is 24 hour. Your URSA Broadcast's date and time are also used for time of day timecode if an external timecode source is not connected.

Language
Tap the 'language' setting to change the language of your URSA Broadcast's menus and status text. English is the only currently available language but more are planned for upcoming software updates.

Timecode Drop Frame
Use the 'timecode drop frame' option to use drop frame timecode when using NTSC project frame rates of 29.97 and 59.94. Drop frame timecode drops a small number of frames from the timecode at set intervals. This keeps your project timecode accurate despite each second not containing a whole number of frames at NTSC frame rates.

Shutter Measurement
Tap the 'shutter measurement' button to change between shutter speed and shutter angle as a unit of shutter measurement. It's important to note that both shutter measurements effect motion blur, but work in slightly different ways. See the 'touchscreen controls' section of this manual for a full explanation of shutter measurement.

Flicker Free Shutter Based On
Use this setting to change the mains power frequency your URSA Broadcast uses to calculate flicker free shutter settings.

When shooting under lights, your shutter speed can effect the visibility of flicker. Your URSA Broadcast will automatically calculate flicker free shutter speeds for your current frame rate and display suggestions in the 'shutter speed' menu. These speeds are effected by the frequency of the local mains power supply used to drive those lights. In most PAL countries, this frequency is 50Hz, while NTSC countries typically use 60Hz power. Simply tap '50Hz' or '60Hz' to set the right frequency for your region.

Battery Display

Your URSA Broadcast can change the way the battery level indicator displays the remaining charge. The two settings are 'percentage' and 'voltage.' When using a battery and plates that support percentage accurate levels, setting 'battery display' to 'percentage' will show your battery power remaining as a percentage.

If your battery and plate combination does not support percentage accurate readings, the display will show four bars which empty as the battery depletes.

If this option is set to 'voltage,' battery levels will be displayed in volts. We recommend that you swap the battery as it approaches 12V.

Display ND Filter As

Use this setting to adjust how the ND filter indicator on your URSA Broadcast displays your ND filter setting. Each setting corresponds to a different camera convention. Cinematographers typically use ND.number notation, while those familiar with DSLRs or broadcast cameras may prefer this information in f-stop format, or as a fraction of available light. These options are available here as 'number,' 'stop,' and 'fraction,' respectively.
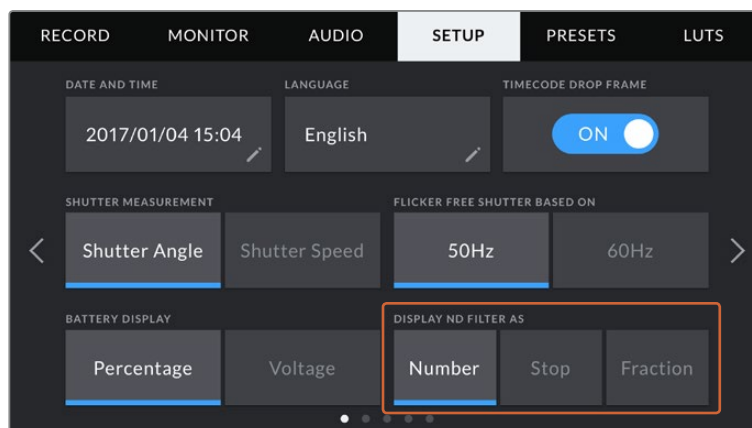
Setup menu in URSA Broadcast with the option to customize
how the ND filter information is displayed

Setup Settings Page 2

The second page of your URSA Broadcast's 'setup' tab contains the following settings.
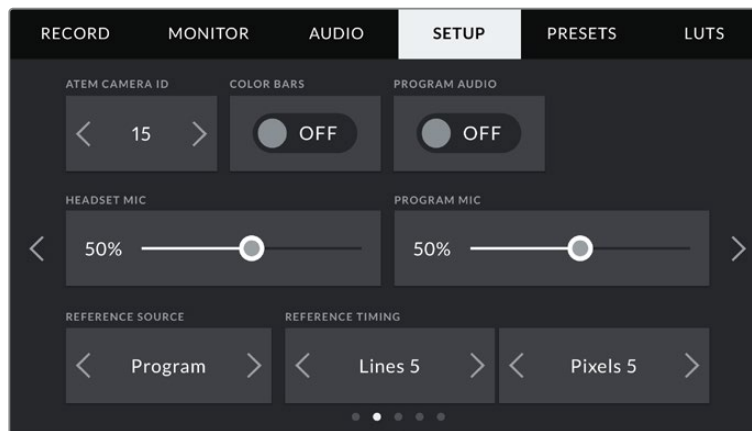
ATEM Camera ID

If you're using URSA Broadcast with an ATEM Switcher and want your camera to receive tally signals from the 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 by tapping the left or right buttons. The default setting is 1.

Color Bars

Outputting color bars rather than a preview image can be useful when connecting your URSA Broadcast to a switcher or external monitor. The appearance of your URSA Broadcast's color bars on your switcher or monitor confirms the connection, and you can perform basic monitor calibration based on the colors of the bars. To turn on color bars for all outputs on your URSA Broadcast, including the LCD touchscreen, simply tap the 'color bars' switch icon.

Program Audio

When connected to an ATEM switcher, setting 'program audio' to 'on' prioritises the program return audio as your input source to be mixed with talkback when monitoring using headphones or a headset. This is useful when you are not feeding the switcher audio from your camera but you still want to listen to the program feed from the mixer. Simply tap the 'program audio' switch icon to toggle camera audio or program audio.

Headset Mic

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

Program Mix

This setting 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. If you are in program view, program audio is heard. The default setting is 100%.

Reference Source

This setting is used to select the reference source. Your URSA Broadcast can lock to an internal or external reference source, or to the reference signal in the program input from an ATEM switcher. If you are using your URSA Broadcast with an ATEM Switcher's camera control function, you should always set your reference source to 'program' unless the switcher itself and all connected cameras are set to an external reference.

> **NOTE** When you are setting your reference source for URSA Broadcast, you may experience a small dropout on your camera's outputs when switching between your reference sources. This is because the camera is adjusting its referencing timing to match that of the external source. For this reason it is important not to change this setting during a production and only while setting up.

Reference Timing

These settings allow you to manually adjust the reference timing on a line or pixel basis. Simply tap the arrow icons on either side of the "lines" and "pixels" settings to make adjustments.

Setup Settings Page 3

The third page of your URSA Broadcast's 'setup' tab contains the following settings
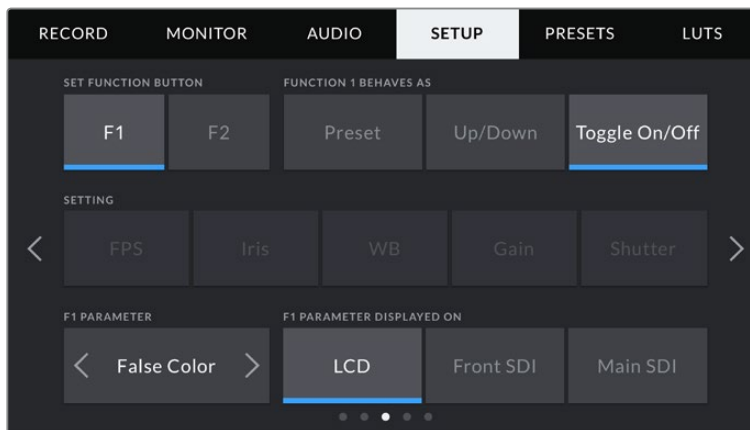
Set Function Button

On the outside of your URSA Broadcast's LCD touchscreen, you'll notice two function buttons, 'F1' and 'F2.' These are mappable to frequently used features and are quickly accessible when using your camera with the LCD touchscreen closed, such as when you are using URSA Viewfinder.
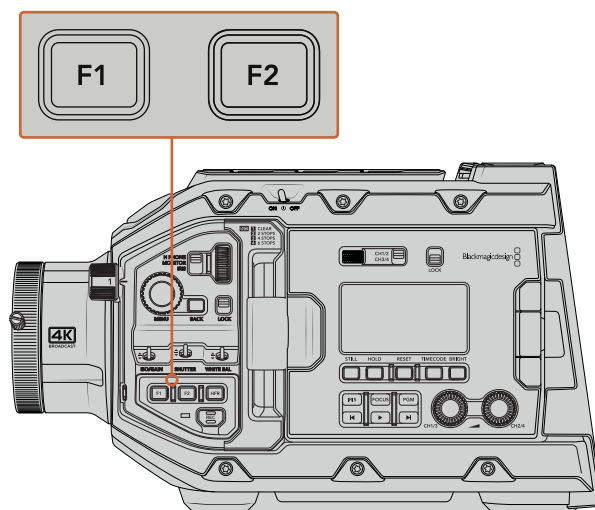
Your URSA Broadcast's F1 and F2 buttons are located on the forward control panel

To set these buttons, select a function button and then its behavior, a setting, and a parameter for that setting.
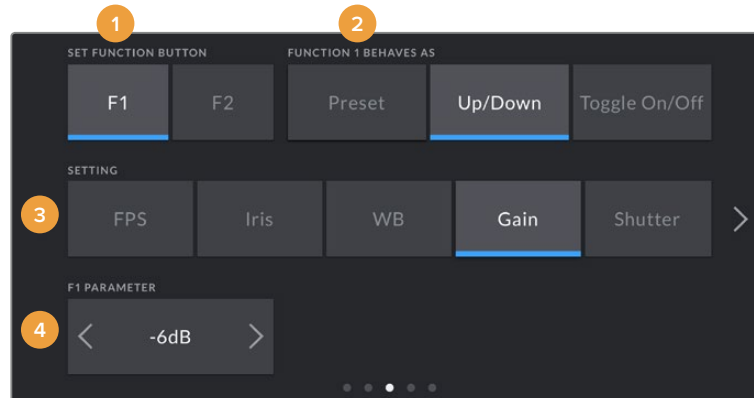
1 Button

2 Behavior

3 Setting

4 Parameter

Function 1/2 Behaves as

Once you have selected the function button you want to map, you can select a behaviour. The available options are:

- **Preset**
  When set to this behavior, pressing a function button will recall a combination of a setting and a parameter.

  To set a preset, select the setting you want to use from the 'setting' menu, and adjust that setting by tapping the arrow icons on either side of the 'parameter' menu.

  For example, to set the F1 button to recall a preset aperture of f8, select the 'preset' behavior, tap the 'iris' setting, and tap the arrows on either side of the 'parameter' menu until you get to f8.' Tapping the preset again returns your camera to the previous setting.

- **Up/Down**
  When set to this behavior, pressing a function button will move a particular setting up or down.

  For example, you may want to set F1 to increase your lens aperture and F2 to decrease it. To do this, select the 'F1' function button, set the behavior to 'up/down', and the parameter to 'up.' Do the same for the 'F2' function button, but set the option to 'down.'

- **Toggle On/Off**
  When set to this behavior, pressing a function button will toggle a particular setting on or off. The 'setting' menu is greyed out in this mode. Instead, tap the left or right arrows in the parameter menu to scroll through the available options. These are 'off speed recording,' 'color bars,' 'clean feed,' 'display LUT,' frame guides,' 'focus assist,' 'false color,' and 'zebra.'

  Using the 'Toggle On/Off' behaviour also lets you select the output this setting applies to. Simply tap any combination of 'LCD,' 'front SDI' and 'main SDI' to select. If the output for an option is not available, such as 'color bars' which always applies to all outputs, the 'LCD,' 'front SDI', and 'main SDI' settings are disabled.

Setup Settings Page 4

The fourth page of your URSA Broadcast's 'setup' tab contains the following settings.
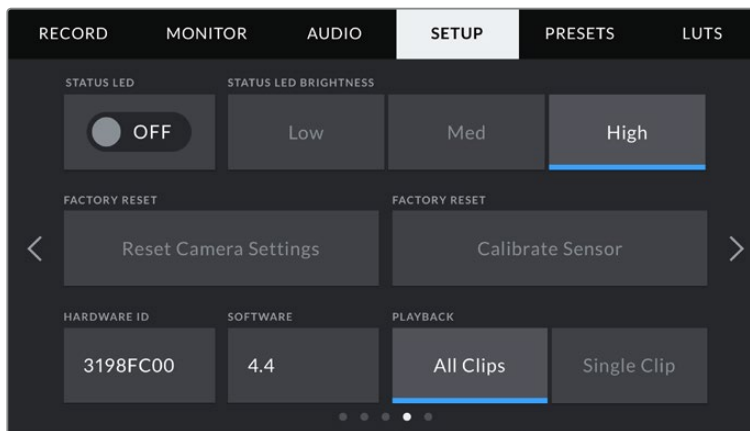
Status LED

Your URSA Broadcast has a small LED on the front panel that provides tally and status information. You can enable or disable it by tapping the 'Status LED' switch icon.

The LED will provide the following status indicators:

- **White**
  The camera is powered on and in 'standby' mode.
- **Red**
  The camera is recording. Slow flashing indicates that your card space is low, while rapid flashing indicates dropped frames.
- **Green**
  The camera is in playback mode. Slow flashing indicates that your camera is playing back clips. The LED will alternate between green and white in standby mode and will alternate between green and clear during playback to indicate this. Three flashes indicate that inserted media has been recognized.
- **Orange**
  If your camera's battery is low, the LED will flash orange and your other current status color. For example, if currently recording, the LED indicator will slowly alternate between orange and red. If your camera is in standby mode, the LED will alternate between white and orange. The threshold for 'low' battery is 20 percent for batteries that support percentage accurate charge information, or 12.5 volts for batteries that don't.

Status LED Brightness

To set the brightness of your URSA Broadcast's door LED or status LED, simply tap 'low,' 'medium,' or 'high.'

Factory Reset

To reset the camera to its default factory settings, tap the 'reset' button. You will be asked to confirm this action as it will erase any LUTS and presets currently stored on the camera. Tap 'reset' on the confirmation page to reset your camera settings. This process can take up to two minutes to complete.
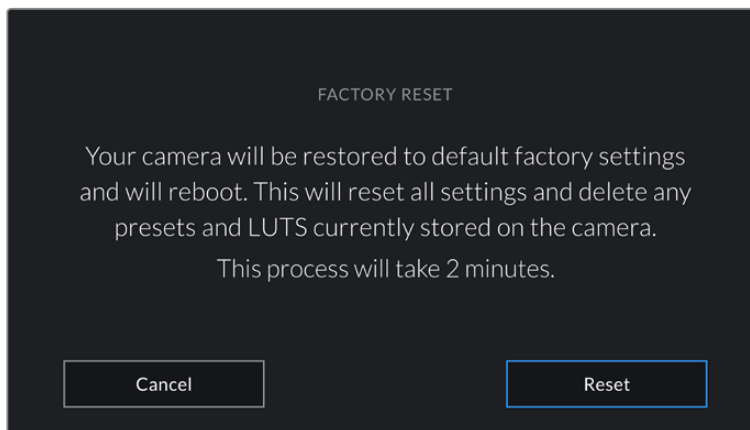
When selecting 'factory reset' you will be prompted to confirm your action

Hardware ID

The 'Hardware ID' indicator displays an 8 character identifier for your URSA Broadcast. This is unique to each camera. A longer, 32 character version of this ID is also included in the metadata for RAW and ProRes video. This can be useful for identifying which footage came from a particular camera if filenames are changed as the camera hardware ID remains constant.

Software

Displays the current software version installed on your URSA Broadcast. See the 'Blackmagic Camera Setup Utility' section for more information on updating software.

Playback

This setting allows you to select whether to play back a 'Single Clip' or 'All Clips' during playback. 'All Clips' will play back through all matching media sequentially, and 'Single Clip' will play one clip at a time. This also applies for the loop function. Selecting loop on 'All Clips' will play through all of the clips on the CFast 2.0 or SD card and then loop. Selecting 'Single Clip' will loop one clip at a time.

Setup Settings Page 5

The fifth page of your URSA Broadcast's 'setup' tab contains the following settings.
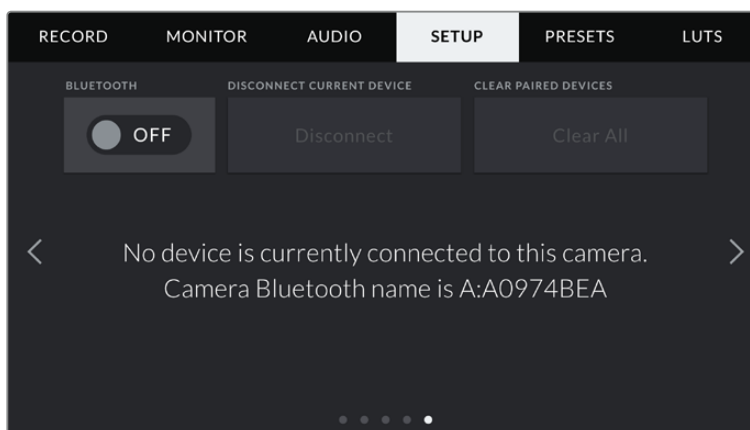
The camera Bluetooth name will be the letter of your camera as selected in the slate, followed by the 8 character hardware ID for your URSA Broadcast

Bluetooth®

Bluetooth control allows you to control your camera wirelessly from portable devices. Using the 'Blackmagic Camera Control App' you can power the camera on or off, change settings, adjust metadata and trigger record remotely from an iPad. You can enable or disable Bluetooth by tapping the 'Bluetooth' switch icon in the 'setup' menu. When Bluetooth is enabled, the camera can be detected by Bluetooth devices up to 30 feet away.

Because URSA Broadcast uses the same set of commands for Bluetooth control as it does for 'Blackmagic SDI Camera Control Protocol', you can write your own applications to control almost every setting in the camera remotely, from monitoring to audio settings, the camera's inbuilt DaVinci Resolve color corrector or lens control.

For more information see the 'Blackmagic SDI Camera Control Protocol' section in this manual.

To pair your camera with an IPad for the first time:

1 Enable Bluetooth by tapping the 'Bluetooth' switch icon in the 'setup' menu on your URSA Broadcast.

2 Open the 'Blackmagic Camera Control App' and select the URSA Broadcast you would like to pair with. Available cameras will be listed by their camera letter, followed by their unique hardware ID. For example A:A0974BEA.
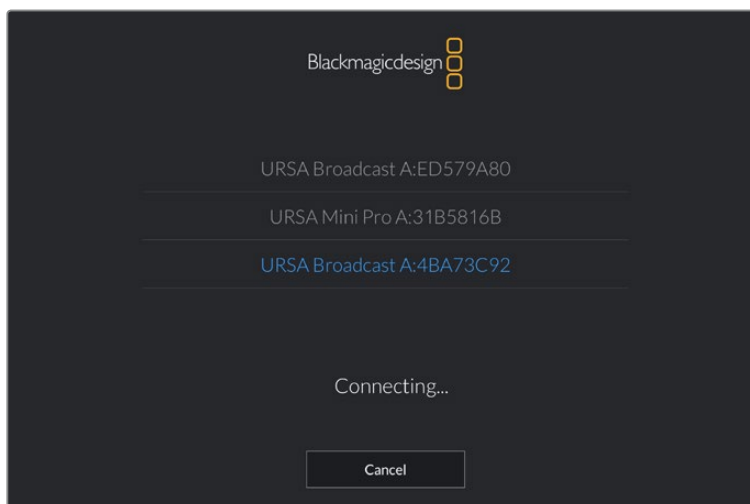

Select the URSA Broadcast you would like to pair with

NOTE When you install the Blackmagic Camera Control App and run it for the first time, you will be asked if you want to 'allow location access.' If you select 'while using the app,' GPS readings from your iPad will be included in the metadata of the files you shoot, allowing you to geotag footage. This information can be viewed in Blackmagic DaVinci Resolve versions 14 or higher.

If you do not want to using this information, select 'never.'

To change settings, go to settings, privacy, location services, camera control on your iPad.

3   When you try to connect for the first time the Blackmagic Camera Control App will request a six digit code to pair with the camera. This code will be displayed on the camera's LCD screen. Type this code into the iPad.
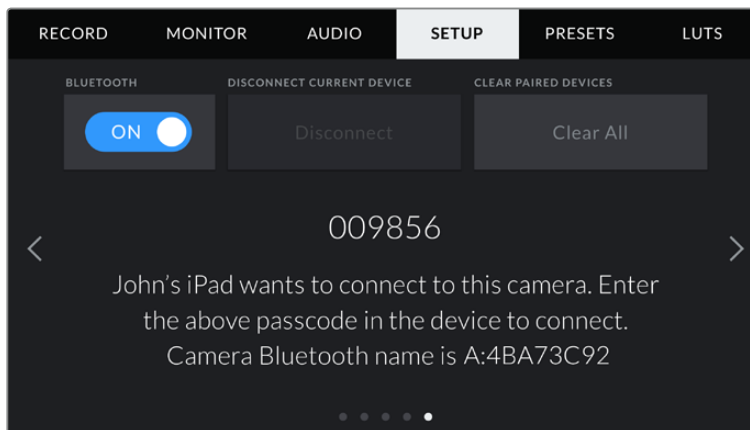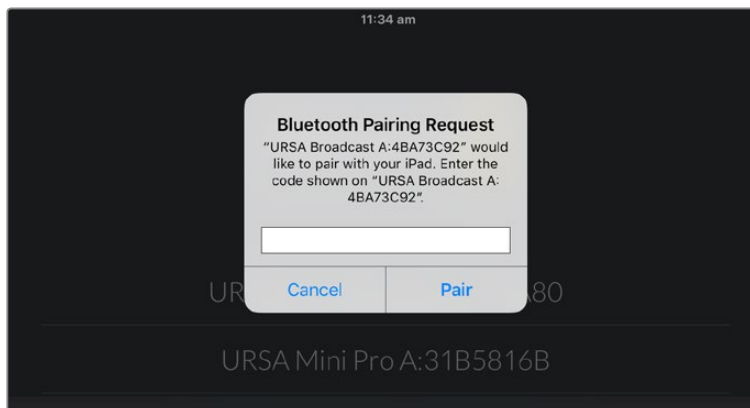
4   The information on the screen will confirm that your URSA Broadcast is now paired with your iPad.
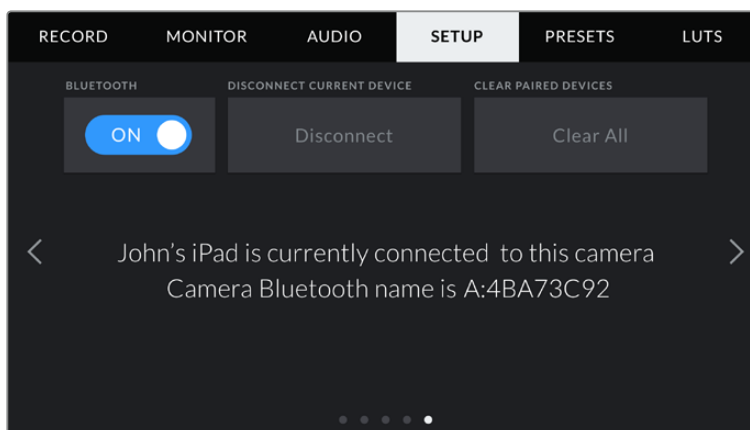
5 If there is a problem pairing the camera to your iPad you will see the following error message:
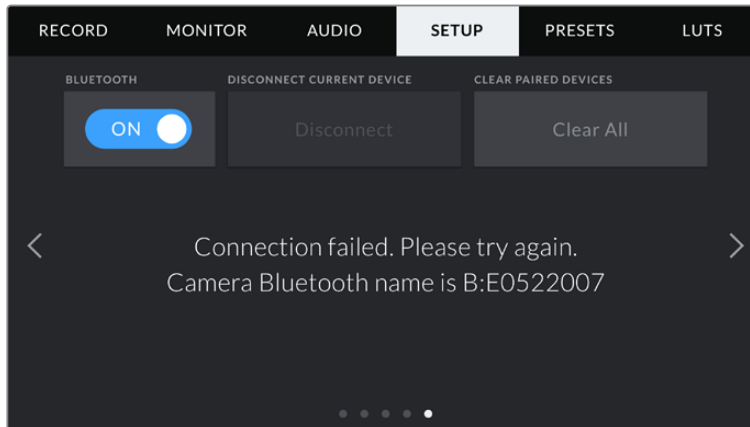
> **NOTE** If you are not using Bluetooth to control your URSA Broadcast, it is a good idea to turn Bluetooth off for the purpose of security.

Disconnect Current Device
Use this setting to disconnect your URSA Broadcast from the iPad it is currently paired with.

Clear Paired Devices
Use this setting to clear the list of devices that your URSA Broadcast has been paired with.

Controlling Your Camera with the Blackmagic Camera Control App

Once you have successfully paired your URSA Broadcast to your iPad, you can power the camera on or off, change settings, adjust metadata and trigger record remotely using the iPad app.
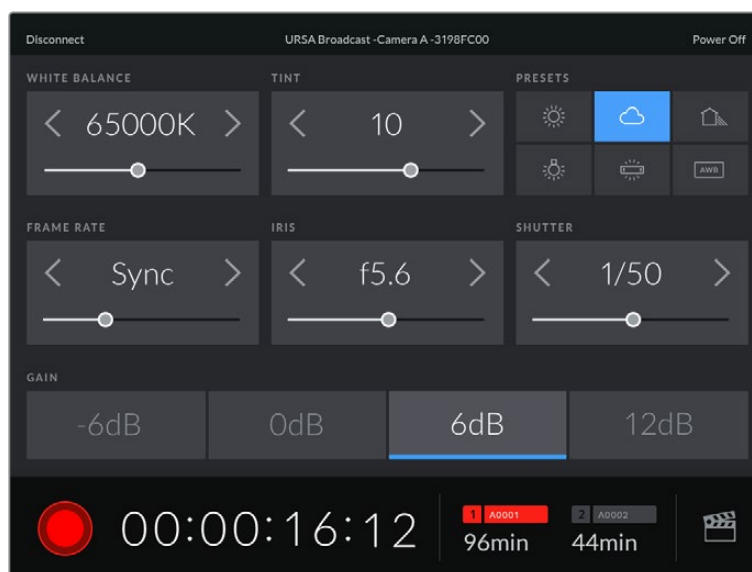

Once paired, the Blackmagic Camera Control app will display this screen, allowing you to adjust your settings and start recording
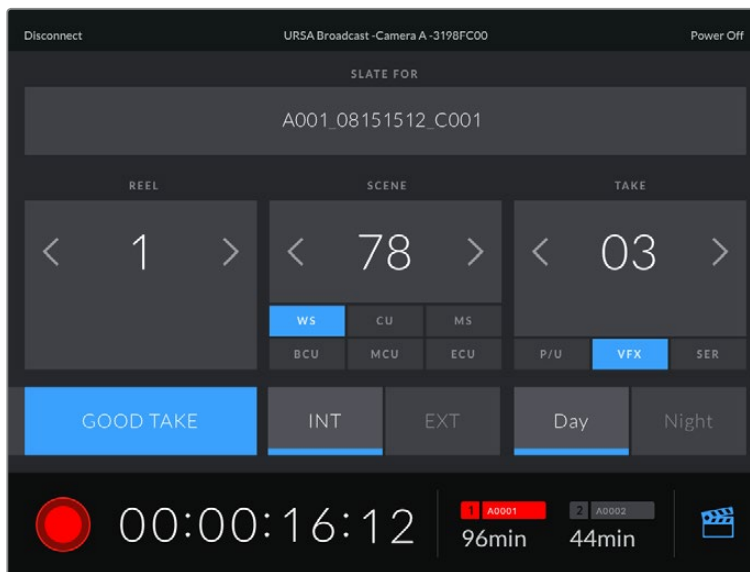
Tap the slate icon in the lower right corner to access and update the slate

URSA Broadcast uses Bluetooth LE to communicate with devices for wireless control. As this is the same type of protocol used in portable devices, it only uses a minimal amount of battery power.

You can power off your URSA Broadcast by tapping 'power off' in the top right corner.
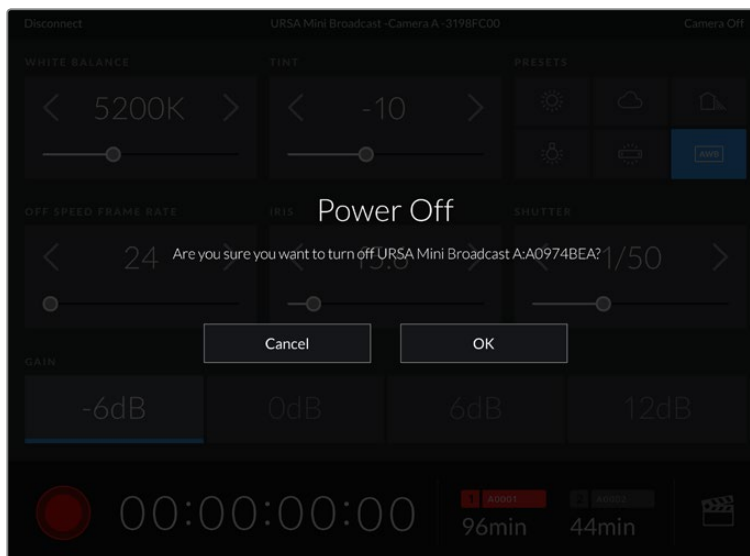

You will be prompted to confirm your selection before your camera is powered off

When Bluetooth is enabled and URSA Broadcast is powered off, the name of your camera will still show up on the list of available devices in the Blackmagic Camera Control App. Since you have already paired with your camera, you can now switch it on remotely by selecting your camera name and tapping 'Connect'. Your camera will not show up in this list if Bluetooth is disabled.

Presets

The 'presets' tab lets you save and recall a complete collection of settings for your URSA Broadcast. This is very useful when one camera is used for multiple projects. For example, you may use your URSA Broadcast for a variety of different shoots, from documentaries to music videos, with very different settings between types of projects. Your URSA Broadcast's 'presets' function lets you save the setup for a particular project or type of shoot and come back to it quickly and easily when required.

You can also import and export presets, which is very useful for setting up a multi camera shoot. Simply set up one URSA Broadcast to suit your project, then export that preset for all the other URSA Broadcasts on set.
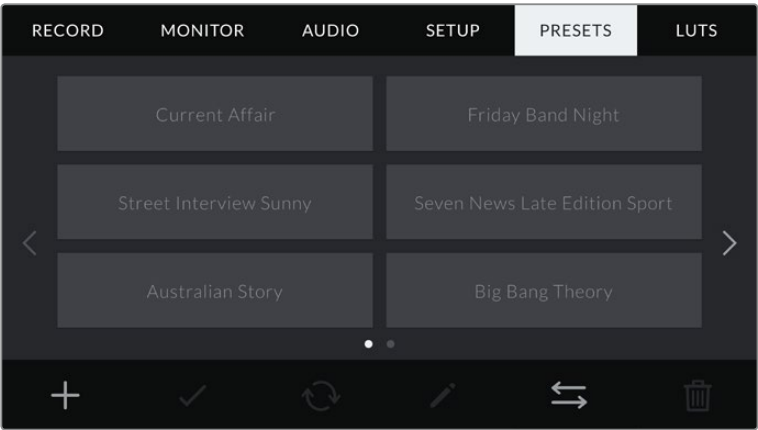
Your URSA Broadcast's Presets tab

> **NOTE** Your URSA Broadcast can save up to twelve presets to its internal memory.

Preset buttons

The button icons along the bottom of your URSA Broadcast's 'preset' menu correspond with the following functions.

| Add | Load | Update | Manage | Delete |

Saving and loading presets

To create a new preset, tap the 'add' icon. This will bring up a touch keyboard on your LCD touchscreen where you can name your preset. Once you've typed in the name, tap 'update' to save all of your URSA Broadcast's current settings to that preset.

If your URSA Broadcast already has a preset loaded with the same name, you will be prompted to overwrite the existing preset or keep both.
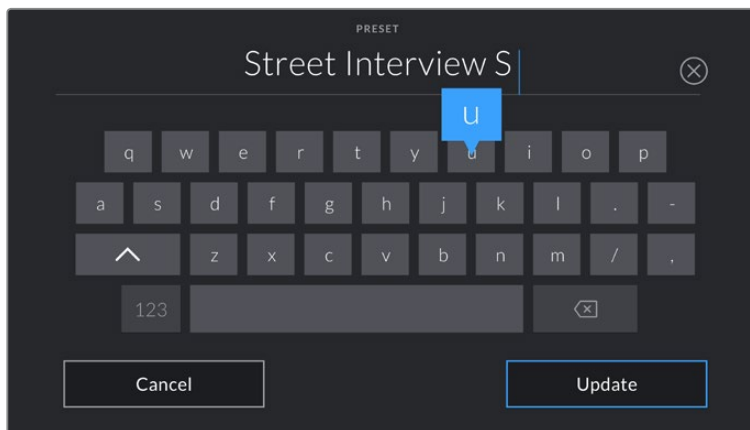
Enter a name for your preset by tapping the 'add' icon in
the preset tab and using the touch keyboard

Once you have a preset saved, tap its name in the preset menu to select it.
To load it tap the 'load' icon.
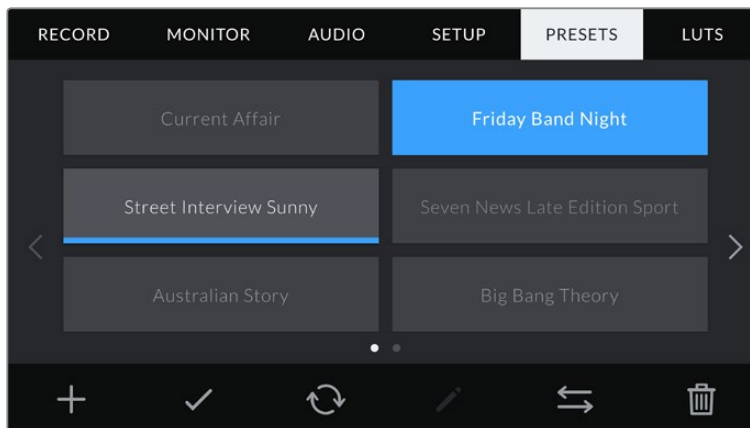
Select a preset and tap the 'load' icon to load it. Selected presets will appear solid
blue, while currently loaded presets have a blue line along the bottom of their icon

You can update a preset by tapping the 'update' icon. This will bring up a prompt asking you if
you want to update the preset with your URSA Broadcast's current setting. Tap 'update'
to confirm.

Importing presets

To import presets, tap the 'preset manager' icon at the bottom of the preset menu. Select either
SD or CFast with the storage media selection switch, depending on where your presets
are saved.

Tap 'import preset' and confirm your selection with the 'import' icon. This will bring up the
import screen. Choose 'card 1' or 'card 2' at the top left of this screen to display any available
presets on those cards.

Your URSA Broadcast will search the root directory and 'presets' folder on the selected CFast or
SD card. It's worth noting that presets saved elsewhere on your CFast or SD cards will not
be visible.

Tap a preset to select it, and tap 'import' to confirm. At the top right of this screen, you'll see the
number of remaining empty preset slots available on your camera.

Exporting presets

To export a preset to a CFast or SD card, select the preset you want to export by tapping it, and tap the 'manage' icon. You will be prompted with two options, 'import preset' or 'export selected preset.'

Use the storage media selection switch to select either SD or CFast, depending on the location you would like to export the preset to. Tapping 'export selected preset' will prompt you to choose which card you would like to export to. Choosing a card will export the selected preset to a 'presets' folder on that card.

If the CFast or SD card you've chosen already has a preset saved to it with the same name as the one you're exporting, you will be prompted to overwrite the preset on the card, or keep both presets.

Deleting presets

Your URSA Broadcast has space for twelve presets. To delete a preset, select it and tap the 'delete' icon. You will be prompted to confirm your choice. Tap 'delete' to confirm.

LUTS

The 'LUTS' menu lets you import, export and apply 3D LUTs to your camera's outputs.
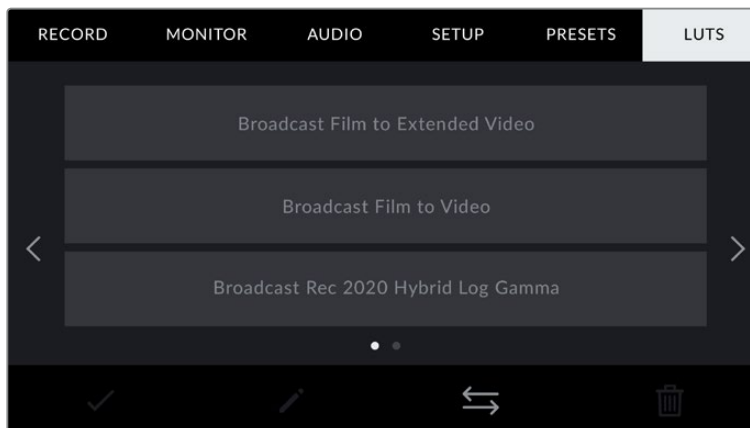
Your URSA Broadcast's LUT tab

Introducing 3D LUTs

Your URSA Broadcast can apply 3D LUTs to images on its LCD touchscreen, front SDI and main SDI. LUTs work by telling your camera what color and luminance output to show for a particular color and luminance input. For example you may want to record internally in camera with normal color but send a preview out to your monitors and switcher of what broadcast legal colors for your region will look like. This is also useful when shooting RAW footage or using 'film' dynamic range, both of which have an intentionally undersaturated, 'flat' appearance. By applying a LUT, you can get an idea of what your footage will look like after it has been graded.

It is easy to create 3D LUTs using DaVinci Resolve or other color correction software, and LUTs are available online from a variety of sources. Your URSA Broadcast can store up to six 17 point or 33 point 3D LUTs, of up to 1.5 megabytes each. Once loaded, you can choose to display a given LUT on your camera's LCD touchscreen, front SDI, main SDI or any combination of these outputs.

Your URSA Broadcast supports 33 point 3D LUTs in .cube format created in DaVinci Resolve and 17 point 3D LUTs converted to Resolve .cube format via LUT conversion programs. Your camera processes 3D LUTs using high quality tetrahedral interpolation.

> **TIP** For more information on displaying LUTs, see the 'monitor settings' section in this manual.

> **NOTE** LUTs are used as a preview tool only. Your URSA Broadcast does not apply, or 'bake in,' LUTS to recorded footage, however information on the LUT applied during a shot is saved as metadata with your recordings. The 'LUT used' field in DaVinci Resolve can be used to verify the name of the LUT that was used as a monitoring LUT on set.

Built-in LUTs

Your URSA Broadcast provides a number of built-in LUTs, that allow you to preview different looks whilst shooting in 'film' dynamic range or when shooting RAW.

- **Broadcast Film to Video**
  The 'Broadcast Film to Video' LUT is similar to the REC 709 color standard for high definition video, and has a high level of contrast and saturation. You may find this setting useful when using URSA Broadcast alongside other broadcast cameras limited to the REC 709 color space.

- **Broadcast Film to Extended Video**
  The 'Broadcast Film to Extended Video' LUT offers a preview with a wider dynamic range than the 'Broadcast Film to Video' LUT, and applies a mild contrast change with a smooth roll off in the highlights.

- **Broadcast Rec 2020 Hybrid Log Gamma**
  The 'Broadcast Rec 2020 Hybrid Log Gamma' LUT offers a preview that is essentially a hybrid between REC 709 and a log image.

- **Broadcast Rec 2020 PQ Gamma**
  The 'Broadcast Rec 2020 PQ Gamma' LUT offers a preview with a gamma curve that is based on what we can perceive with our eyes, for efficient encoding of HDR images.

LUTS buttons

The button icons along the bottom of your URSA Broadcast's 'LUTS' screen correspond to the following functions:

Load	Manage	Delete
✓	⇄	🗑

Importing LUTS

To import a 3D LUT, tap the 'manage' icon at the bottom of the LUT menu, and tap 'import LUT' to confirm.

This will bring up the import screen. Select either SD or CFast with the storage media selection switch, depending on where your LUTs are saved. Choose 'card 1' or 'card 2' at the top left of this screen to display any available 3D LUTs on those cards.

Your URSA Broadcast will search the root directory and '3DLUTS' folder on your selected CFast or SD card. Any LUTs you have saved elsewhere will not be visible.

Tap a LUT to select it and tap 'import' to confirm your selection. The LUT will be saved to your URSA Broadcast.

> **NOTE** If your URSA Broadcast's six 3D LUT slots are full, you will not be able to import until you delete some existing LUTs to make space.

If the LUT you want to import has the same name as a LUT already saved to your camera, you will be prompted to overwrite the existing LUT or keep both. At the top right of this screen, you'll see the number of remaining empty LUT slots available on your camera. You will only be able to import as many LUTs as you have free slots on your camera.

> **NOTE** If you are having trouble importing a LUT to your URSA Broadcast, it may be the wrong size. You can use a LUT editor like Lattice to check its size, or open it in any text editor on your computer. Next to the tag 'LUT_3D_SIZE' will be a number indicating the LUT's size. If this value is not 17 or 33, you can use Lattice to resize your 3D LUT to 17 points.

Applying a LUT

Once you have a LUT saved onto your camera, tap it in the LUT menu to select it, and tap the 'load' icon. This will enable that LUT to all outputs on your camera. However, you will still have to turn 'display LUT' on in the monitor menu for each output to apply it. See the 'monitor settings' section in this manual for more information.

Exporting LUTs

To export a LUT to a CFast or SD card, select the LUT you want to export and tap the icon. You will be prompted with two options, 'import LUT' and 'export selected LUT.' Use the storage media selection switch to select either SD or CFast, depending on the location you would like to export the LUT to.

Tapping 'export selected LUT' will prompt you to choose which card you want to export to. Choosing a card will commence exporting, unless you are exporting a LUT that already exists on that card. If a duplicate LUT is found, you will be asked if you want to overwrite the LUT on your card, or if you would like to keep both.

Deleting LUTS

Your URSA Broadcast has space for six 17 point 3D LUTs. To delete LUTs you are no longer using, or make room for more, select the LUTs you want to delete and tap the icon. You will be prompted to confirm your choice. Tap 'delete' to confirm.

Entering Metadata

Metadata is information saved inside your clip, such as take numbers, camera settings and other identifying details. This is extremely useful when sorting and processing footage in post production. For example, take and shot and scene numbers are essential organisational tools, while lens information can be used to automatically remove distortion or better match VFX assets to plates.

Your Blackmagic URSA Broadcast automatically saves some metadata to each clip, such as camera settings, timecode, date and time. You can use your camera's slate to add many additional details.

The Slate

Swiping left or right on your URSA Broadcast's touchscreen will bring up the slate.

The slate is divided into two tabs, 'clips' and 'project.' The 'clip' tab contains information that may vary clip by clip, while 'project' is where you enter details common between clips, such as the project name, director, and camera and operator ID.

> **TIP** Metadata entered into the slate is viewable on your URSA Broadcast's front or main SDI outputs when set to 'director view.' See the 'monitor settings' section in this manual for more information.

'Clip' metadata

Changes made to clip metadata work slightly differently in 'standby' mode, when your URSA Broadcast is ready to record, and 'playback' mode, when you're reviewing footage you've already shot. In 'standby,' clip metadata will be saved to the next clip recorded, except for 'good take last clip' which refers to the most recently recorded clip.

In 'playback' mode clip metadata is always recorded to the current clip being viewed.

Slate for
This setting shows the clip which the metadata currently displayed in the 'clip' applies to. In 'standby' mode, this refers to the next clip that will be recorded.

Lens Data
These settings display information about the current lens fitted to your camera. Many electronic lenses automatically supply information such as the lens model, aperture and focal length.

If you are using a lens that does not provide this information, or you want to enter additional data, you can tap the pencil icon in this setting to enter the information manually. This will bring up the 'lens data' menu, which contains the following information:

The lens data menu showing information automatically populated from a B4 broadcast lens with 12-pin Hirose connector plugged into URSA Broadcast.

- **Lens Type**
  Shows the lens model. If your lens type is not automatically shown here, you can tap this setting to enter the data manually.

Use the touch keyboard to enter lens data if it is not provided automatically

- **Iris**
  Shows the iris aperture setting at the start of your clip. This information can be displayed in f- or T-stops depending on the lens used, if supplied automatically. Tap this setting to enter data manually.

- **Focal length**
  Shows the focal length setting of the lens at the start of the recorded clip. When automatically supplied, this is shown in millimeters. Tap this setting to enter data manually.

- **Distance**
  Shows the focus distance settings of the lens for the recorded clip. Some lenses can provide this data automatically and it will be provided in millimeters. You can also enter this data manually.

- **Filter**
  Shows the current lens filters used. Tap this setting to enter data manually. You can make multiple entries separated by commas.
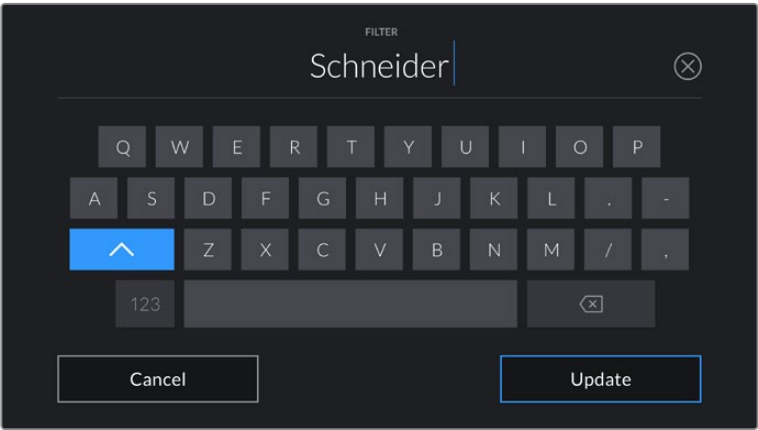
Filter information needs to be entered manually
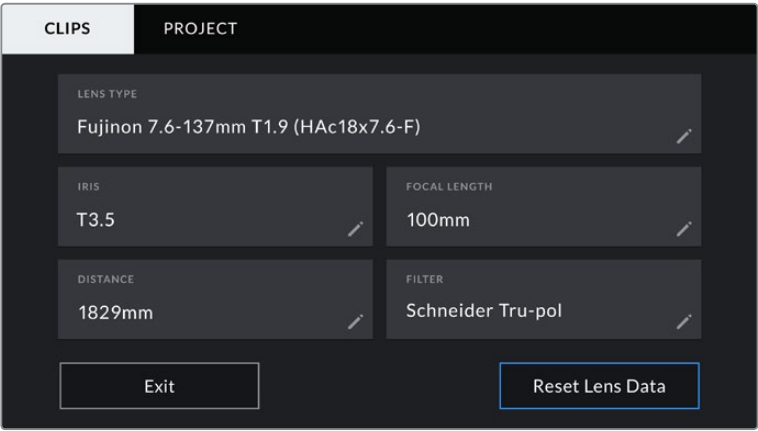
The 'lens data' menu showing information that has been manually entered

NOTE You can clear lens data at any time by tapping the 'reset lens data' icon in the 'lens data' menu. You will be prompted to confirm your choice. If you confirm, all lens data will be cleared and repopulated with any lens data automatically provided by the currently fitted lens. If you have manually entered any information into these fields, you will need to reset the lens data the next time you mount a lens, otherwise the manually entered value will remain.
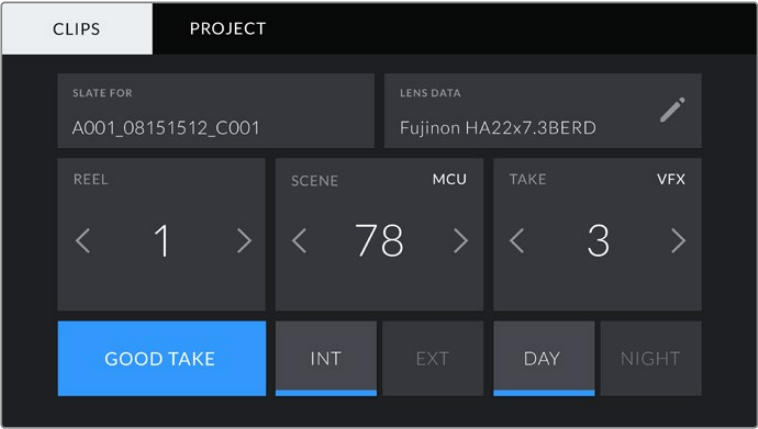
Your URSA Broadcast's slate is divided into 'clip' and 'project' tabs

Reel

The 'reel' indicator shows the current reel.

Your URSA Broadcast automatically increments reel numbers, so there is usually no need to enter this manually. When you are moving to a new project and want to start from reel '1' again go into the project tab of the slate and tap 'reset project data'.

Scene

The 'scene' indicator shows the current scene number, and can also show the current shot number and type.

The number on this indicator always refers to the current scene. You can move this up and down using the left and right arrows on either side of the scene number, or tapping the scene number to enter the scene number editor.

The range of possible scene numbers is 1 to 9999.

By adding a letter to the scene number in the scene number editor, you can also indicate the current shot. For example 23A would indicate scene twenty three, shot one. If you have a shot letter added to your scene, your URSA Broadcast will suggest letter increments whenever you enter the scene number editor. For example, if your current scene number is 7B, your URSA Broadcast will offer '7C' as an increment suggestion.

The scene number indicator can also show information about the current shot type in the top right corner. You can select these in the scene number editor at the right hand side of the shot keyboard.

The shot types available are:

WS	wide shot
MS	medium shot
MCU	medium close up
CU	close up
BCU	big close up
ECU	extreme close up
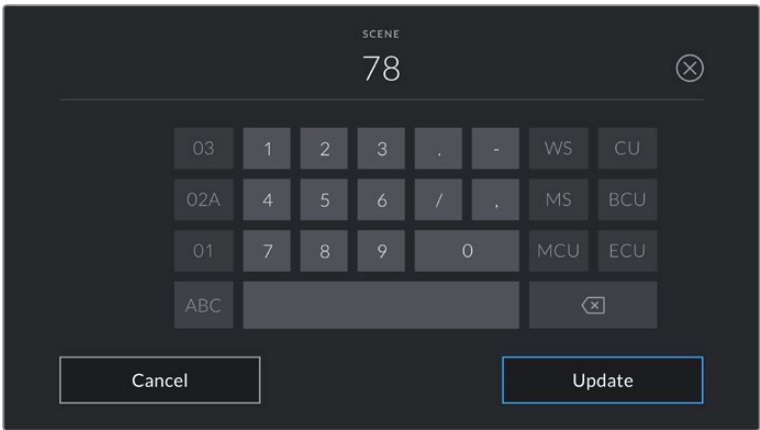
When entering 'scene' metadata, your URSA Broadcast will prompt you with increment suggestions to the left of the touch keyboard, and shot types to the right
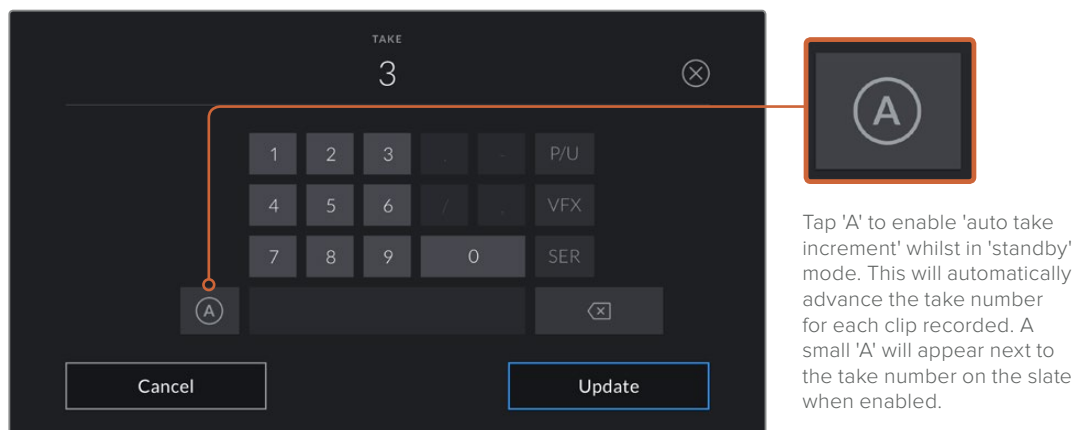
Take

The 'take' indicator shows the take number for the current shot. You can increment this up or down by tapping the left or right arrows on either side of the take number, or tapping the indicator to enter the take number editor.

> **TIP** When the shot number or scene letter are advanced, the take number will revert to '1.'

You can add take descriptions in the take number editor. These are offered to the right of the take number keyboard, and correspond to the following scenarios:

PU	'Pick up.' This refers to a reshoot of a previous take to add additional material after principal photography has wrapped.
VFX	'Visual effects.' This refers to a take or shot for visual effect use.
SER	'Series.' This refers to a situation in which multiple takes are shot while the camera is kept running.

Tap 'A' to enable 'auto take increment' whilst in 'standby' mode. This will automatically advance the take number for each clip recorded. A small 'A' will appear next to the take number on the slate when enabled.

When entering 'take' metadata, your URSA Broadcast will offer prompts for additional shot types to the right of the touch keyboard

Good take

Tap the 'good take' indicator to flag good takes for easy recall in post production. This tag applies to either the last clip recorded, if your URSA Broadcast is in 'standby' mode, or the clip currently being viewed in 'playback' mode.
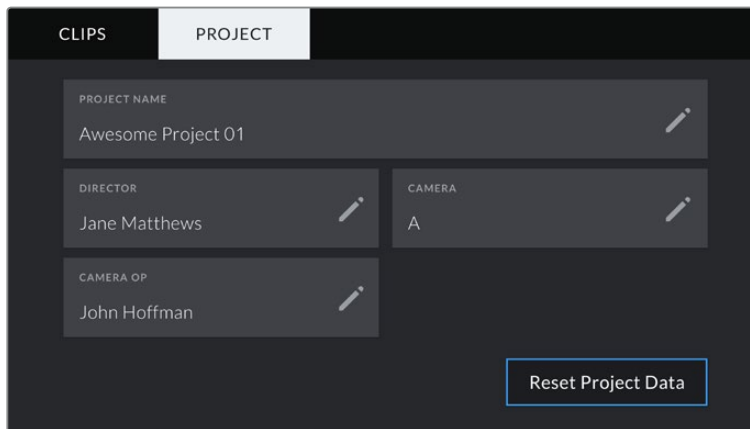
Int / Ext

Tap 'int' or 'ext' to add a 'interior' or 'exterior' tag to the next clip in standby mode, or the current clip in playback mode.

Day / Night

Tap the 'day' or 'night' icons to add a 'day' or 'night' tag to the next clip in standby mode, or the current clip in playback mode.

'Project' Metadata

Project metadata behaves the same way whether you are in 'standby' or 'playback' mode. This metadata always refers to your project as a whole and is independent of clip numbers.

Your URSA Broadcast's 'project' slate tab

Project name
Displays your current project name. Tap the pencil icon to change the project name.

Director
Displays the director's name for the current project. Tap the pencil icon to change the director name.

Camera
Displays a single letter camera index. Tap the pencil icon to change the camera index.

> **NOTE** Camera index is used in metadata and for file naming purposes and differs from your URSA Broadcast's ATEM Camera ID, which is used when controlling your URSA Broadcast with an ATEM switcher. For more information on ATEM Camera ID, see the 'ATEM camera control' section in this manual.

Camera Op
Displays the camera operator. Tap the pencil icon to change the camera operator name.

Camera Video Output

HD Monitoring Output

Blackmagic URSA Broadcast's down converted 3G-SDI out connector always outputs 1080 HD video so you can easily connect to routers, monitors, SDI capture devices, broadcast switchers and other SDI devices. This output is labeled 'front SDI' in the touchscreen settings menu.
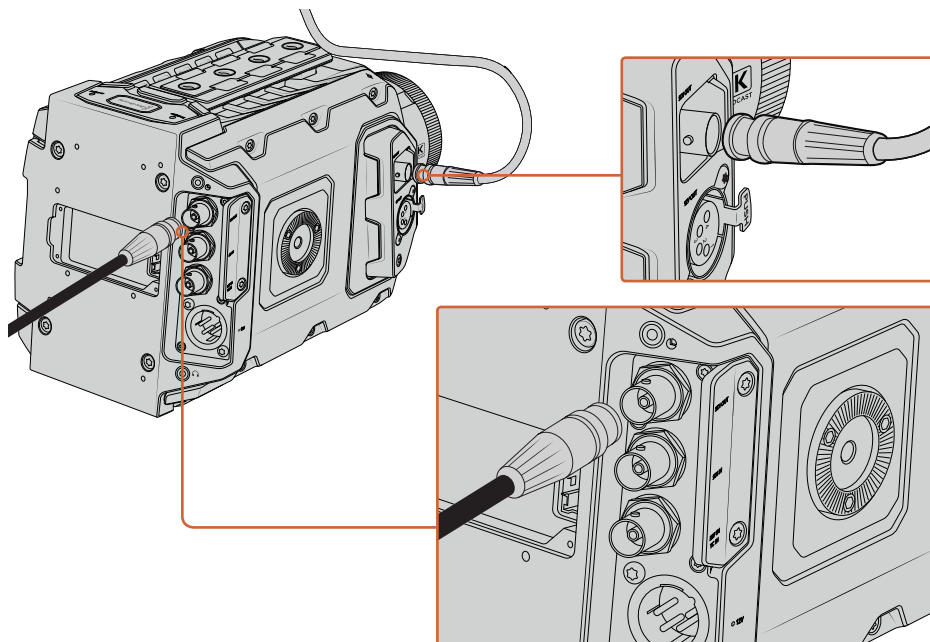
12G-SDI Output

The 12G-SDI out connector on the rear panel supports HD and Ultra HD video including High P formats such as 2160p50, 59.94 and 60 on a single SDI cable. Interlaced HD formats are also supported including 1080i50, 59.94 and 60. You can use the 12G-SDI output to connect to any SDI monitor as well as Ultra HD switchers such as ATEM Production Studio 4K. This output can be switched between HD and Ultra HD by selecting 1080p or 2160p from 'display settings/SDI mode' on the touchscreen.

Connecting to Video Switchers

The SDI outputs allow you to use your camera for live television production. You can connect the rear panel SDI output directly to production switchers for live production work, or to ATEM Camera Converters to convert your signal to optical so you can send it hundreds of meters to a broadcast truck on location.

When connected to a switcher, you can easily view the switcher's program output on your Blackmagic URSA Broadcast. To do this, first connect the switcher to your camera's rear 12G-SDI input. Now press the 'program' button marked PGM on your camera's fold out monitor. To switch back to the camera image, simply press the PGM button again.

You can connect the 12G-SDI output to any 1080 HD or Ultra HD live production switcher or monitor. The HD monitoring output can be plugged into an external viewfinder, such as the Blackmagic URSA Viewfinder, or plugged into an external monitor when mounted to production equipment. For example a jib arm or crane

Connecting to Monitors

SDI monitoring can be really helpful when accessing the fold out monitor is impractical, such as when secured high on a jib arm, on a crane, or mounted on a vehicle.

Monitoring information is displayed via your HD-SDI monitoring out connector by adjusting the 'front SDI overlay' settings in the display settings menu. SDI overlays provide frame guides and information such as recording details and camera settings. If you simply want to monitor your shots, you can always turn overlays off for a clean SDI output.

Connect the camera's SDI output to SDI monitors or to a Blackmagic SmartScope Duo 4K for live waveform monitoring.

SDI Output Formats

Rear SDI Output	2160p23.98, 24, 25, 29.97, 30, 50, 59.94, 60. 1080p23.98, 24, 25, 29.97, 30, 50, 59.94, 60. 1080i50, 59.94, 60.
3G-SDI Monitoring Output	1080p23.98, 24, 25, 29.97, 30, 50, 59.94, 60. 1080i50, 59.94, 60.

URSA Mini Shoulder Mount Kit

Attaching the shoulder mount

The URSA Mini Shoulder Mount Kit lets you carry URSA Broadcast on the shoulder for ENG style shooting. This kit includes a top handle, shoulder mount baseplate, extension arm for the URSA Mini side handle, long LANC cable, Viewfinder adapter plate, plus all the required screws.

The quick release mount on the baseplate lets you lock your camera into an ENG style tripod plate or place it on your shoulder so you can follow the action.

The URSA Mini Shoulder Mount Kit works with any tripod plate modeled after the Sony VCT 14. These mounts are easily found at camera stores or online.

It's also worth mentioning that mounts modeled after the VCT U14 tripod plate are a different system and are not compatible.

When attaching the shoulder mount kit, you will need the following tools:

- 1 x flat head screwdriver for the 2 x ¼" shoulder mount base plate screws.
- 1 x 3/16" Hex key driver for the 2 x ¼" top handle screws.
- 1 x 2.5mm Hex key driver for the 4 x Viewfinder adapter plate M3 screws.
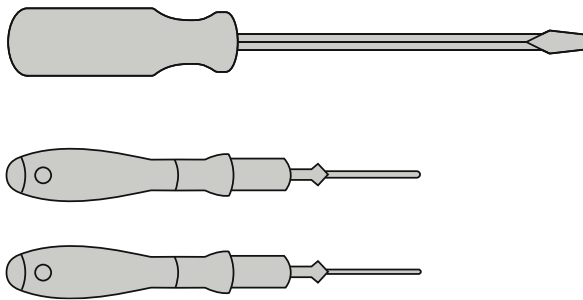
To attach the shoulder mount kit to your URSA Broadcast you will need a large flat head screwdriver, a 3/16" Hex key driver for the top handle and a 2.5mm Hex key driver for the Viewfinder adapter plate

To attach the shoulder mount baseplate

Insert screws via threaded hole in slot

2 x ¼" baseplate screws
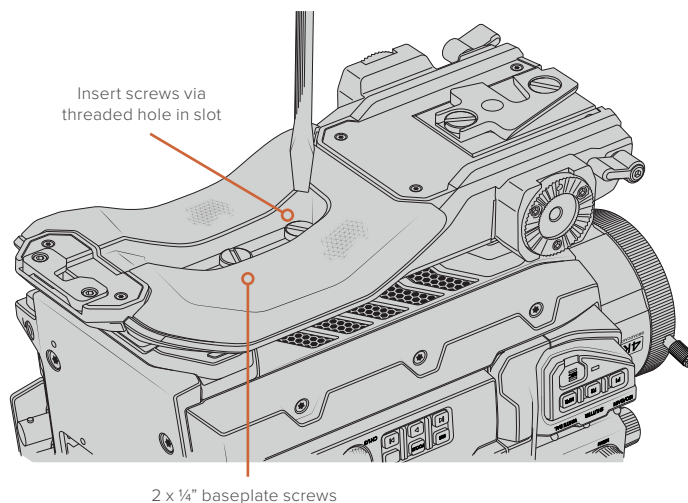
1. Gently place your URSA Broadcast upside down on a flat, stable surface so you can easily access the base of your camera.

2. Fasten the shoulder mount baseplate to URSA Broadcast using the 2 x ¼" flat head screws and driver.

3. Tighten the screws until the baseplate is firmly attached and the screws won't loosen. Avoid over-tightening as it may damage the screw threads.

To attach the top handle without URSA Viewfinder

You can use URSA Mini Shoulder Mount Kit with or without the optional URSA Viewfinder.

The top handle is supplied with a rubber viewfinder cap on its base which is replaced with an adapter plate when attached to the URSA Viewfinder. We recommend leaving the cap attached when using the handle without the URSA Viewfinder.

Top handle   URSA Viewfinder cap
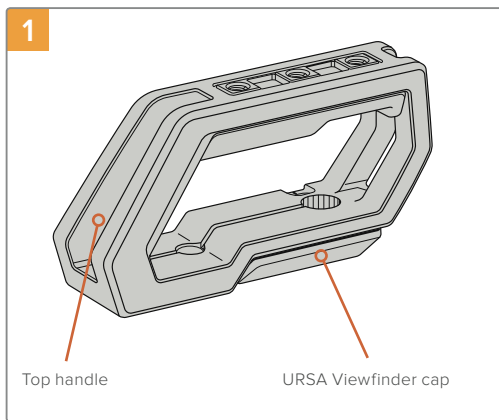
Place your URSA Broadcast on a flat, stable surface so you can access the top of your camera.
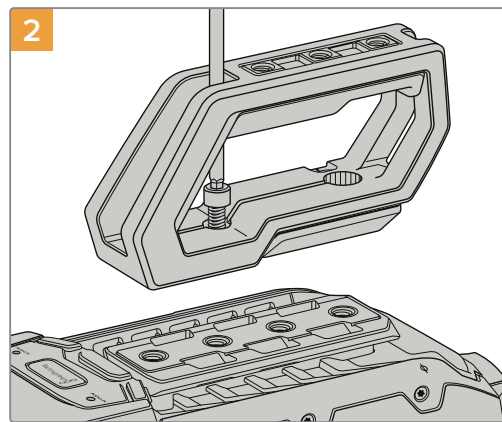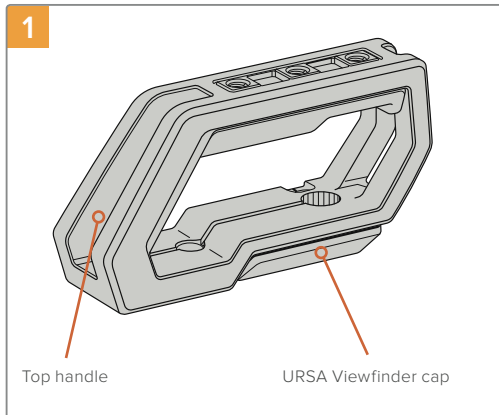

Fasten the handle to any two of your URSA Broadcast's top 1/4" mounting points using the two supplied 1/4" screws with a 3/16" Hex key driver. URSA Broadcast's rear two mounting points are recommended for most situations, but you can choose any pair for better weight balance when using large lenses.
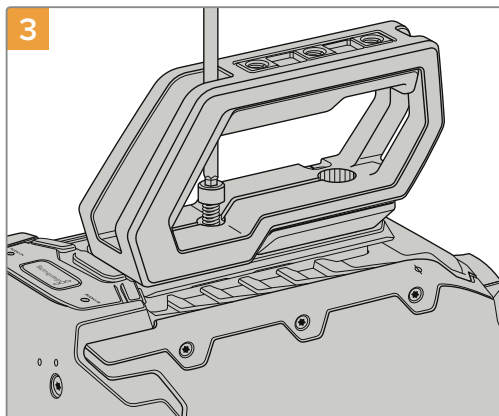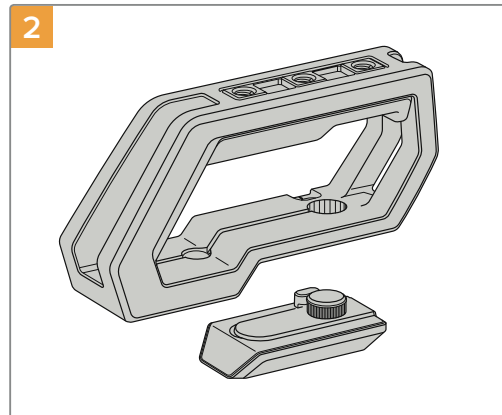

Tighten the screws until the handle is firmly in place and the screws won't easily loosen. Avoid over-tightening the screws as it may damage the screw threads.
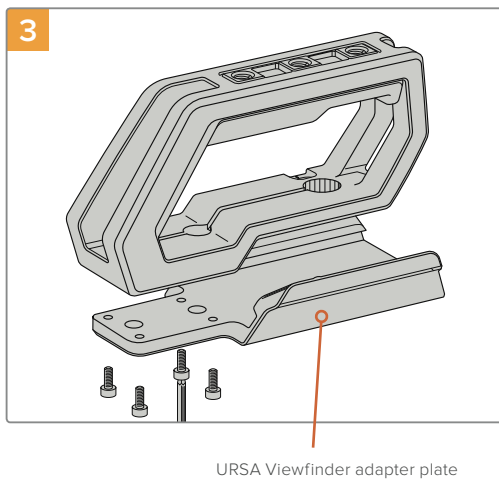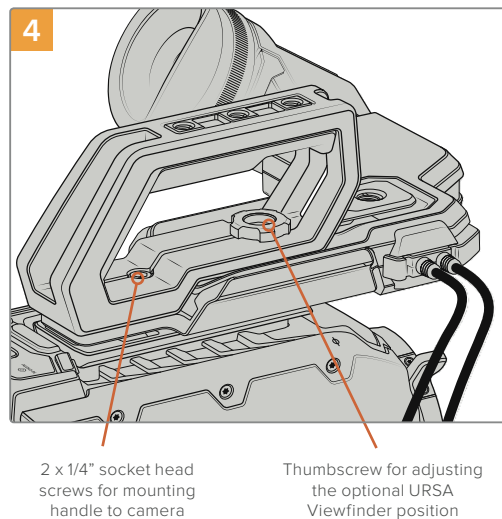
To attach the top handle with URSA Viewfinder

1

Top handle   URSA Viewfinder cap

Place your URSA Broadcast on a flat, stable surface so you can access the top of your camera.

2

Remove the URSA Viewfinder cap from the base of the handle by gently lifting its arm away from the side of the handle and pulling the cap from the hole.

3

URSA Viewfinder adapter plate

Fasten the URSA Viewfinder adapter plate to the handle using the 4 x M3 screws with a 2.5mm Hex key driver.

4

2 x 1/4" socket head screws for mounting handle to camera   Thumbscrew for adjusting the optional URSA Viewfinder position

Fasten the handle to any two of URSA Broadcast's top 1/4" mounting points using the two supplied 1/4" screws with a 3/16" Hex key driver. URSA Broadcast's rear two mounting points are recommended for most situations, but you can choose any pair for better weight balance when using large lenses. Avoid over tightening the screws as it may damage the screw threads.

The hole inside the front of the handle is used with the thumb screw when attaching and adjusting the URSA viewfinder. For information on how to attach the URSA Viewfinder to the top handle, refer to the 'Blackmagic URSA Viewfinder' section in your URSA Broadcast manual.

Attaching the extension arm

B4 lenses typically feature a handgrip on the lens body, so a side handle isn't necessary when shooting with URSA Broadcast on your shoulder.

If you have a different lens mount fitted, however, you may find it useful to fit the optional URSA Mini side handle on an extension arm for comfortable shoulder based shooting.
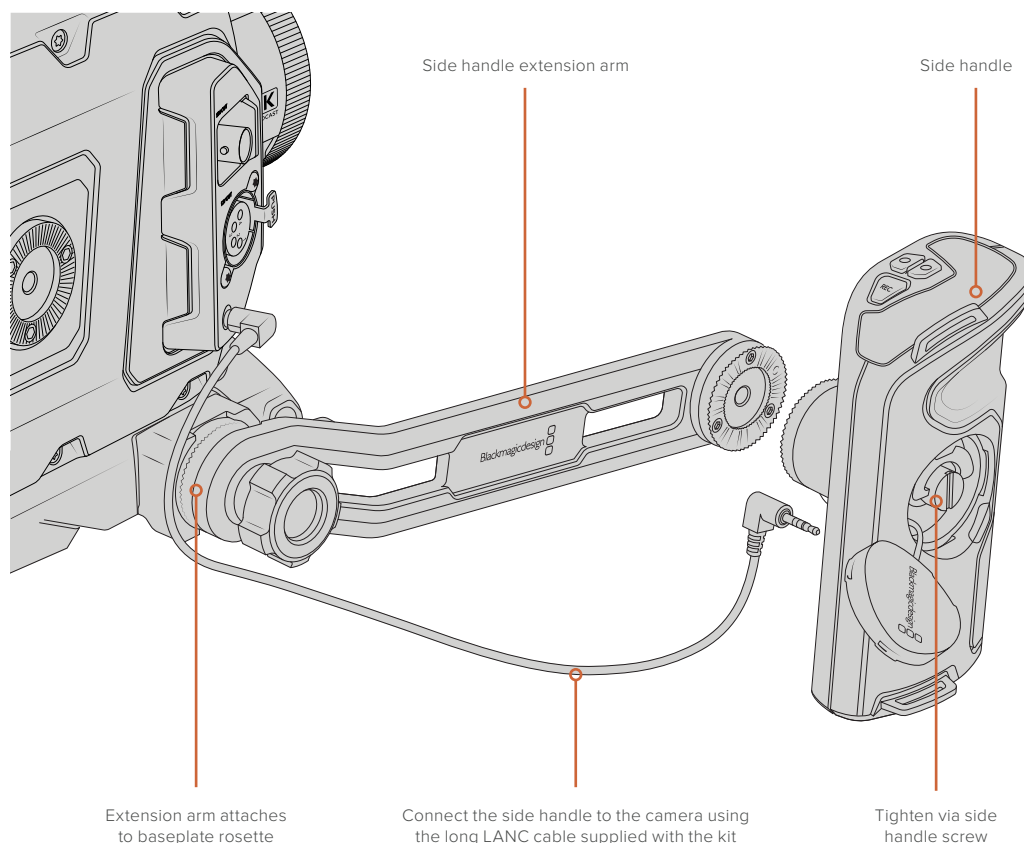
URSA Mini Shoulder Mount kit comes with an extension handle and longer LANC cable to move the optional side handle to a more ergonomic position.

To attach the side handle extension arm:

1   Place your URSA Broadcast on a flat, stable surface allowing room next to the camera to lower the extension arm. Mounting URSA Broadcast to a tripod is helpful for this purpose.

2   Attach the indented end of the extension arm to the baseplate rosette, lower the arm to suit, and fasten with the supplied rosette thumbscrew.

3   Attach the side handle to the extension arm's front rosette. Fasten by tightening the side handle screw with the large flat head screwdriver, or by twisting the D ring with your thumb and forefinger.

4   Connect the side handle LANC output to the camera LANC input using the long LANC cable supplied with your shoulder mount kit.

You can easily adjust the extension arm and side handle to suit your preference by loosening the rosette screws, making your adjustment, then retightening.

With your URSA Mini Shoulder Mount Kit now attached, you have additional speed for fast shooting on the run, plus the ability to quickly mount your camera on a tripod for tight, stable shots!

Side handle extension arm   Side handle

Extension arm attaches   Connect the side handle to the camera using   Tighten via side
to baseplate rosette   the long LANC cable supplied with the kit   handle screw

Blackmagic URSA Viewfinder

Blackmagic URSA Viewfinder is a powerful electronic viewfinder designed for your Blackmagic URSA Broadcast. The 1080HD color OLED display and precision glass optics provides a bright, vivid, and lifelike image so you can quickly find focus and see the finest detail in your images.

This viewfinder is perfect for handheld operation on the shoulder, or for environments where you need absolute precision with zero reflection and light glare, for example in extremely bright shooting conditions.

The viewfinder is connected and powered by the camera and uses the embedded SDI data from the camera to generate the various display options. This means that your camera can output a clean SDI feed to the viewfinder but still allows you to toggle various display options within the viewfinder for quick access to camera status, plus accurate information.

For example, if you select the '2.40:1' frame guide option in URSA Broadcast's menu, it will actually tell the viewfinder which frame guide is selected in the camera so when you toggle the frame guide display on the viewfinder, the same '2.40:1' frame guide is also displayed.
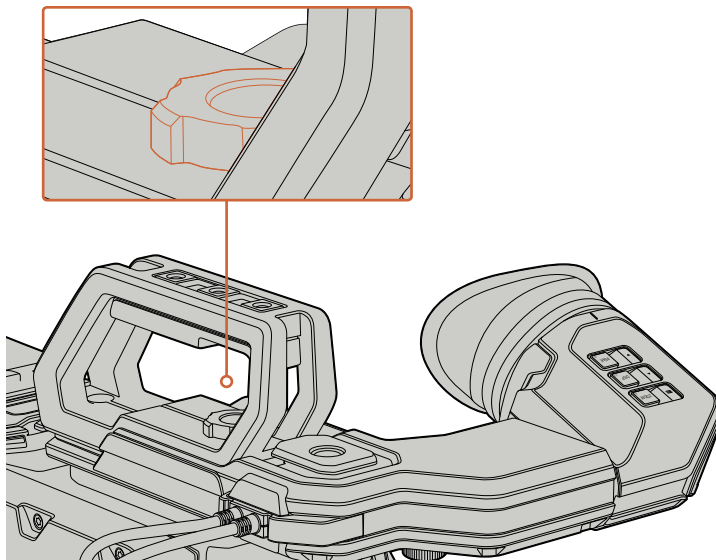
Mounting and Connecting to Blackmagic URSA Broadcast

Blackmagic URSA Mini Shoulder Mount Kit is required to mount URSA Viewfinder correctly on URSA Broadcast.

To attach Blackmagic URSA Viewfinder, remove the URSA Viewfinder cap from URSA Mini Shoulder Mount Kit top handle and install the Viewfinder adapter plate, as detailed in the 'URSA Mini Shoulder Mount Kit' section in this manual.
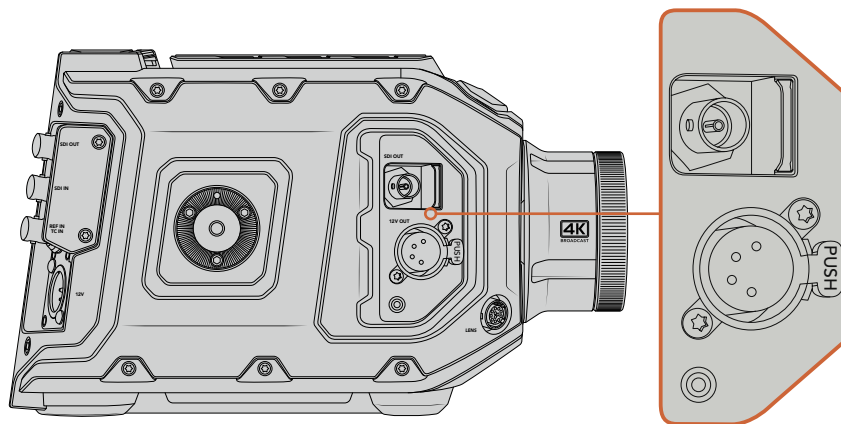
Slide URSA Viewfinder mount into the URSA Viewfinder adapter plate and use the 1/4" thumbscrew included in URSA Mini Shoulder Mount Kit to secure URSA Viewfinder to the top handle and adapter plate.

There is no need to use any tools to secure the thumbscrew, finger pressure is sufficient and will prevent over tightening.

To mount your Blackmagic URSA Viewfinder to your URSA Broadcast, slide the viewfinder mount along your camera's handle ridges and tighten the thumbscrew to a ¼" mounting point

To connect your URSA Viewfinder to your URSA Broadcast, simply connect the viewfinder's attached cables to your camera's front 12V power and 3G-SDI outputs. The URSA Viewfinder will turn on automatically when your camera is powered.

Connect your viewfinder's SDI and power cables to your URSA Broadcast's HD-SDI monitoring output and +12 volt output

When using the URSA Viewfinder with URSA Broadcast, it is highly recommended that you also install the URSA Mini shoulder mount kit as this provides the correct mounting points, 1/4" thumb screw, and height adjustments to optimize the positioning of your viewfinder. See the 'URSA Mini shoulder mount kit' section in this manual.

Adjusting the Eyepiece

The detachable rubber eyepiece can be adjusted to fit your left or right eye. Adjust the viewfinder arm by loosening the knob on the bottom of the arm and sliding it left or right to comfortably fit your eye.

Button Features

On the top of the viewfinder you'll find the zoom, display and peak buttons. These buttons are used for zooming into your image, and turning overlays and focus peaking on or off.
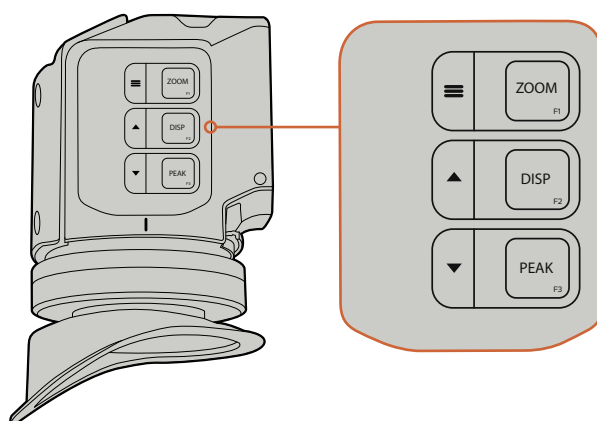
The Zoom (F1), Display (F2) and Peak (F3) buttons are located on top of the URSA Viewfinder

They are also used for additional features, such as opening the menu and navigating settings. Icons printed on the side of the buttons show you which buttons are used to control the viewfinder menu and navigation features.

The buttons also have a customizable function feature so you can assign shortcuts to quickly enable common features you may use frequently. For example you may wish to assign the false color feature to the zoom button. Refer to the 'shortcuts' section for more information.

ZOOM (F1) - 'menu'
The 'zoom' feature helps you find sharp focus by zooming into your picture. Press the 'zoom' button to zoom in and press again to return to 100% view. When using the settings menu, the 'zoom' button also serves as the 'menu' button. Press and hold this button to open the settings menu. In the settings menu, press this button once to confirm setting changes.

DISPLAY (F2) - 'up'
Press the 'display' button to see the overlay view. When using the settings menu, this button also serves as the 'up' button. You can also quickly open the 'shortcuts' menu setting by pressing and holding this button. Refer to the 'shortcuts' section for information on how to set shortcuts.

PEAK (F3) - 'down'
The focus peaking feature creates a green edge around the sharpest parts of the image so you can easily confirm your focus. Press the 'peak' button to turn the peaking feature on. Press again to turn peaking off. When using the settings menu, this button also serves as the 'down' button. You can also quickly open the 'setup' menu by pressing and holding this button.
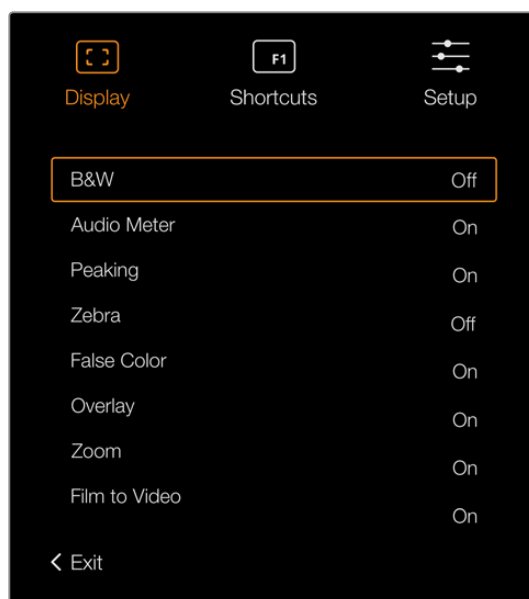
Menu Settings

The settings menu contains three primary menu headings for display, shortcuts, and setup. To open the settings menu, press and hold the 'menu' ≡ button. Press the 'up' ▲ and 'down' ▼ button to navigate between the settings and press the 'menu' ≡ button again to confirm your selection.

Display

The 'display' menu provides the following features:

B&W
Switches between color and monochrome.

Display	Shortcuts	Setup
B&W		Off
Audio Meter		On
Peaking		On
Zebra		Off
False Color		On
Overlay		On
Zoom		On
Film to Video		On
‹ Exit		

The 'display' menu in URSA Viewfinder

Meters

Switches between the types of meters to display in overlay view. The options are 'histogram', 'audio', 'both' or 'none'.

Peaking

Switches peaking on and off.

Zebra

Switches zebra levels on and off. Set your desired zebra levels using the camera settings. For more information, refer to the 'settings' section in this manual.

False Color

Switches the false color feature on and off. False color overlays different colors onto your image that represent exposure values for different elements in your image. For example, pink represents optimum exposure for skin tones. By monitoring the pink false color when recording people, you can maintain consistent exposure for skin tones. Similarly, when elements in your image change from yellow to red, that means they are now over exposed.
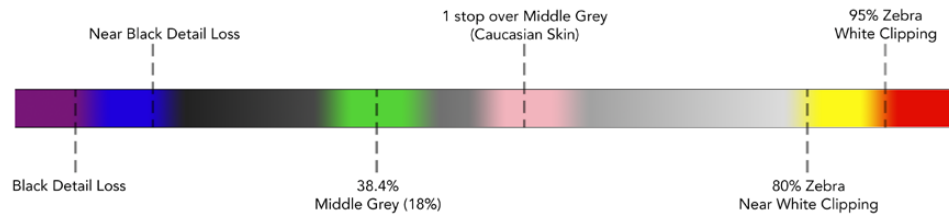
False Color Chart

Overlay

Switches overlays on and off. You can select which types of overlay to display in your viewfinder's 'setup' menu. The style of these overlays, such as the safe area percentage, are set in your camera.

Zoom

Turns the zoom feature on and off.

Film to Video

Switches between film and video display mode. Refer to the 'record settings' section in this manual for information on film and video mode. This setting is only available when your camera is outputting 'film' images to your viewfinder. It is disabled when receiving 'video' images to prevent applying a LUT over a LUT.

Shortcuts

The shortcut function is useful when you need to quickly access a particular setting for a frequently used feature. To customize your shortcut buttons:

1   In the 'shortcuts' menu, press the 'up' ▲ or 'down' ▼ button to move up or down and select one of the 3 buttons to make it your shortcut button. Press the 'menu' ≡ button to confirm your selection.

2   Press the 'up' ▲ or 'down' v button to toggle and select one of the features below to assign to the shortcut button. Press the 'menu' ≡ button to confirm your selection.

- B&W
- Peaking
- Zebra

- False Colour
- Display
- Zoom

- Film to Video
- Meters
- Focus Chart

3 Scroll to 'exit' and press the 'menu' ≡ button to close the menu display view.
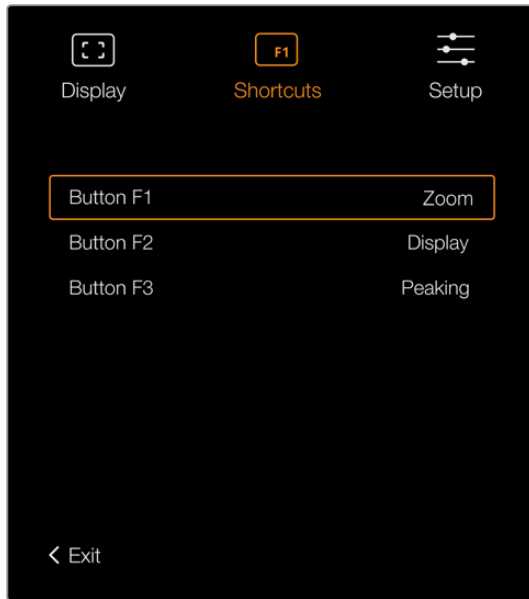
The 'shortcuts' settings in URSA Viewfinder

Setup

The 'setup' menu provides the following features:

Brightness Adjustment
Allows adjustments for the brightness of the display with range -10 to +10.

Tally Brightness
Allows adjustments of tally LED brightness.

Focus Chart
Your Blackmagic URSA Viewfinder has a built in focus chart so you can focus the eye piece to suit your eyes. Simply turn the focus diopter on the eyepiece until the chart is in perfect focus. Pressing any button on your viewfinder will close the focus chart display.

Frame Guides
Toggles the appearance of frame guides. When 'frame guides' are turned 'on' in your URSA Broadcast's 'front SDI' monitor settings, you can use this setting to toggle the appearance of these guides in your Blackmagic URSA Viewfinder.

For more information, see the 'Monitor Settings' section in this manual.

Safe Area Guide
Toggles the appearance of a safe area guide. When 'safe area guide' is turned 'on' in your URSA Broadcast's 'front SDI' monitor settings, you can use this setting toggle its appearance in your Blackmagic URSA Viewfinder.

For more information, see the 'Monitor Settings' section in this manual.

Grid
Toggles the appearance of a rule of thirds grid, crosshair or center dot. When 'grids' are turned 'on' in your URSA Broadcast's 'front SDI' monitor settings, you can use this setting toggle their appearance in your Blackmagic URSA Viewfinder.

For more information, see the 'Monitor Settings' section in this manual.

> **NOTE** Enabling 'Grid' in your URSA Viewfinder setup menu will also allow your viewfinder to display tally signals sent from an ATEM switcher. Overlays must also be set to 'on' in the display menu.

Status Text

Toggles the appearance of status text, such as white balance, frame rate and ISO. When 'status text' is turned 'on' in your URSA Broadcast's 'front SDI' monitor settings, you can use this setting toggle its appearance in your Blackmagic URSA Viewfinder.

For more information, see the 'Monitor Settings' section in this manual.

> **TIP** When using Blackmagic Viewfinder with URSA Broadcast, the appearance of status text can clash if both the viewfinder and camera are set to show status text. In this situation, we recommend turning status text to 'on' in your camera, and status text to 'off' in your viewfinder.

IR Sensor

The IR Sensor on your viewfinder automatically detects when you are near the eyepiece and turns on the OLED display. If you are away from the viewfinder for over twenty seconds in 'standby' mode, display turns off to conserve power and to extend the life of the OLED display. While recording, the timeout sensor is extended to 5 minutes, at which point the OLED display will be slowly dimmed. Any movement in front of the eyepiece will reset this timer. The viewfinder will detect when you look into the viewfinder eyepiece, pressing any button on the viewfinder will also turn the display back on.

> ⚠ Deliberately blocking or covering the IR sensor could cause the viewfinder's display to remain powered for prolonged periods of time. This could decrease the lifespan of the display and cause image retention if high contrast images or frame guides are displayed on the viewfinder.
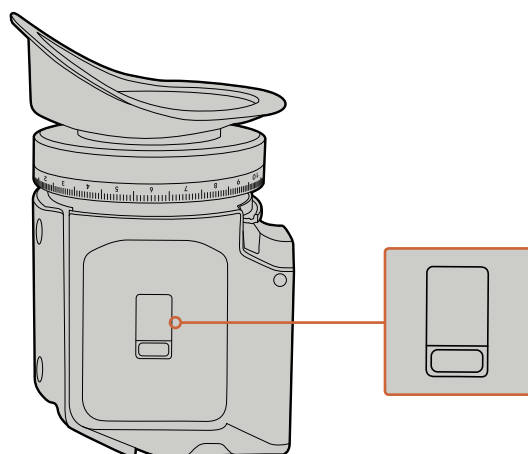
The IR sensor is located at the bottom of the URSA Viewfinder

## Updating URSA Viewfinder's Internal Software

Update your viewfinder using the Blackmagic Camera Setup utility software. The viewfinder will need to be powered when updating, so we recommend keeping the viewfinder connected to your URSA Broadcast during the update process. This also means your URSA Broadcast will need to supply consistent power, so be sure to plug into external power.

Connect your computer to the small USB connection located at the front of your viewfinder, near the eyepiece. When Blackmagic Camera Utility is launched and your viewfinder is connected to your computer, you will be prompted to update if your computer detects that your viewfinder is using an older version. Follow the on screen prompts to update your viewfinder's internal software.

NOTE Refer to the 'Blackmagic Camera Setup Utility' section in this manual for more information.

TIP We recommend updating all your Blackmagic URSA equipment at the same time for optimized performance

Blackmagic URSA Studio Viewfinder
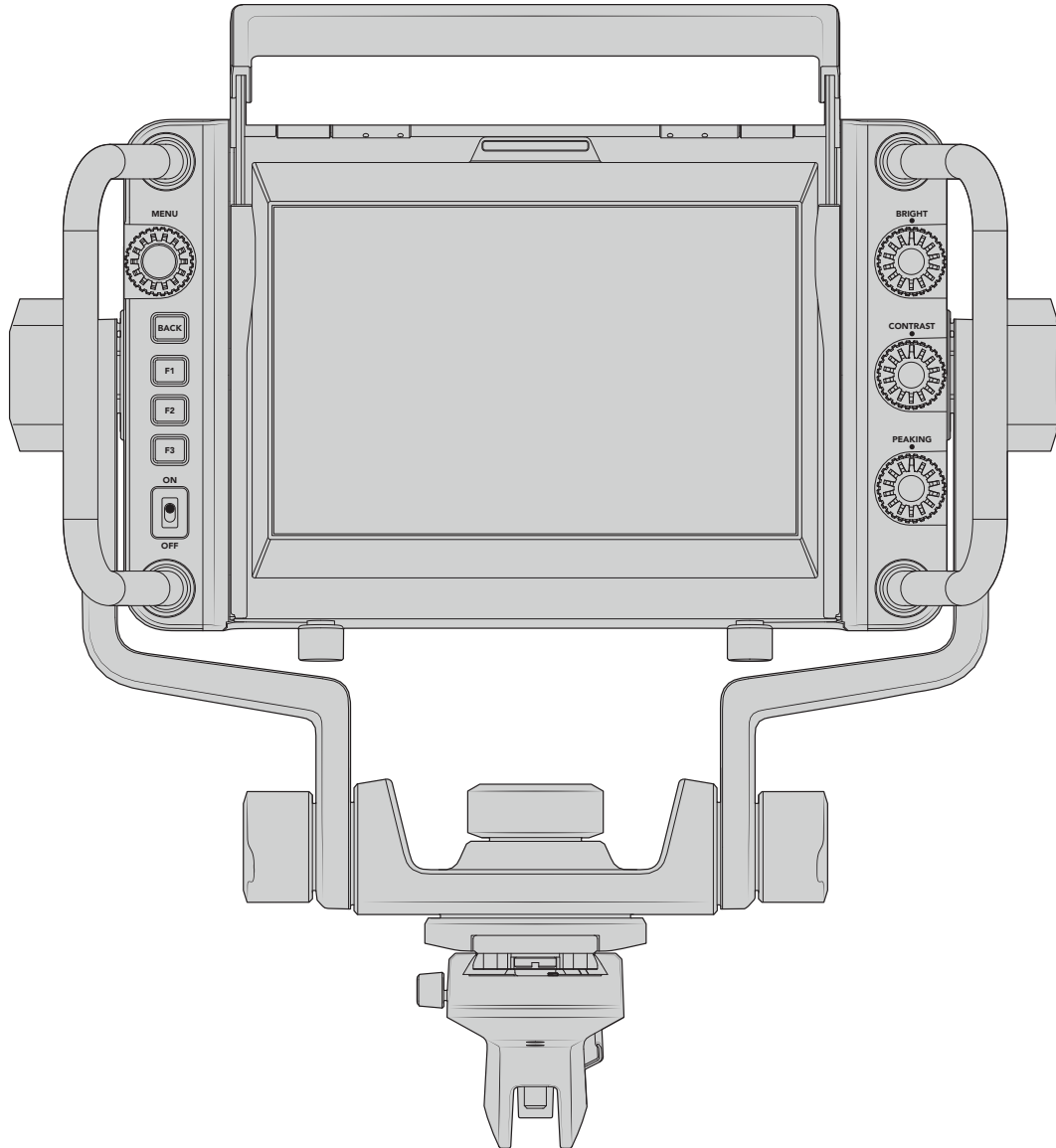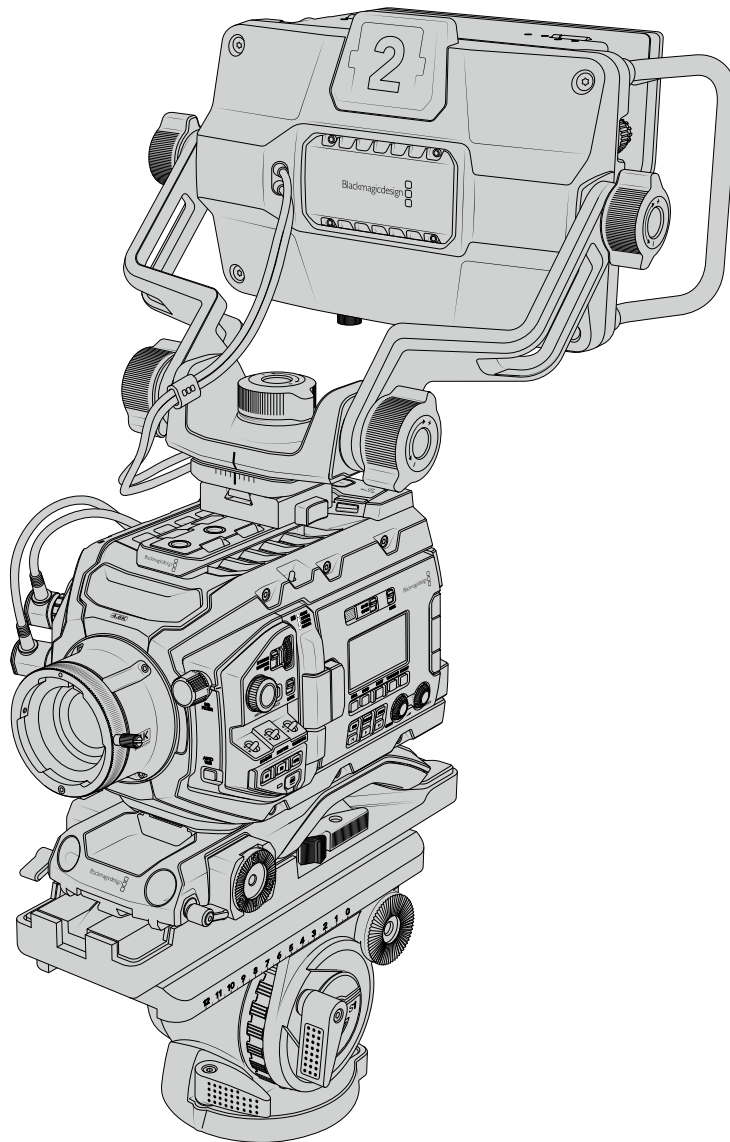

Blackmagic URSA Studio Viewfinder

Blackmagic URSA Studio Viewfinder is a powerful viewfinder that allows you to turn your Blackmagic URSA Broadcast into a professional live production camera. The studio viewfinder features a bright 7" screen and has a large easily viewable tally light, control knobs, large handles, sun hood and variable tension articulated mount. These features make it easy to stand behind the camera and comfortably follow the action for extended periods of time, especially when filming live concerts, sports, and other long events. The URSA Studio Viewfinder is perfect for professional live production in the studio or on location.

Mounting and Connecting to Blackmagic URSA Broadcast

When using the Blackmagic URSA Studio Viewfinder with Blackmagic URSA Broadcast, you have the option of mounting the unit to the camera in a number of ways.
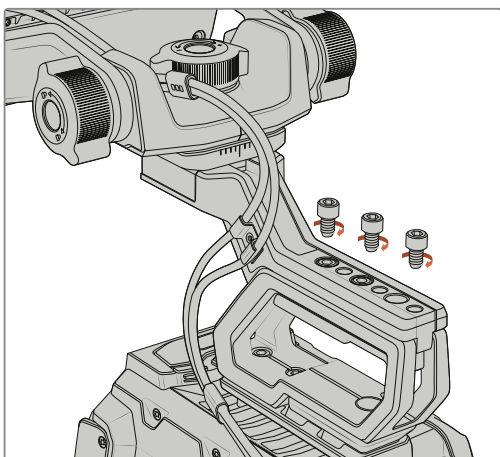
You can mount the Blackmagic URSA Studio Viewfinder directly to the top of Blackmagic URSA Broadcast via the supplied V-lock mount plate which can be easily removed from the top handle mount.

Unscrew the V-lock plate from the URSA Mini handle mount using a 3/16 Hex key, and then attach it to the top of the camera with the supplied 1/4" screws. As this will make the centre of gravity on the camera much higher. We recommend doing this while the camera is attached to a tripod for stability.


If you are mounting the Blackmagic URSA Studio Viewfinder to your URSA Broadcast whilst using the URSA Mini shoulder mount kit, you need to attach it using the supplied URSA Mini handle mount. Attach the supplied URSA Mini handle mount to the top handle with three of the supplied 1/4" screws using a 3/16 Hex key. Slide the Studio Viewfinder's V-lock into the V-lock plate slot until it clicks in securely.

See the 'URSA Mini Shoulder Mount Kit' section in this manual for more information.
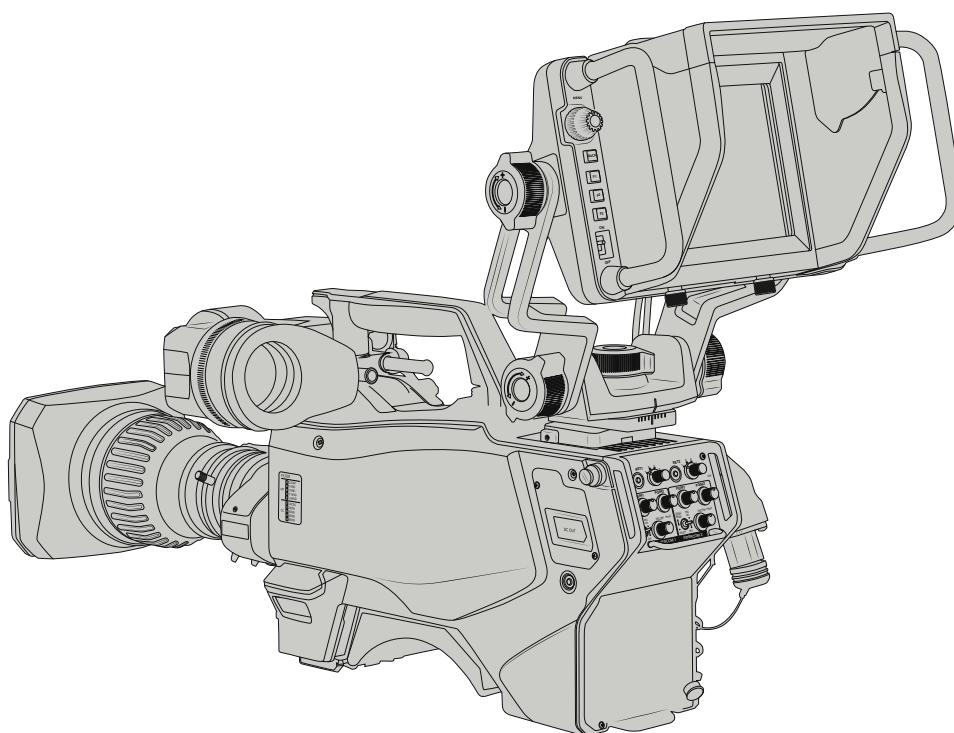
Blackmagic URSA Studio Viewfinder mounted
to shoulder mount kit
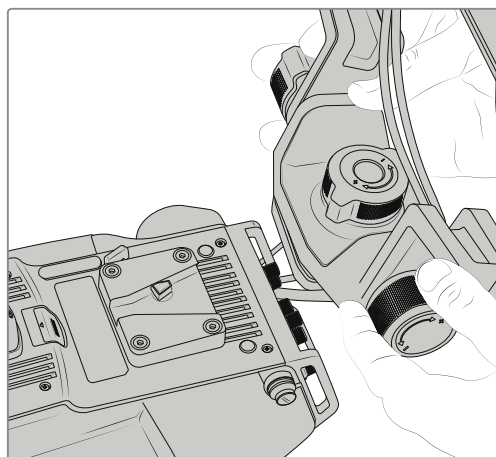
V-Lock mount plate being attached to
3rd party camera

The V-Lock mount plate can also be installed on any camera you want to use the URSA Studio Viewfinder with that has 1/4" mounting points, or by using a third party cheese plate. You can also mount the Blackmagic URSA Studio Viewfinder to a third party camera system that has an existing V-lock mount plate as many of them have this quick release plate on them already.

TIP The Blackmagic URSA Studio Viewfinder connects to the camera via a quick release V-lock mount plate, which means that the viewfinder can be removed quickly if you need to take the camera off a tripod. When filming sports matches it can be advantageous to leave both the Blackmagic URSA Viewfinder and Blackmagic URSA Studio Viewfinder attached to the camera, so that at the conclusion of the match you can quickly switch to the URSA Viewfinder for handheld filming. Both viewfinders use the same 12V power and 3G-SDI cables to connect to the camera, making it easy to swap cables in such a situation.

To connect your Blackmagic URSA Studio Viewfinder to your URSA Broadcast, simply connect the viewfinder's attached cables to your camera's front 12V power and 3G-SDI outputs.

The power switch on the viewfinder will then allow you to turn on the viewfinder instantly when your camera is powered. Note that there are cable clamps on the side of the URSA Mini handle mount to keep you cables neat and hold the cables in place.
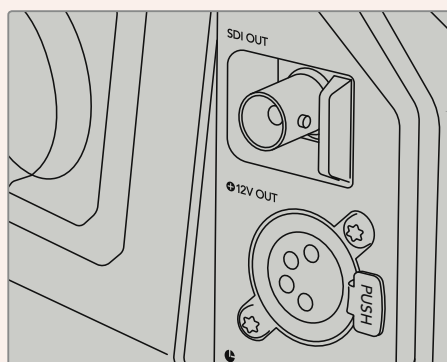

SDI and 12v power connections on URSA Broadcast

TIP The URSA Studio Viewfinder uses open standard SDI and broadcast 4 pin XLR power connections so it can be used with any other camera or even as an adjustable portable location monitor. It also uses the open standard ATEM tally and device control protocol so any other camera system can add this information to their SDI stream to allow them to work with the tally and overlays on the URSA Studio Viewfinder.

Adjusting the Blackmagic URSA Studio Viewfinder

The Blackmagic URSA Studio Viewfinder features large handles and variable tension articulated mounting that allow you to adjust the position and angle of the viewfinder. The large handles allow you to quickly and easily take hold of the viewfinder and adjust the angle and direction of the unit. Combined with the sun hood the handles also help to protect the screen from damage, which means that you can store the fully assembled Blackmagic URSA Studio Viewfinder in a carry case without disassembly. The large handles also allow you easily to pick up and carry the unit between locations.
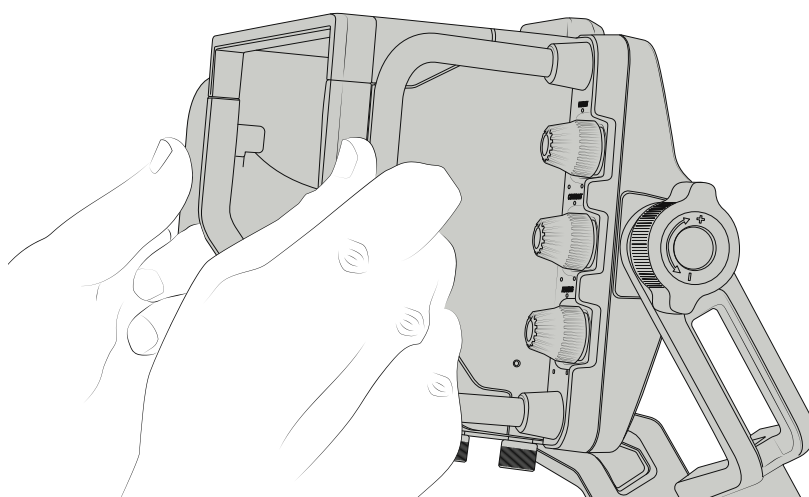

The supplied mount features tension dials for pan and tilt, with additional tension dials on either side of the viewfinder for additional friction control. The left hand dial allows you to adjust the drag friction of the arm and the right hand dial allows you to lock the Viewfinder in place once you have found the angle you require.

These tension dials have a very large range of tension adjustment, allowing you to select a specific amount of resistance. This allows you to easily pan and tilt the viewfinder to the precise position you require.
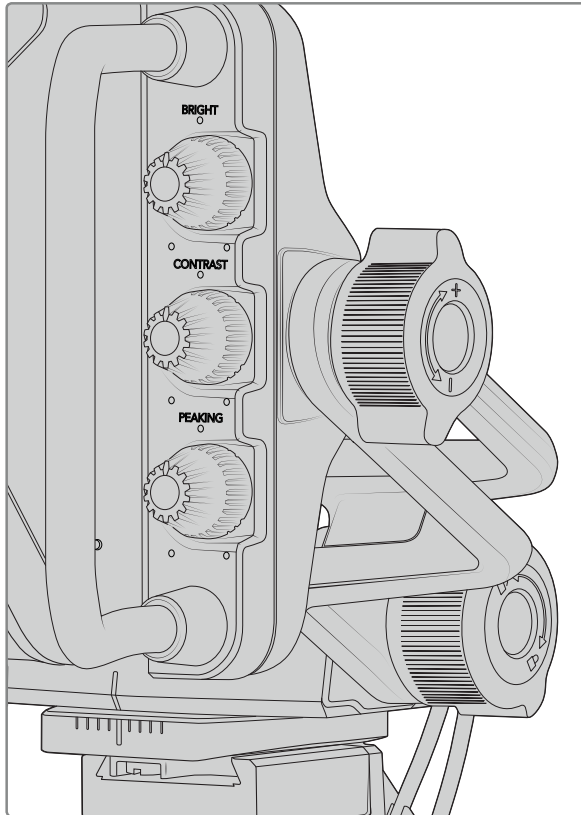
Tension dials on either side of the viewfinder
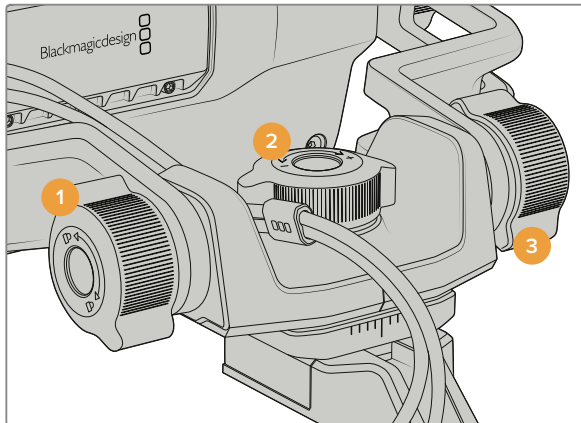
1   **Tilt Lock Dial**
Locks the angle of tilt on the viewfinder mechanism.

2   **Pan Tension Dial**
Controls pan tension.

3   **Tilt Tension Dial**
Controls tilt tension.

TIP The center tension dial on the supplied mount controls pan tension, and can be loosened to allow you to take hold of the viewfinder and move the camera independently. This means that you can film things like motorsport, where you need to pan the camera left and right to follow the action, whilst holding the viewfinder positioned towards your eyes. A visual guide on the mount helps to ensure that the viewfinder can easily be returned to the center.

Sun hood

The sun hood helps you to see the screen in bright or sunny conditions. To attach the sun hood, slide it over the top of the Blackmagic URSA Studio Viewfinder and push it into place, securing it with the two captive screws on the base of the sun hood. The top section of the visor is adjustable, and can raise and lower to provide additional viewing angles. The sun hood provides additional protection for the 7" screen, and can be removed quickly and easily if desired or to access the USB-C connector for software updates.
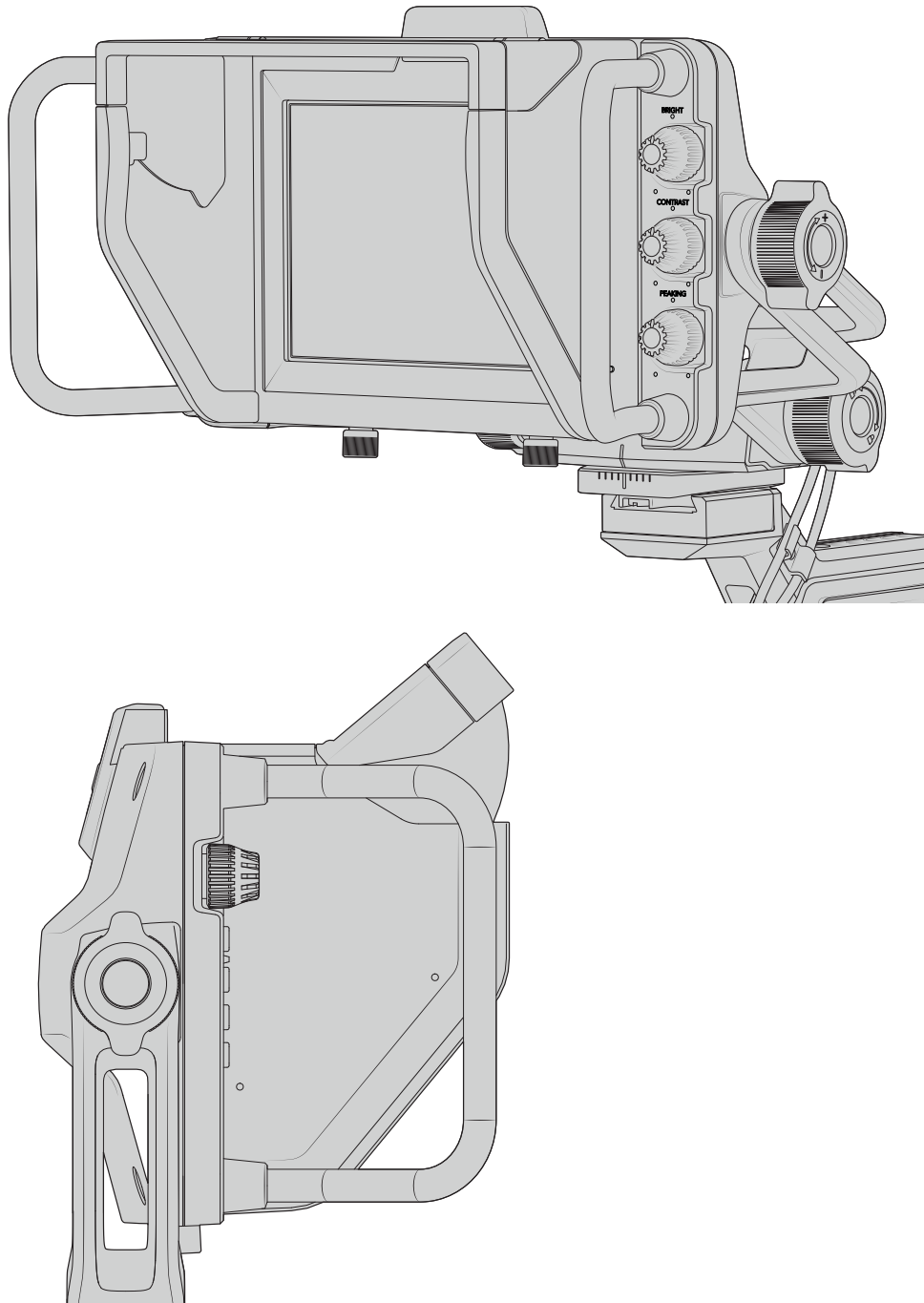
Sun hood and adjustable visor

Button Features

The dials down the right hand side let you change brightness, contrast, peaking quickly and easily. The dials are ergonomically designed so you can adjust the dials from the side with your thumb when using the sun hood, or with two fingers for finer more controlled adjustment.
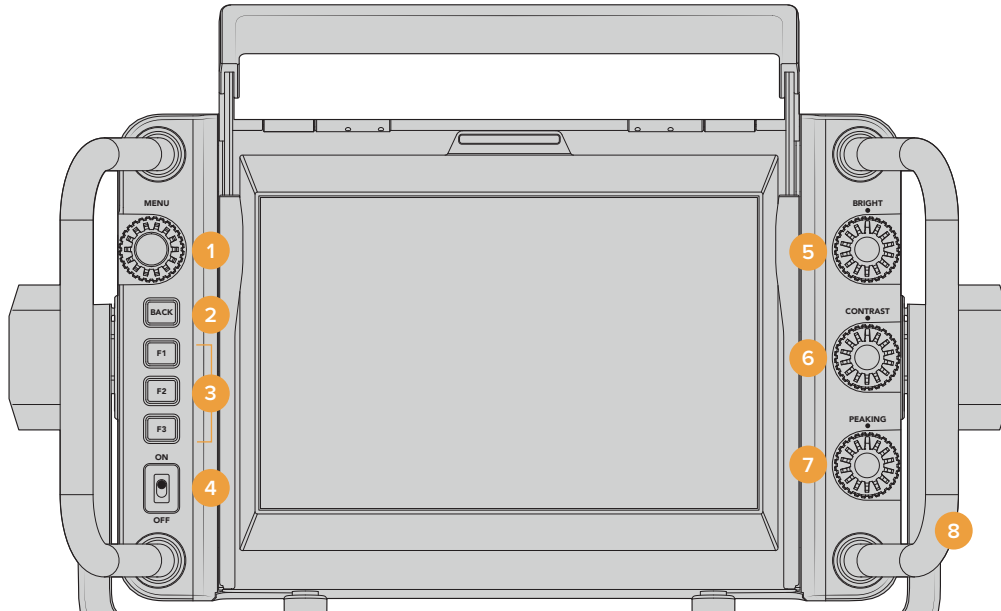
1 Menu Dial
The push button 'menu' dial allows you to enter the menu, and navigate through the viewfinder settings.

2 Back button
Exits the menu system

3 F1, F2, F3
Assignable function buttons. You can assign functions to these buttons for easy access to your most commonly used functions.

4 ON/OFF switch
Switches the Blackmagic URSA Studio Viewfinder on and off.

5 Bright
Adjusts the brightness of the image on screen. Overlays on screen will show the brightness level on a scale of -100 to +100.

6 Contrast
Adjusts the contrast of the image on screen. Overlays on screen will show the contrast level on a scale of -100 to +100.

7 Peaking
Adjusts the focus peaking level for the image on screen. Overlays on screen will show the peaking level on a scale of -100 to +100. In the setup menu you can select between various styles of peaking to suit your environment. There is the option for the traditional style of focus peaking that many will be familiar with from other broadcast systems, as well as the option to use colored lines for focus. As with URSA Broadcast you have the option of 'red', 'green', 'blue', 'black' and 'white' lines which gives you flexibility to make them easily viewable when shooting in environments that have a lot of a particular colour.

8 Handles
The built in handles are large and allow you to hold the Studio Viewfinder in place as you reposition the camera while shooting. They also provide protection for the screen when setting up and packing down.
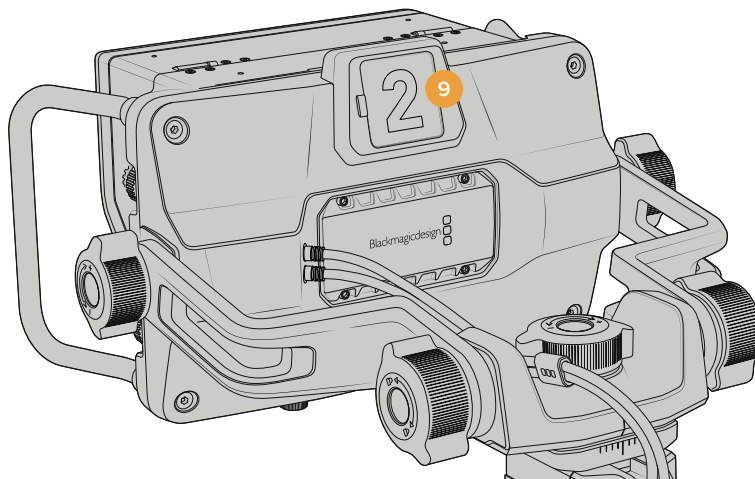
9 Tally Light

The large tally light on the rear of the Blackmagic URSA Studio Viewfinder lets both the talent and operator know which camera is on the air, which camera is about to be on air, and if they are ISO recording. The tally illuminates red for on-air, green for preview and when used with URSA Broadcast will illuminate orange for ISO record.

As the director cuts between cameras on the ATEM switcher, tally information is sent back to the camera over SDI so the light is lit when the camera is being previewed to switch to, on the air or recording. In addition, the URSA Studio Viewfinder also includes clip-on transparent camera numbers that attach to the tally light, making it easy for talent to clearly see camera numbers from up to 20 feet away.
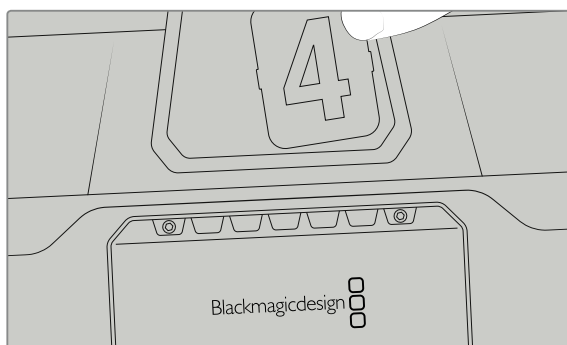

We have included editable PDF's in the software installer that allows you to edit and print out your own tally numbers to match the ones provided, and also to create your own custom tally number inserts. After installing the Blackmagic cameras software these can be found on a Mac in the Application > Blackmagic Cameras > Documents folder and on a PC in the Blackmagic Design > Documents folder.

The tally light will illuminate according to the ATEM switching operations, and when the camera is not connected to a switcher the tally light will illuminate red as a simple record tally indicator. Refer to the 'Understanding Studio Camera Control' section in this manual for more information.

TIP When using the Blackmagic URSA Studio Viewfinder with an ATEM switcher, it is important to select 'clean feed' on URSA Broadcast to ensure that you don't see overlays or the focus box on the SDI output to the ATEM switcher. Navigate to the 'monitor' menu on URSA and select 'clean feed' for 'main SDI'.

Menu Settings

The push button 'menu' dial allows you to enter the menu by pressing it, whilst rotating the dial navigates up and down through the menu options. Pressing the 'menu' dial whilst a menu heading is highlighted, will allow you to switch between the display, shortcuts, setup and cursor sub menus. Rotating the dial will scroll through the settings in each menu. Pressing the dial when a setting is highlighted allows you to adjust that setting by rotating the 'menu' dial. Confirm your selection by pressing the 'menu' dial once more. You can exit out of the menu by hitting the 'back' button or by navigating to and selecting exit.
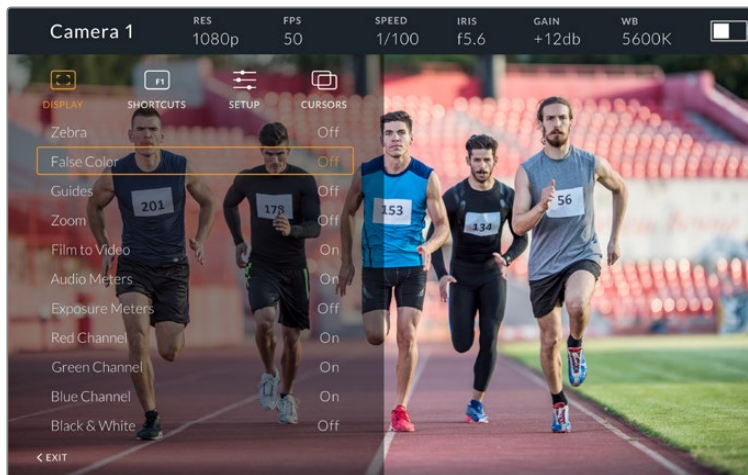

Display

Zebra

Switches zebra levels on and off. The level of zebra will be determined by the setting on your URSA Broadcast, in the 'All' section of the 'Monitor' menu. When the Studio Viewfinder is not connected with URSA Broadcast, the zebra level will represent 95% of the luminance levels of a Rec 709 signal. For more information, refer to the 'settings' section in this manual.

False Color

Switches the false color feature on and off. False color overlays different colors onto your image that represent exposure values for different elements in your image. For example, pink represents optimum exposure for skin tones. By monitoring the pink false color when recording people, you can maintain consistent exposure for skin tones. Similarly, when elements in your image change from yellow to red, that means they are now over exposed. False color is a good feature to assign to one of the function buttons, as it provides quick and easy access to a commonly used reference tool for exposure.
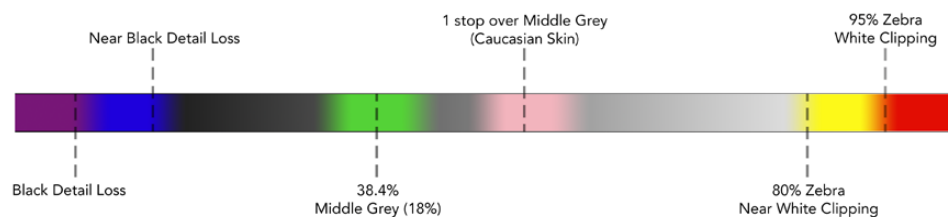
False Color Chart

Guides

This setting gives you the option to show or hide your guides. The guides will match the style of guides that have been set in the URSA Broadcast in the camera 'all' section of the 'monitor' menu.

The aspect ratio, frame guide opacity level, safe area percentage, and the type of grids shown will match what you have set in the camera. The 'setup' menu in the Studio Viewfinder then allows you to configure which type of guides you would like to see in the Studio Viewfinder when guides in the display menu are switched on. Guides then allows you to then switch these 'on' or 'off' with one command.

Zoom

Turns the 'zoom' feature on and off. The 'zoom' feature helps you find sharp focus by zooming into your picture. When zoomed in, you can navigate to specific parts of the screen by rotating the menu dial left and right. The overlay will indicate which part of the picture you are zoomed into.

Film to Video

When sending a 'film' dynamic range SDI signal from your URSA Broadcast, the 'film to video' setting allows you to apply a more colorful and contrasty LUT to the image. This setting will only be available when 'film' dynamic range is detected and will otherwise be greyed out to prevent the wrong LUT being applied to the image.

Audio Meters

The audio meters display the audio level that is being input via SDI into the Blackmagic URSA Studio Viewfinder, therefore the meters will show you URSA Broadcast's audio input levels. If you have program input selected, the audio meter will display these audio levels.

Exposure Meters

Switches the display of the histogram 'on' or 'off'.

Red Channel

Allows you to switch on or off the red channel of your image.

Green Channel

Allows you to switch on or off the green channel of your image.

Blue Channel

Allows you to switch on or off the blue channel of your image.

Black and White

Switches between color and monochrome.

Shortcuts

The shortcut function allows you to map specific functions to the F1, F2 and F3 buttons. These shortcut buttons allow you to quickly toggle 'on' and 'off' any of the settings in the display menu, or your cursors. This is extremely useful when you need to quickly access a particular setting for a frequently used feature.

To customize your shortcut buttons: In the 'shortcuts' menu, rotate the push button 'menu' dial to move up or down and select one of the 3 buttons. Press the 'menu' dial to confirm your selection and then rotate the 'menu' dial to scroll through the assignable features. You will have the option to select one of the following features: 'zoom', 'cursor 1', 'cursor 2', 'cursor 3', 'zebra', 'false color', 'guides', 'film to video', 'audio meters', 'exposure meters', 'red channel', 'green channel', 'blue channel', 'black and white'. Once chosen click the menu button to confirm that selection, and assign that function to the chosen shortcut button. Pressing the shortcut button will now switch this feature 'on' and 'off'.

Once you have set up your shortcuts as required you can either scroll to 'exit' and press the 'menu' dial to close the menu display view, or hit the back button to exit out of the menu.
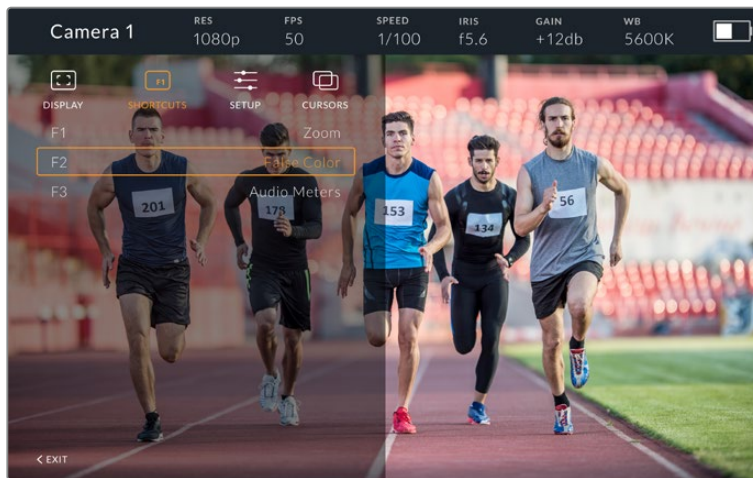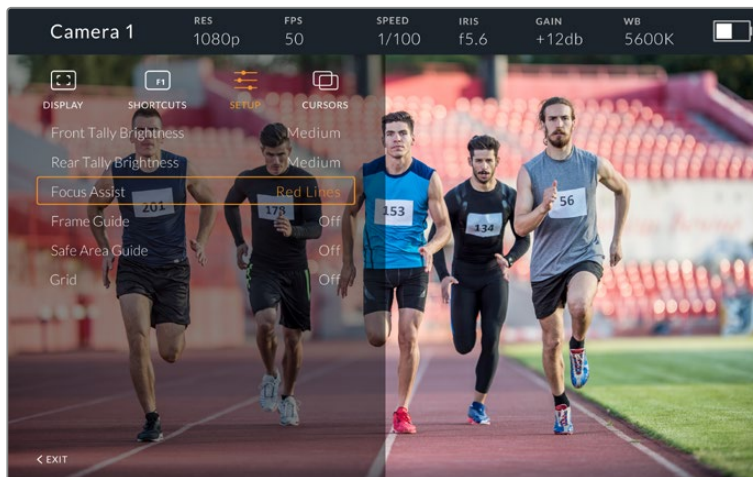

The 'shortcuts' submenu

Setup

The 'setup' menu is where you choose your preferences for how the viewfinder is setup.

Front Tally Brightness
Allows adjustments of tally LED brightness between 'off', 'low', 'medium' and 'high'. The tally light will illuminate whilst adjustments are being made so you can see what each brightness level represents.

The 'setup' submenu

Rear Tally Brightness
Allows adjustments of tally LED brightness between 'low', 'medium' and 'high'. The tally light will illuminate whilst adjustments are being made so you can see what each brightness level represents.

Focus Assist

The 'focus assist' setting toggles the appearance of peaking on the viewfinder. You have the choice of 'red', 'green', 'blue', 'black' and 'white' as well as traditional peaking.

Frame Guide

Gives you the option to show 'frame guides' as part of your Studio Viewfinder's 'Guides'. When connected to URSA Broadcast they will match your camera's 'frame guides' aspect ratio. When connected to other systems they will default to the 14:9 aspect ratio.

Safe Area Guide

Gives you the option to show the 'safe area' indicator as part of your Studio Viewfinder's 'Guides'. When connected to URSA Broadcast these will match your camera's 'safe area guide' percentage. When connected to other systems they will default to 90%.

Grid

Gives you the option to show grids as part of your Studio Viewfinder's 'Guides'. When connected to URSA Broadcast these will match your camera's 'grids' settings. When not connected, this will switch your crosshairs on or off.

Cursors

The cursors allow you to mark an area on screen where graphics like a lower third, graphic, logo or ticker will be overlaid. To adjust these cursors go to 'cursors' and select 'edit cursors'. This will bring up a page that shows you all three cursors and allows you to select each one individually and then dial in the width, height, x and y co-ordinates for positioning each one individually.
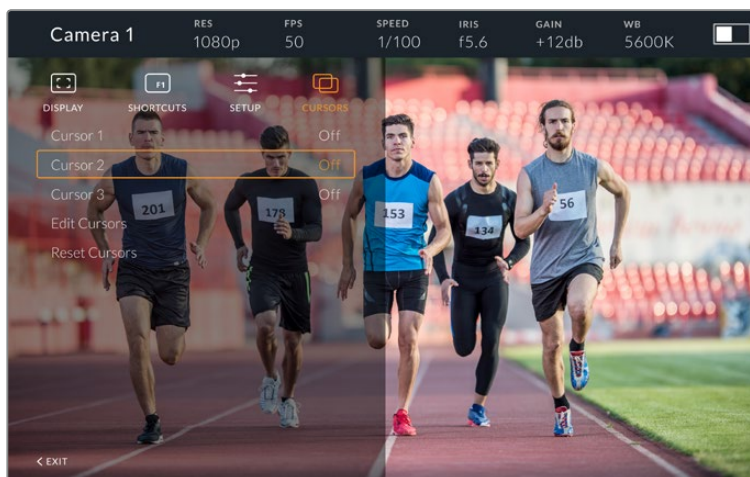
The cursors submenu
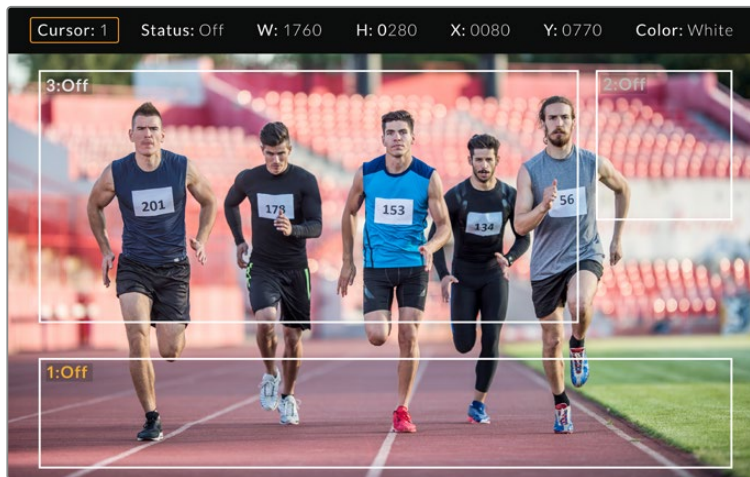
Cursors displayed on screen

Once you have set them up they can be switched on or off from the 'cursors' menu or assigned to your function keys for quick access. This is important for live production, as it allows the camera operator to take this into consideration and accurately compose and frame shots. You can create up to three black or white custom cursors that can have variable height, width and position, making it easy to match the size and location for all the graphics that will be added live or during later broadcast. You also have the option to reset the cursors to their default state.

Using a headset with the Blackmagic URSA Studio Viewfinder

When using the Blackmagic URSA Studio Viewfinder with URSA Broadcast, the headphone connection on the camera will now become a talkback headset connection, allowing for direct communication with the director.

TIP Because URSA Broadcast's headphone socket is iPhone headset compatible, you can use your iPhone headset to communicate with the director. Pushing the button on the built-in remote will allow you to talk back to the director.

Updating URSA Viewfinder's Internal Software

Update your viewfinder using the Blackmagic Camera Setup utility software. The viewfinder will need to be powered when updating, so we recommend keeping the viewfinder connected to your URSA Broadcast during the update process. This also means your camera will need to supply consistent power, so be sure to plug into external power.

Remove the sun hood to provide access to the small USB-C connection located on the bottom of the Blackmagic URSA Studio Viewfinder, and connect your computer to the USB-C port. When Blackmagic Camera Utility is launched and your viewfinder is connected to your computer, you will be prompted to update if your computer detects that your viewfinder is using an older version. Follow the on screen prompts to update your viewfinder's internal software. Refer to the 'Blackmagic Camera Setup Utility' section in this manual for more information.

We recommend updating all your Blackmagic URSA equipment at the same time for optimized performance.

Mounting Batteries
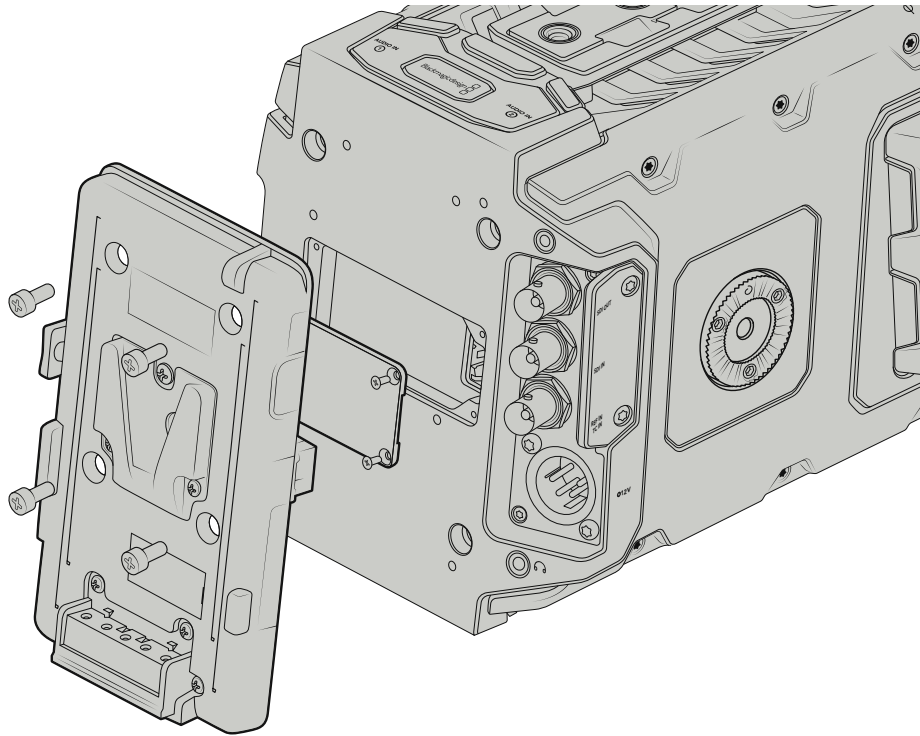
Connecting a third party battery plate lets you mount V-mount or gold mount batteries

Mounting V-mount or Gold Mount Batteries

You can easily mount industry standard V-mount or gold mount batteries to Blackmagic URSA Broadcast.

To mount a battery, you'll need to attach a Blackmagic V-mount battery plate, a third party V-mount or gold mount battery plate to your camera's plate mount.

> **TIP** The standard Blackmagic V-mount battery plate supports displaying percentage information with Switronix Hypercore batteries and IDX Duo batteries in SMBus mode.

You can purchase V-mount battery plates from Blackmagic Design resellers, or V-mount and gold mount battery plates from suppliers of professional digital cinema and video equipment. If you don't have an off the shelf battery plate designed for Blackmagic URSA Broadcast and you want to modify your own battery plate, then you can use the supplied adapter cable and connector. Refer to the 'using your own battery plate' section for information about how any battery plate can be modified to use with URSA Broadcast.

To mount your battery plate to the rear panel:

1 Remove Blackmagic URSA Broadcast's molex power cover if attached to the rear panel by unscrewing the 4 corner screws with a phillips head PH1 screwdriver. You'll now see Blackmagic URSA Broadcast's 12 way molex 55959-1230 power connector.

2 Connect your battery plate's molex connector to your camera's molex power connector.

3 Screw the third party battery plate onto your Blackmagic URSA Broadcast's plate mounting points using 4 x M3 screws. Make sure the connector cable is tucked safely into the cable slot and not crushed between the plates when tightening.

With the third party plate connected to your camera, you can now mount a V-mount or gold mount battery.

## Using your own Battery Plate

Adapter Cable and Connector

If you don't have an off the shelf battery plate designed to plug into URSA Broadcast and want to modify your own battery plate, you can use the supplied adapter cable and connector, which is also available at your local Blackmagic Design support office.

To wire the adapter cable and connector to your battery plate:

1 Strip approximately half an inch of insulation from the end of each red and black wire.

2 Solder all 4 x red 'Batt' wires to the corresponding 'positive' wire from your battery plate.

3 Solder all 4 x black 'GND' wires to the corresponding 'negative' wire from your battery plate.

Ensure the joins are well insulated.
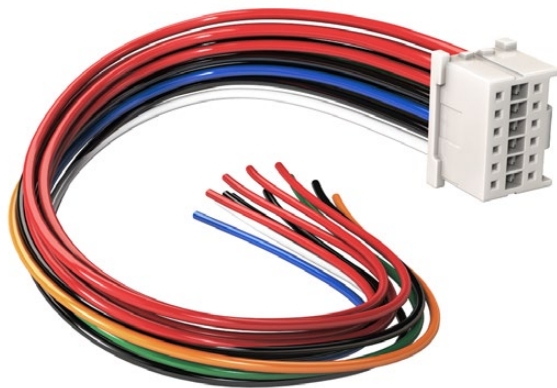
If you need to modify any battery plate to plug into URSA Broadcast, use the supplied adapter cable and connector, which is also available from your local Blackmagic Design support office

This enables battery power to your camera. You can also connect additional wires for features such as 12 V output and battery status. Refer to your battery plate information, plus the diagram and tables on this page for help connecting the wires. If you require further assistance visit the Blackmagic Design support center at www.blackmagicdesign.com/support.
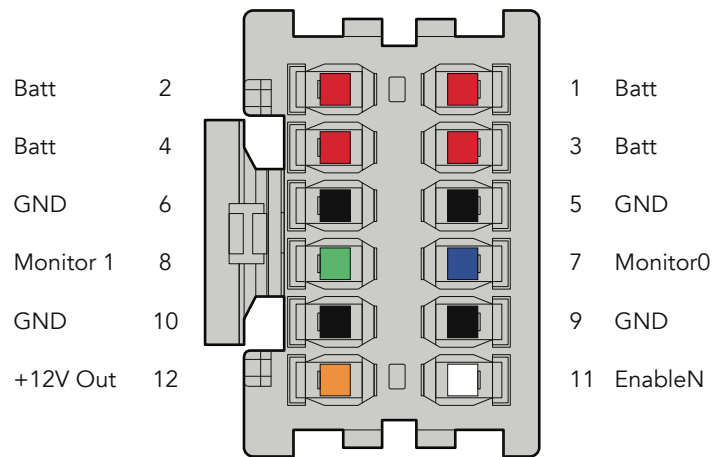
The rear view of the adapter's connector housing.
Refer to the wire configuration table for a description of each pin

Wire Configuration Table

Pins	Signal	Color	Direction	Description
1, 2, 3, 4	Batt	Red	To URSA	12 V to 20 V
5, 6, 9, 10	GND	Black	–	–
7	Monitor0	Blue	To URSA	Analog battery level or open drain data line (20 V max)
8	Monitor1	Green	To URSA	Open drain clock line (3.4 V max)
12	+12 V out	Orange	From URSA	12 V regulated output 1.5 A max (18 W)
11	EnableN	White	To URSA	Connect to GND to enable +12 V out. Leave floating if +12 V out is not required.

Each Batt and GND pin supports 3 amps. Make sure all Batt and GND pins are connected. To monitor the battery status using Anton Bauer, IDX, or Blueshape plates, follow the connection table below:

Anton Bauer	Connect the blue/white striped wire to the housing blue wire at pin 7.
IDX	Connect the green wire to the housing green wire at pin 8, and the grey wire to the housing blue wire at pin 7.
Blueshape	Connect the blue wire labelled "SMBC " to the housing green wire at pin 8. Connect the brown wire labelled "SMBD" to the housing blue wire at pin 7.

Secure any unused wires by cutting them as close as possible to the rear of the adapter connector.

Blackmagic Fiber Converters

Blackmagic Camera Fiber Converter and Blackmagic Studio Fiber Converter are optional accessories that provide a SMPTE fiber connection between your URSA Broadcast or URSA Mini camera and an ATEM switcher.

SMPTE fiber lets you you connect all video, power, talkback, tally and camera control signals between an ATEM switcher and your camera using one single industry standard SMPTE hybrid fiber optic cable. Using a SMPTE fiber connection greatly reduces the amount of cables required, which helps makes the production setup more efficient and simpler to setup. The standard connectors on Blackmagic Studio Fiber Converter allow you to easily add the fiber converters into an existing broadcast truck infrastructure.
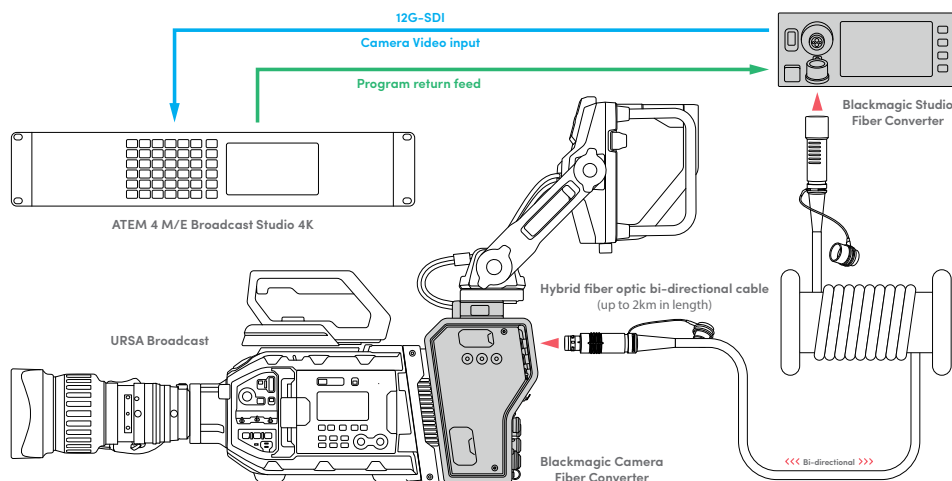

Blackmagic Camera Fiber Converter

Mounts to the back of your URSA Mini or URSA Broadcast and connects to the Blackmagic Studio Fiber Converter via a standard SMPTE hybrid 304 connector.

Blackmagic Studio Fiber Converter

This converter converts the optical fiber SDI signal from the camera unit to SDI via BNC, which is then connected to an ATEM switcher. The converter also takes all return feed sources, including program return from the ATEM switcher, and sends them back to the camera unit.

The Blackmagic camera and studio fiber converters connect via optical fiber to provide efficient SDI video, power, talkback, tally and control signals via a single SMPTE fiber optic cable.

Getting Started with Blackmagic Fiber Converters

Getting started is fast and efficient. It won't take long before you are producing video content and enjoying the benefits of SMPTE fiber.

About SMPTE Fiber

SMPTE fiber cables provide you with a simplified way to carry multiple signals as well as power, over long distances. This is useful in broadcast scenarios, as you don't need to connect several cables for each camera that is connected to your switcher.

With a SMPTE 311 hybrid fiber optic cable, you can use one single industry standard optical fiber cable to connect each camera to your ATEM switcher, and provide all video, power, talkback, tally and control signals along one cable. With optical fiber you can also carry these signals and power over longer distances up to 2 kilometers.
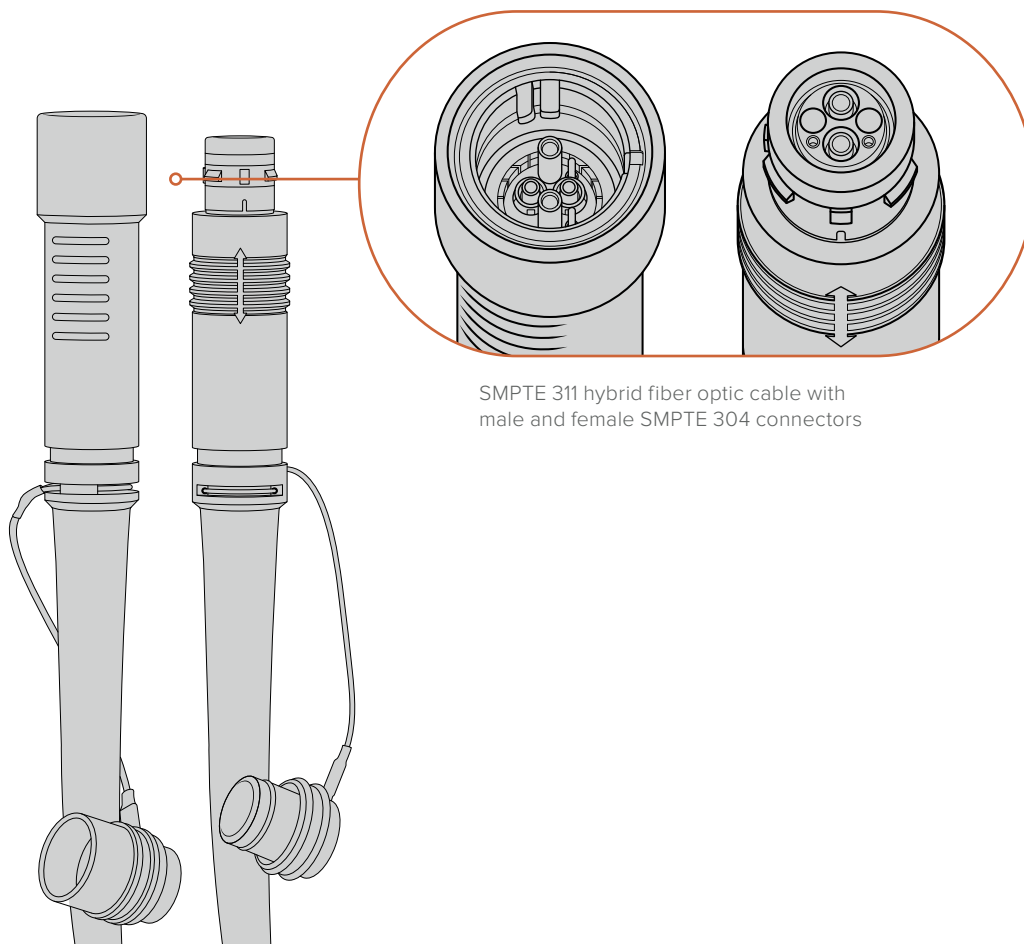
SMPTE 311 hybrid fiber optic cable with male and female SMPTE 304 connectors

NOTE The male and female ends of a SMPTE 311 hybrid fiber optic cable can be identified by looking for the male and female pins inside the tip of the SMPTE 304 connector. The gender of the connectors is not determined by their outward appearance.

> **TIP** Connect the rubber cap from each end of the SMPTE fiber cable into the rubber cap on each converter to prevent any dust or debris from entering the caps.

One of the main benefits of using a SMPTE fiber connection is to connect to the control room or broadcast truck in a traditional live broadcast environment. Most modern sporting stadiums already have optic fiber cables installed between camera positions and the control room or broadcast truck, so this means you can plug directly into these systems.

The optic fiber cable used to connect to an existing fiber system, or to connect the two Blackmaic fiber converters together, is a SMPTE 311 hybrid fiber optic cable with SMPTE 304 connectors.

Protecting SMPTE Connectors

It is very important that the SMPTE fiber cable's connectors are always protected by their rubber caps. This is because minute dust particles can collect very quickly on the polished ends of the glass fiber tubes which can interrupt signal flow. The best practice is to immediately replace the rubber cap as soon as a connector is exposed. For example, immediately prior to connection, and immediately after disconnection.

It's also a good idea to connect the rubber cap from each end of the SMPTE fiber cable into the rubber cap on the converters whilst in use, to prevent any dust or debris from entering the caps.

Plugging in Power

Power from the studio unit is sent through the fiber cable to the camera unit, therefore the first step to connecting power is to power the studio unit.
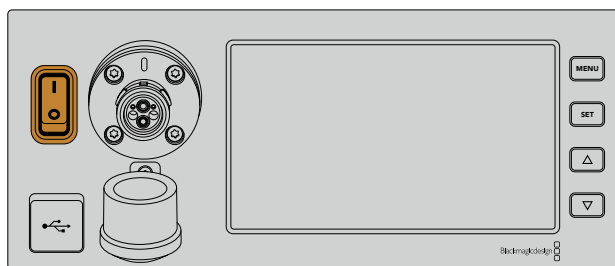
Powering the Studio Fiber Converter

Plug a standard IEC power cable into the power connector on the studio unit's rear panel.
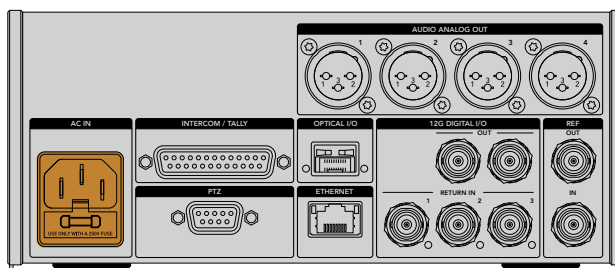
Connect power to your studio fiber converter via a standard IEC power cable

To turn the unit on, set the power switch on the front control panel to the 'on' position.

Connecting SMPTE Fiber

The next step in getting started is to connect the SMPTE fiber cable between the studio fiber unit and the camera unit. This provides power from the studio unit to the camera unit, and fiber for all video feeds.

> **NOTE** Extensive safety checks are initiated whenever a powered hybrid fiber optic cable is plugged into the converter and the power safety of the unit is continually monitored during use.

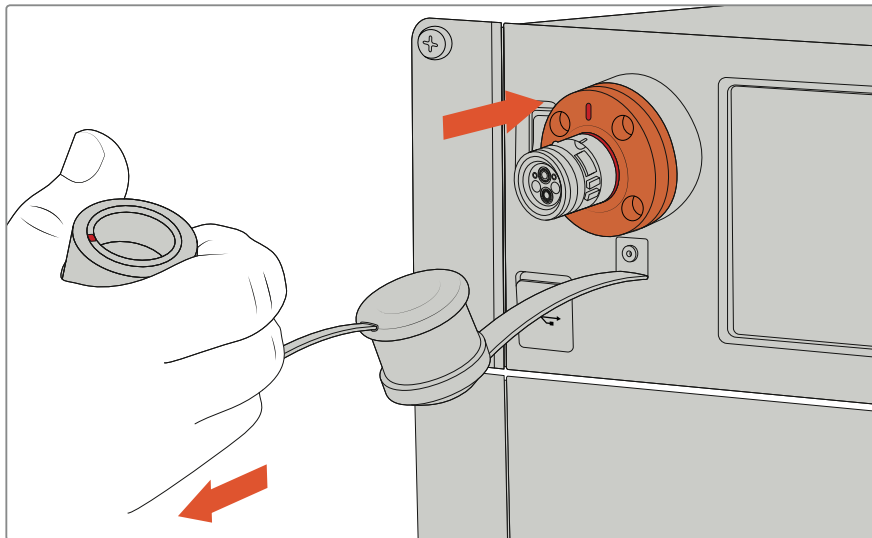## Connecting the Fiber Cable to the Studio Unit

The male end of the SMPTE fiber cable's locks securely onto the female fiber connector on the front panel of the Blackmagic Studio Fiber Converter. This is a secure lock ensuring that the cable is not accidentally disconnected during broadcast.

To connect the cable:
Align the red indicator on the cable connector with the red dot on the unit's fiber connector, and plug the connector in until it securely clicks into place.

To disconnect the cable:
Push the metal base of the studio unit's fiber connector towards the front panel and remove the cable connector. Plug the male end of the SMPTE fiber cable into the female connector on the front of Blackmagic Studio Fiber Converter

Push the metal base of the studio unit's fiber connector towards the front panel to disengage the cable connector allowing you to pull the cable away from the unit.

Once plugged in, it is a good idea to connect the rubber cap from the end of the SMPTE fiber cable into the rubber cap from the Blackmagic Studio Fiber Converter. This will prevent any dust or debris from entering the caps, and ensure that the caps remain clean.

Connecting the Fiber Cable to the Camera Unit

The female end of the SMPTE fiber cable locks into the male connector on the side of Blackmagic Camera Fiber Converter, ensuring that the cable is not accidentally disconnected during broadcast.

To connect the cable:

1   Align the red indicators on each connector, and plug the cable connector into the camera unit's connector until it securely clicks into place.
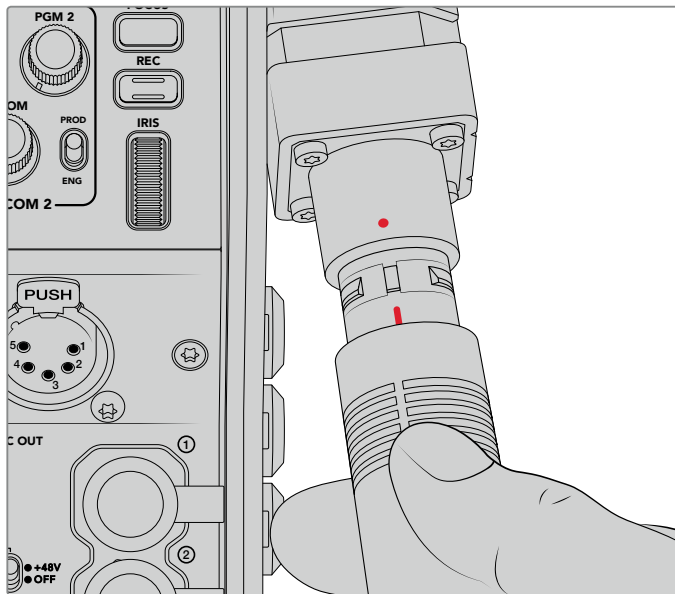
2   Once plugged in, it is a good idea to connect the rubber cap from the end of the SMPTE fiber cable into the rubber cap from the Blackmagic Camera Fiber Converter. This will prevent any dust or debris from entering the caps, and ensure that the caps remain clean.


Align the red indicators to connect the SMPTE Hybrid Fiber Optic cable to the large connector on the Blackamgic Camera Fiber Converter

NOTE The SMPTE 304 connectors on the SMPTE 311 cable are very durable and lock firmly to the camera. If you need to disconnect the cable, please ensure that you have the camera firmly attached to a tripod head or are bracing the camera with your spare hand while trying to disconnect the cable.

To disconnect the cable:

1   Pinch the top section of the female end of the cable, and compress the rubber sheath around the cable, pulling it gently away from the tip of the cable until you can see the red ring under the sheath. This will detach the teeth from the locking mechanism.

2   Put one hand on the camera to brace it gently, and pull the cable away from the connector on the Blackmagic Camera Fiber Converter. The cable should disconnect easily without the need for excessive force.
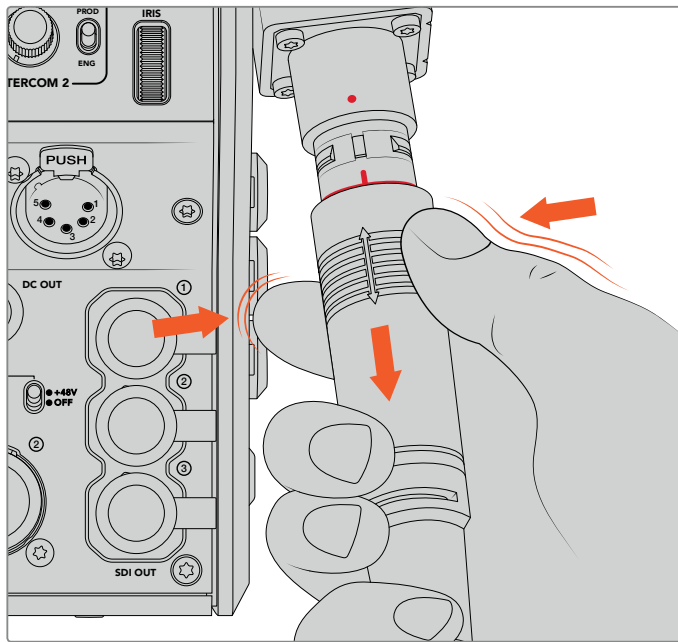
Pinch the rubber around the tip of the cable to reveal the red
ring below, then pull the cable to disconnect

NOTE The SMPTE hybrid fiber cable is the heart of the broadcast ecosystem, so it is crucial that great care is taken. For example, avoid kinks in the cable, always prevent the cable from being pressed under heavy items, and avoid bending at 90 degree angles. Avoid dropping the connectors and take care when connecting and disconnecting. Always cap the connectors as soon as they are exposed.

Confirming Power and Fiber

The two units will now establish a handshake process to determine that power is being supplied safely and fiber is securely connected.

This process involves the following:

1   The studio unit establishes a low power state with the camera unit. This is shown by the camera unit's red power status indicator. In a low power state, intercom functionality is enabled, but the full power required to operate the unit has not yet been confirmed.

2   Once power is determined as safely connected, a high power state is established and the camera unit's power indicator will illuminate green.

3   The fiber connection is confirmed and the fiber status indicator will illuminate green.

This is usually very fast and the indicators can turn green almost immediately. If you are using a cable over greater distances, the handshake process can take a moment longer before indicators illuminate green.

If the power light remains red for an extended period of time and does not turn green, or flickers between red and green, check that both ends of the fiber cable are securely connected. If the interruption persists, check the condition of your fiber cable.

Power Safety Considerations

The SMPTE hybrid fiber optic cable is capable of carrying high voltage over long distances so that you can power a camera and accessories that are located up to 2km away.

To ensure safe operation, your Blackmagic Studio Fiber Converter has safety mechanisms built in to ensure accurate monitoring and automatic management of the voltage being carried.

A dedicated micro controller along with internal handshaking and communication between the Blackmagic fiber converters ensure that a hybrid fiber optic cable remains off until it is plugged into the Camera Fiber Converter. It then goes into a low power state and completes safety checks before going into high power mode. High voltages are not enabled until the converters ensure that an optical signal is present, there is a 5mA signal core current loop, and there is less than 30mA of imbalance between the power cores.

Connecting to an ATEM Switcher

How to connect Blackmagic Studio Fiber Converter to your switcher:

1 Connect a BNC cable from Blackmagic Studio Fiber Converter's rear 12G-SDI output to one of the SDI inputs on your switcher. Ensure your camera is set to use the same format and frame rate as your switcher.

2 Connect a BNC cable from your program return feed output on your switcher to the 'return in' 1 input on the studio unit's rear panel.

> **TIP** When using multiple cameras in a live production, you may need to run the program return feed from the switcher through a Teranex Mini SDI Distribution 12G or a Smart Videohub. That is because there are a set number of program outputs on the switcher and you will likely need access to more.

3 If you require any other return feeds to be sent to your camera such as a clean program return feed, a teleprompter feed, an ISO feed from another camera, graphics or any other signal then plug these into 'return in' 2 or 3.
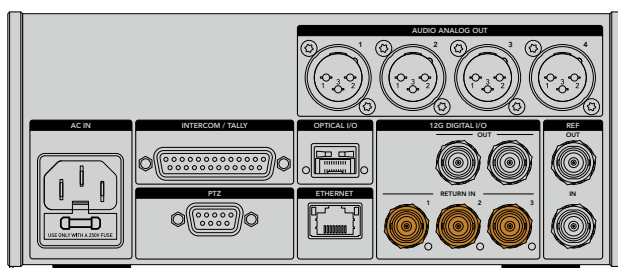
Plug the program return feed from the switcher and other return sources into the 'return' inputs on the studio unit's rear panel

Confirming Video

You can now check that video is working and all return feeds are present.

1 Ensure the ATEM switcher's program output is connected to the studio unit's SDI return input 1.

2 If you want to check all return feeds, plug video sources into SDI return inputs 2 and 3.

3 Now plug an SDI monitor, such as a Blackmagic SmartView 4K, into the 12G-SDI output on the side panel of the camera unit.

With a monitor connected to the 12G-SDI output, you can then press and hold either of the two return buttons on the camera unit's front panel and see the return feed displayed. Double press the return button to lock the return feed on.

Now rotate the corresponding selection knob next to the return button to switch between all three return feeds. You can set the two return buttons to monitor two different return feeds if you want to.
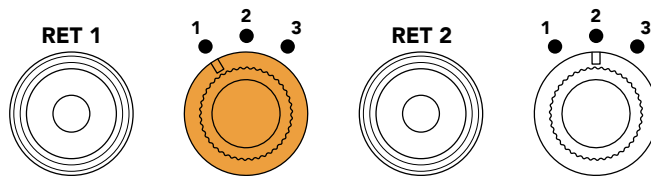
Switch between the return feeds on the camera unit and press the corresponding return button to view the selected feed on a monitor
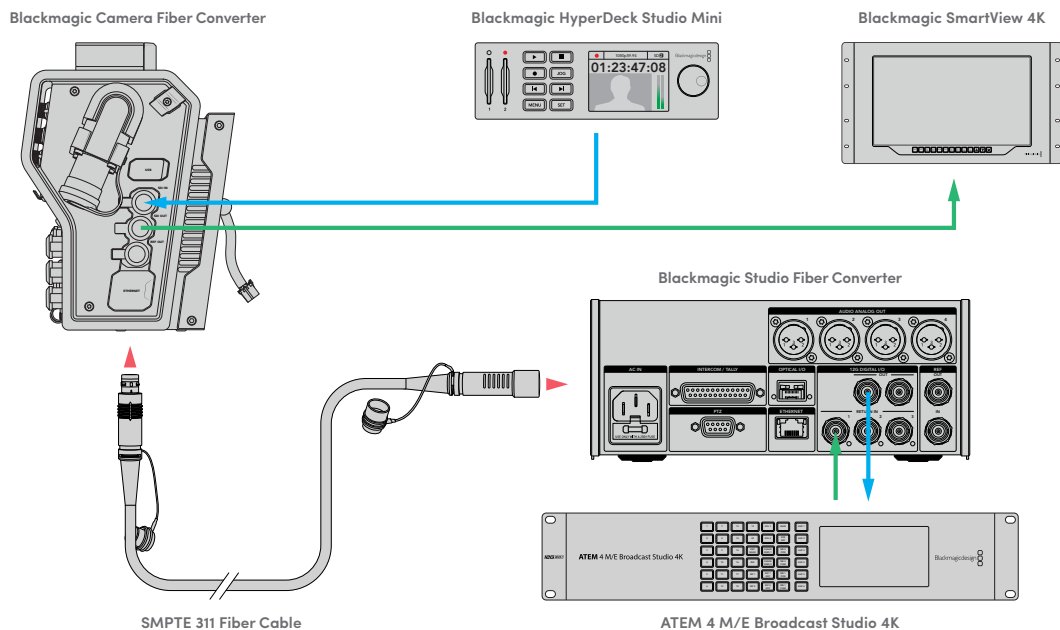
To confirm video, plug video sources into the return feed inputs on the studio unit, then view them on a monitor connected to the camera unit

Why Connections on the Front?

The fiber connection is located on the front of the studio unit so it can become the optical patch connection in the rear of a rack. Typically, the studio converter will be installed facing the rear of a rack so the SMPTE cables can be plugged direct into the unit. This means there is no need for extra rack patch panels and the cost of an extra short cable to the fiber unit. The large LCD next to the SMPTE fiber connector lets you quickly verify a good connection to the camera.

Plugging in Camera SDI

Connecting video signals between your Blackmagic Camera Fiber Converter and URSA Broadcast or URSA Mini, is as simple as connecting two of the three included SDI cables from the side of your converter to the rear of your camera.

How to connect your Camera Fiber Converter to your camera

1 Connect one of the included BNC cables from Blackmagic URSA Broadcast or URSA Mini's rear 12G-SDI output to the SDI input on Blackmagic Camera Fiber Converter.

2 Connect one of the included BNC cables from the SDI output on Blackmagic Camera Fiber Converter to the 12G-SDI input on Blackmagic URSA Broadcast or URSA Mini's rear panel.

Plugging in Return SDI Outputs

The three SDI outputs marked 'SDI Out' on the front of the camera unit are loop outputs of the return feeds coming from the switcher. These let you connect the return feeds to other SDI equipment near the camera, for example a teleprompter or talent monitor.
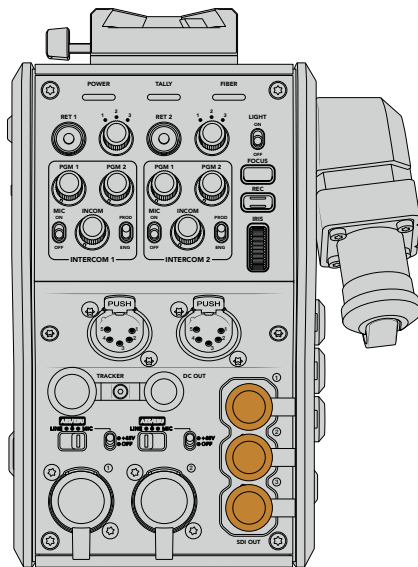
The three return feed loop outputs can be connected to SDI equipment near the camera, for example a teleprompter or monitor

NOTE The return feed SDI loop outputs support 3G-SDI to provide enough bandwith for three separate feeds. This means Ultra HD return feeds from the switcher up to 2160p60 are down converted to 1080p at the equivalent frame rate.
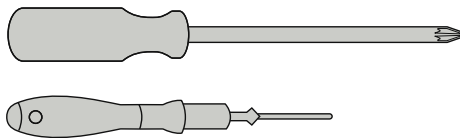
Mounting Blackmagic Camera Fiber Converter

Blackmagic Camera Fiber Converter mounts to the back of URSA Mini and URSA Broadcast directly behind the camera body, and connects to your camera's rear SDI in and SDI out BNC connectors. If you have installed a battery plate to the rear of your camera, you will need to remove it before connecting the Blackmagic Camera Fiber Converter.

> **NOTE** Before installing Blackmagic Camera Fiber Converter you should check that URSA Mini's internal software is version 4.4 or above and URSA Broadcast is 4.6 or above. You can check your software version on page 4 of the camera's 'setup' menu. For more information on updating your camera firmware see the section 'Blackmagic Camera Setup Utility' in this manual.
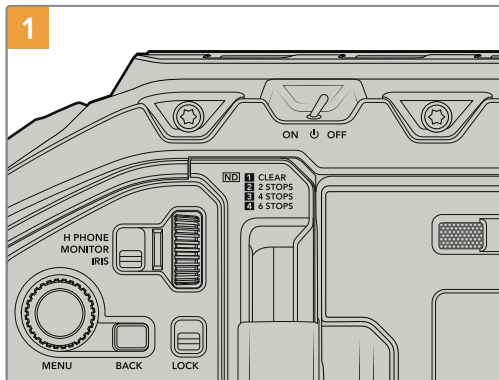
When attaching Blackmagic Camera Fiber Converter, you will need the following tools:

- 1 x phillips head screwdriver
- 1 x T10 torx screwdriver

To attach the Blackmagic Camera Fiber Converter to your URSA Mini or URSA Broadcast, you will need a large phillips head screwdriver and a T10 torx driver
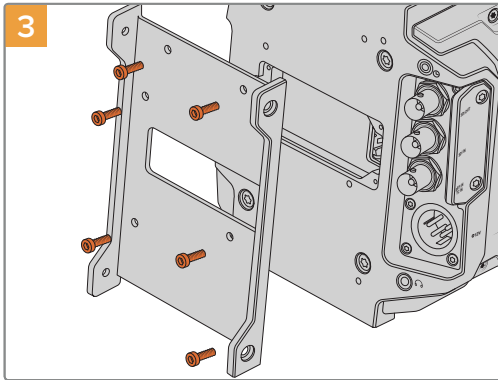
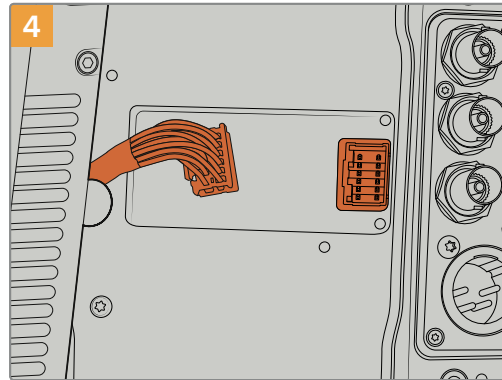### To mount and connect Blackmagic Camera Fiber Converter:

Ensure your camera is powered off. If using URSA Broadcast or URSA Mini Pro, power it off by moving the power switch to 'off'.
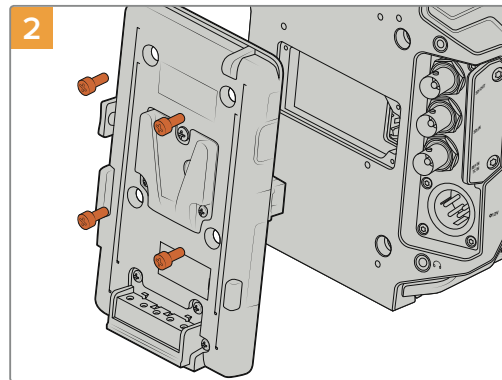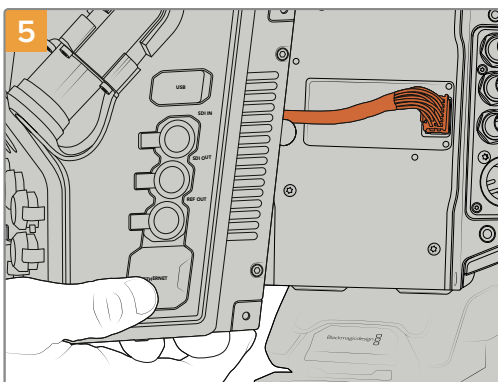

Remove the battery plate or molex power cover plate, if attached, using a phillips head screwdriver.
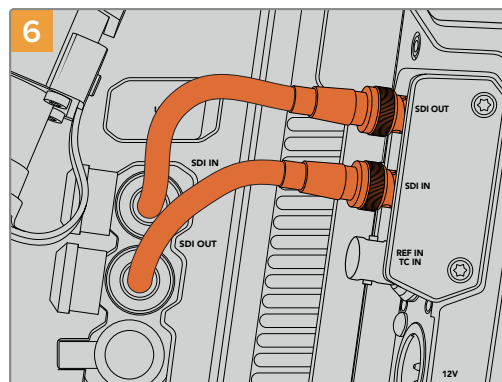
3 Attach Blackmagic Camera Fiber Converter's mounting bracket using 6 x T10 Torx screws.

4 Plug the molex connector on Blackmagic Camera Fiber Converter into the molex power socket on your camera's rear panel.

5 Slide the Blackmagic Camera Fiber Converter onto the mounting bracket, and attach it using 2 x T10 Torx screws on each side of the bracket.

6 Use the included BNC cables to connect the SDI output on the back of your camera to the SDI input on Blackmagic Camera Fiber Converter, and the SDI output from the fiber converter to the SDI input on the rear of your camera.

NOTE When setting up your production and using URSA Broadcast with the fiber unit attached, it's important to maintain some clearance underneath the fiber unit to allow adequate ventilation.

As your camera will often be used on a tripod, or shoulder mounted, clearance will already be provided. However, if you are operating the unit sitting flat on a surface it is a good idea to attach the URSA Mini shoulder mount pad, or third party baseplate or bridge plate as this will maintain the cooling fan's air flow in the underside of the Fiber Converter.
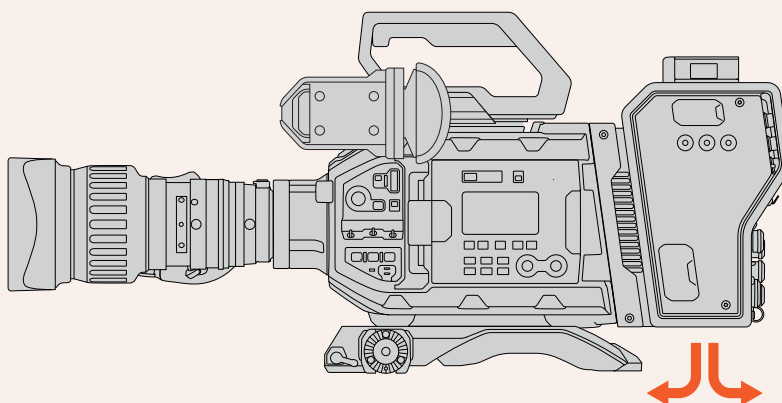
Attaching the URSA Studio Viewfinder

The attached V-lock plate on the top of the unit lets you connect a Blackmagic Studio Viewfinder. This positions the studio viewfinder directly at the eye level when the camera is mounted on a pedestal or tripod.
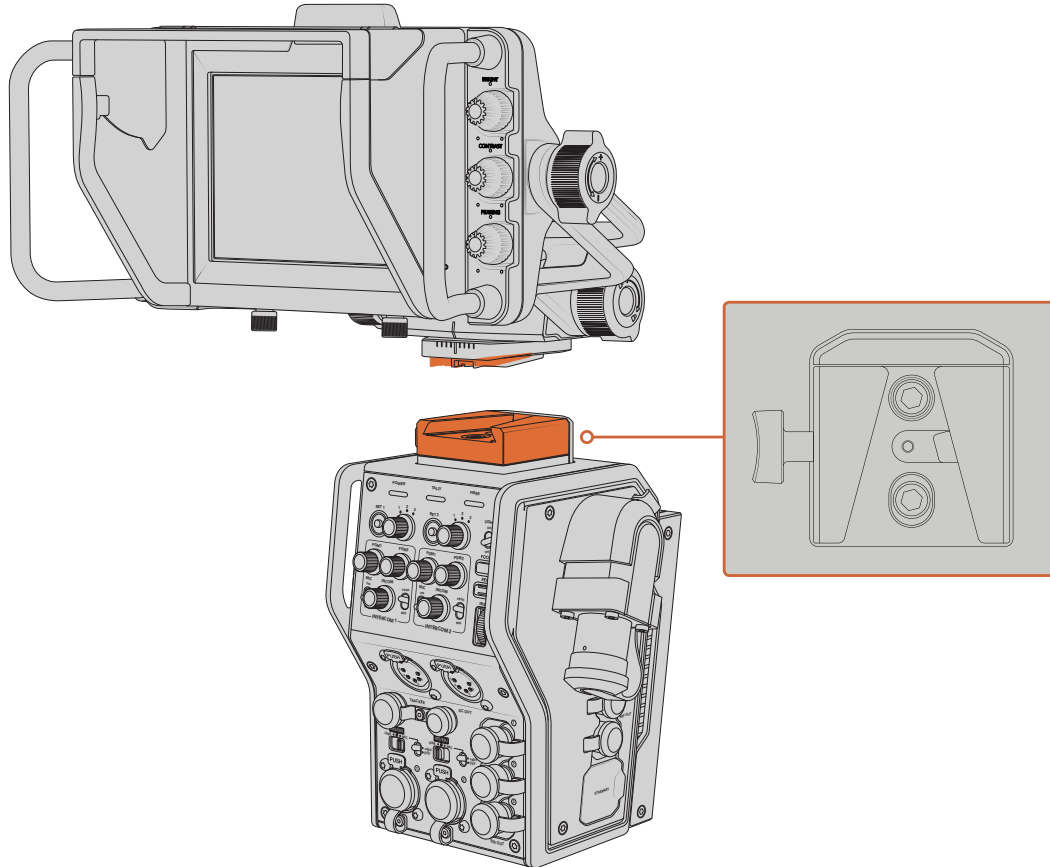
The V-Lock mount on the top of the camera unit lets you mount the Blackmagic URSA Studio Viewfinder

Plugging in a Talkback Headset

Plug a broadcast headset into one of the two 5 pin XLR connectors on the front of the camera unit. Having two headset connectors allows two people to communicate with crew simultaneously.

That's all there is to getting started! With the fiber converters powered and video connected via SMPTE fiber, you can start using the converters to create your live production with greater flexibility and efficiency. Please continue reading the manual for more information on how to use all the features on your Blackmagic fiber converters.

Operating the Camera Fiber Converter

Selecting a Return Feed

The two return buttons on the front panel can be used in the same way as the PGM button on the camera, to switch the feed on the LCD, Blackmagic URSA Studio Viewfinder and HD monitoring outputs between the camera view and program return view.

The two return buttons marked 'ret 1' and 'ret 2' switch between two chosen return feeds. The three way rotary switches next to the 'ret 1' and 'ret 2' buttons assign which return feed you would like to view when you press the corresponding button to the left of the switch. These positions on the rotary switch relate to the 'return in' 1, 2 and 3 SDI connectors that are on the back of the Studio Fiber Converter.
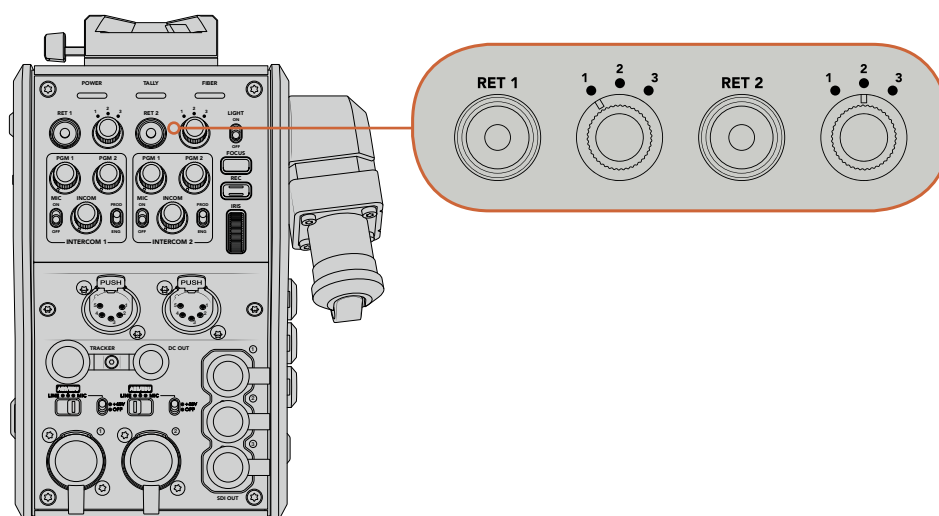
The return buttons and three way rotary switches allow you to select which return feed to view when the return buttons are pressed

Press and hold one of the return buttons to see the selected program feed. The program feed will continue to display whilst the return button is being held. Double press the return button to lock the display to the return feed. Pressing the return button again will exit the return feed and return to the camera view.

This means you can quickly and easily adjust which of the three return feeds being sent from Blackmagic Studio Fiber Converter you would like to have fast access to on the two return buttons. For example the three return feeds might be the switcher's program output feed complete with graphics, a teleprompter feed and a feed direct from another camera.

By using these switches you could assign 'ret 1' to be your program feed permanently and then use the second 'ret 2' button to check what is being sent to the teleprompter, and to occasionally switch it to check framing on another camera when you need to match its framing or angle.

There are also return buttons on the left side of the unit, marked 'ret 1' and 'ret 2' that provide additional access to view the return feeds when operating your camera from the side. They perform the same function as the return buttons on the front of the unit. Next to the return buttons is a call button, that when pressed, displays a flashing red border on a multivew connected to an ATEM switcher, alerting the switcher operator that you need assistance.

Using Talkback

The two female 5-pin XLR connectors allow you to plug in two headsets, so that you and another crew member can have communication with the rest of the crew simultaneously.

The intercom controls for each headset are grouped into two sets for two independent intercoms, and are effectively three way audio mixers for each headset XLR connector that is directly below.
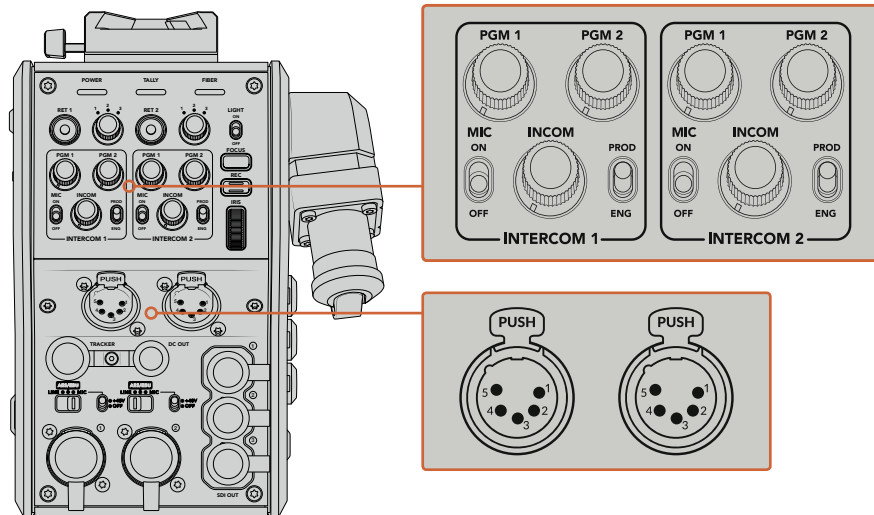
The intercom controls for each headset are located directly above each headset connection

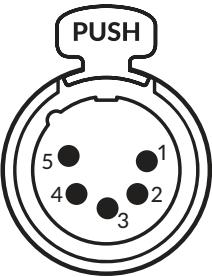You will hear the audio from the feeds that you have selected for 'ret 1' and 'ret 2' through a connected headset. The 'pgm 1' and 'pgm 2' dials adjust the audio levels of those feeds, and the 'incom' dial adjusts the overall volume. The 'mic' switch allows the operator to turn their headset microphone 'on' or 'off'.

Each intercom also has 2 selectable channels, a production channel and an engineering channel. This means that for broadcast setups with a large crew, you can split your crew communications between the two channels. The production channel uses audio channels 15 and 16 of the SDI stream, and could be setup to allow you to communicate with the director, producer and other crew members in the control room or broadcast truck. The engineering channel uses audio channels 13 and 14 of the SDI stream, and could be setup to allow you to communicate with the lighting crew, technical operators and other camera operators. The engineering channel will be enabled in a future software update.

The Blackmagic Camera Fiber Converter also includes a standard 10 pin connection for tracker talkback, which is perfect when both headset connections are in use and you need to feed an additional talkback connection for your crane operator.

There is also a backup channel available for use while setting up or troubleshooting the camera chain in case the fiber link is down.

Headset XLR Pinout Diagram

External view	Pins	Signal	I/O	Specifications
	1	Intercom MIC (Y)	In	Carbon (-20 dBu, unbalanced) Dynamic (-60 dBu, balanced/unbalanced) Manual (-20/-40/-60 dBu, balanced/unbalanced)
	2	Intercom MIC (X)	In	
	3	GND	–	GND
	4	Intercom left	Out	11 dBu (VR Max, 250 Ω Load)
5-pin XLR 'headset' connector	5	Intercom right	Out	11 dBu (VR Max, 250 Ω Load)

Using Tally

The tally indicator on the front of the panel, provides a traditional tally indicator with red for program and green for preview, so that you know when the camera you are operating is on air.

Status Indicators

The 'power', 'tally' and 'fiber' status LEDs at the top of the converter will illuminate different colors depending on the status of the unit. When the fiber cable is unplugged, no lights are illuminated.
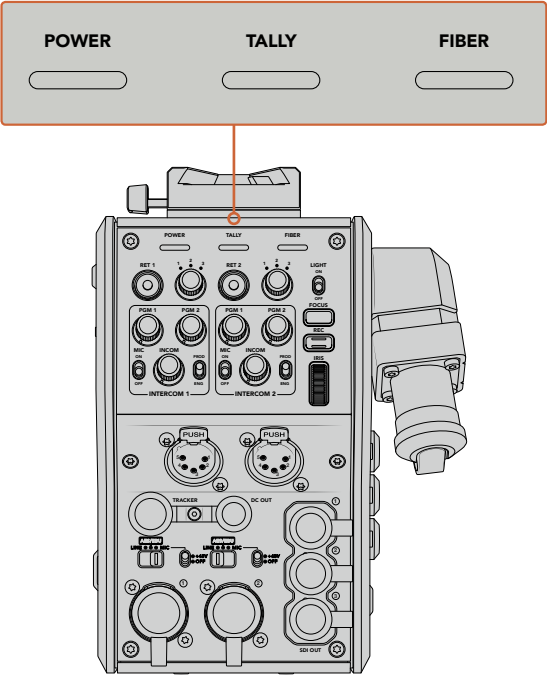
The status LEDs will illuminate different colors to let you know the status of the unit

Below is a description of each LED color, LED action, and the status represented:

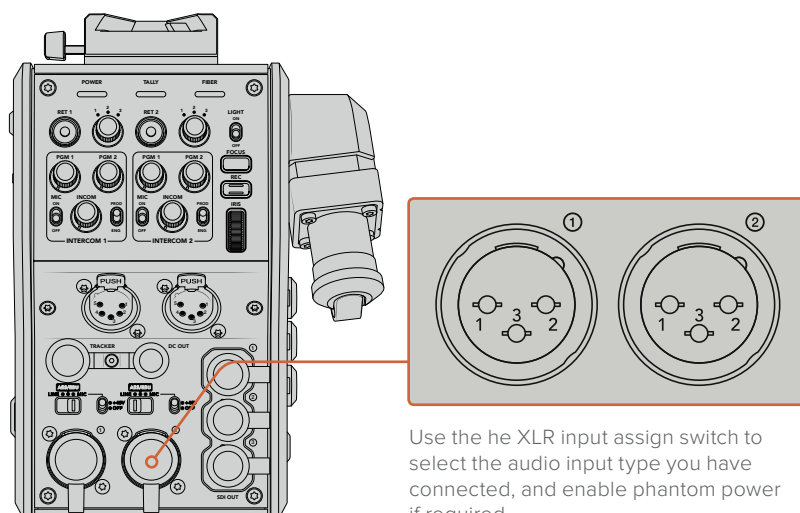|		
Power	**Constant Red**	When the SMPTE hybrid fiber optic cable is connected to a powered Blackmagic Studio Fiber Converter, and the other end of the cable is connected to Blackmagic Camera Fiber Converter, the power LED on the converter turns red to indicate that it is receiving power, and is in a low power state. In this low power state, intercom functionality is enabled but the full power required to operate the unit has not yet been enabled. If the power LED remains red for an extended period of time and does not turn green, check that both ends of your SMPTE hybrid fiber optic cable are securely connected. If the connection remains unstable, check the condition of your fiber cable.
	Constant Green	After a successful fiber connection has been established and Blackmagic Studio Fiber Converter has determined that the cable connection is safe, the power LED will turn green and the camera converter will enter high power mode.
	Flickering between Red and Green	If the power LED flickers between red and green, check that both ends of your SMPTE hybrid fiber optic cable are securely connected. If the connection remains unstable, check the condition of your fiber cable.
Tally	**Constant Red**	The tally LED illuminates red to indicate that the camera you are operating is currently on air.
	Constant Green	The tally LED illuminates green to indicate that the camera you are operating is currently in preview mode.
Fiber	**Constant Red**	When the SMPTE hybrid fiber optic cable is plugged into the camera fiber converter, the fiber LED will turn red to indicate that the handshake process has begun, and the converter is in a low power state. In this state, intercom functionality is enabled for use while setting up or for troubleshooting the camera chain in case the fiber link is down.
	Constant Green	Once a successful SMPTE hybrid fiber optic cable connection is established, the fiber LED will turn green.

Once both the power and fiber lights are green, this indicates that the safety checks have been completed, and the converters have entered high power mode.

Audio Inputs

Your Blackmagic Camera Fiber Converter has two XLR inputs labelled '1' and '2' that allow you to plug in external analog audio from professional equipment such as audio mixers, PA systems or external microphones.

Use the he XLR input assign switch to select the audio input type you have connected, and enable phantom power if required

The camera audio is embedded into channels 1 and 2 of the camera feed, and the 2 audio inputs on the back of the camera fiber converter are embedded as channels 3 and 4. All 4 audio channels are also deembedded at the other end on the studio fiber converter as analog audio outputs.

The XLR connections on Blackmagic Camera Fiber Converter have set gain levels, so if you require audio adjustment you can do this using URSA Mini and URSA Broadcast's XLR audio 1 and 2 inputs. Once connected, you can use the XLR input assign switch to set how the XLR inputs behave when selected as an input source. The options available are mic audio, line level audio and AES digital audio.
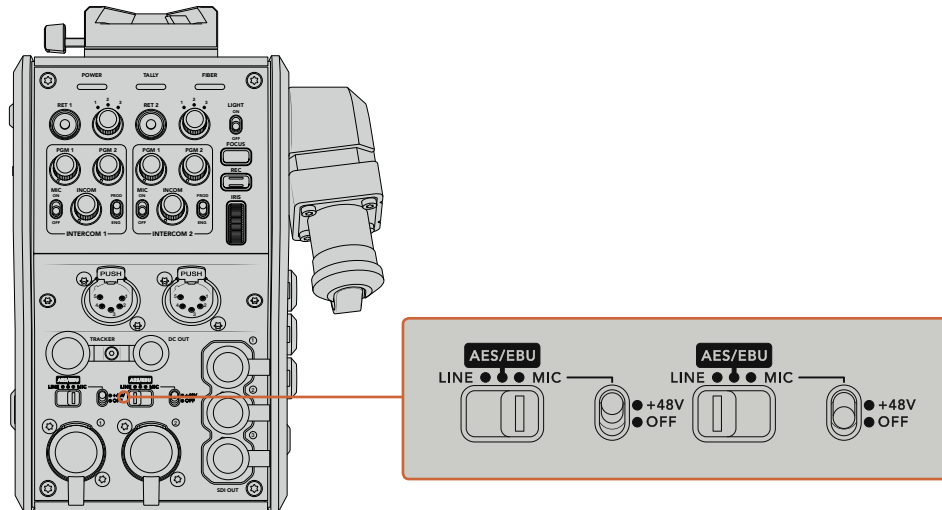
If you would like to connect microphones that aren't self powered, you can enable 48V phantom power. Move the phantom power switch to '+48V' to enable phantom power for any microphone connected to the XLR below, or 'off' to disable phantom power.

IP Video

A connected SMPTE Fiber cable provides for a 10-Gbit IP link between your Camera Fiber Converter and the Studio Fiber Converter. This allows all of your video and return feeds to be IP video based using high end, lossless broadcast quality 10-bit video encoding and decoding. All other connections such as talkback, tally, camera control and lens control are also converted to low-latency IP so you get incredibly reliable performance. The 1G and 10G Ethernet connections on the Camera Fiber Converter and Studio Fiber Converter will be enabled in a future software update.
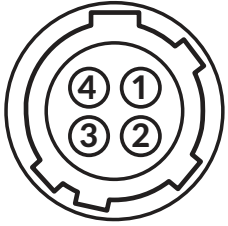
Power Specifications

The Blackmagic Studio Fiber Converter provides power for Blackmagic Camera Fiber Converter, your camera and it's accessories. A molex connector plugs into the molex socket on your camera's rear panel to send power to your camera from the Camera Fiber Converter.

If you need to position your camera at a distance of more than 2.1 km from the broadcast truck, and your camera and converter are not receiving enough power over the long cable run, you can power the camera and converter locally by having the 4-pin XLR from the camera's power supply plugged into the +12V input on your URSA Broadcast or URSA Mini Pro. The power will be sent through the molex connector to the Camera Fiber Converter.

The '+12V out' connector, sometimes referred to as a 'D-tap' or 'P-tap' allows you to power accessories like an external monitor or a large box lens, up to +11.9V to 14V dc at 2 amps. The 4-pin 'DC out' connector provides an additional option for powering accessories like an external monitor. A pinout table for the DC out connector is provided below.

DC out connector Pinout Diagram

External view	Pins	Signal	I/O	Specifications
	1	Unregulated GND	–	GND for Unregulated Out
	2	NC	–	No connection
	3	NC	–	No connection
'DC out' connector	4	Unregulated Out	Out	+11.9V to 14V dc, 500 mA (max)

Operating in a Small Environment

When URSA Broadcast is being used as a studio camera, we have added camera controls on the fiber converter including iris and focus control, so you can control compatible lenses from behind the camera. This is helpful if you don't have a camera control operator controlling the lens remotely.

As a studio camera, URSA Broadcast still has the ability to record internally, so the record button lets you trigger internal recording on the camera.
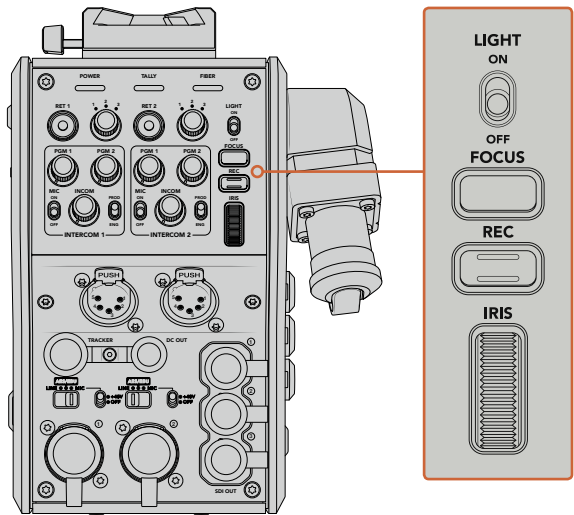
Focus
Pressing the button marked 'focus' will trigger the autofocus if you are using a lens that supports autofocus.

Record
Pressing the button marked 'rec' will trigger the recording when pressed, and will stop recording when pressed again.

Iris
If you are using a compatible active lens that allows control from the camera, you can open or close the iris using the 'iris' wheel. Rotate the wheel up or down to open or close the lens aperture.
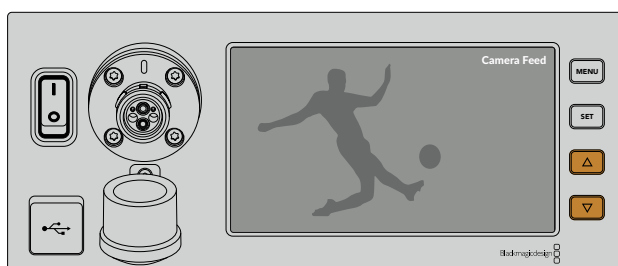
Operating the Studio Fiber Converter

Selecting the LCD Source

When powered on, your Blackmagic Studio Fiber Converter's large LCD will immediately display the feed from your camera.

As the central base unit, the studio fiber converter takes the program feed from your switcher, plus all return sources, and feeds them to the camera unit via the SMPTE fiber cable. The built in LCD lets you monitor each source connected to the return feed inputs, and you can switch between them by pressing the up and down arrow buttons on the front control panel. The 'menu' and 'set' buttons will be enabled in a future software release.

A text overlay in the top right corner of the LCD lets you identify which feed you are monitoring when you switch between feeds.

For example, as you press the arrow buttons, the overlay will appear for a few seconds to indicate which feed you are monitoring..

Press the up and down arrow buttons to monitor the return feed sources

Rack Mounting the Studio Unit

If you're running multiple Blackmagic Studio Fiber Converters, you can use Blackmagic Studio Fiber Rack Kit to install your converters into a broadcast rack or road case. Using the rack kit, you can mount two studio units in a rack side by side, or fitted to either side. A blanking panel is supplied with the Studio Fiber Rack Kit to cover the empty side of the rack if you only want to mount a single unit.

Your Studio Fiber Converter is two rack units high, and is half the width of a standard rack shelf, so two Studio Fiber Converters can fit neatly side by side in a 2RU rack space.
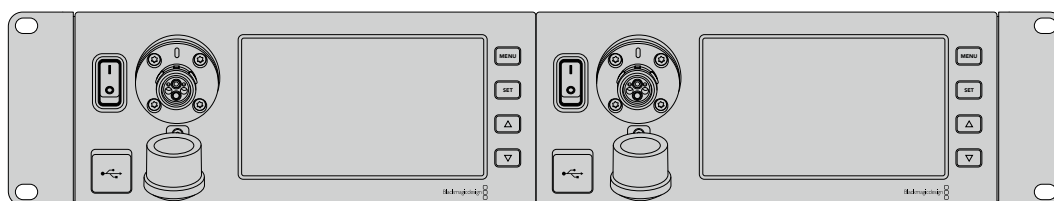
Blackmagic Studio Fiber Converters mounted side by side
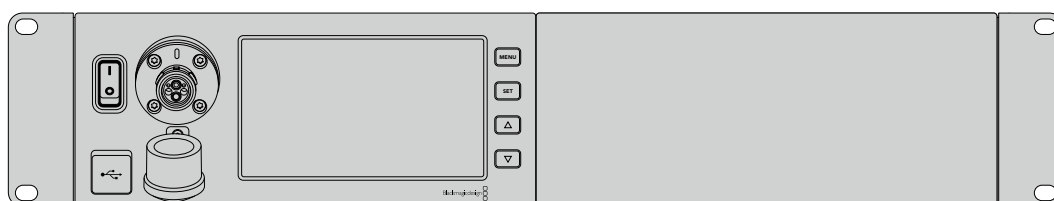
The supplied blanking plate can be used to cover an empty rack space if needed

The Blackmagic Studio Fiber Rack Kit contains the following items:

2x Rack ears

Attach rack 'ears' to the outside edge of Blackmagic Studio Fiber Converter for mounting in a rack

1x Half rack width blanking panel

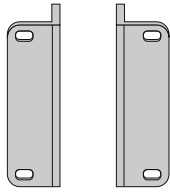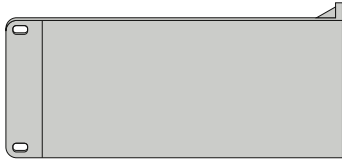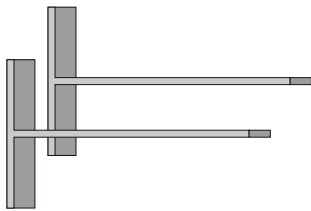The blanking panel has a mounting ear on one side so you can cover the empty rack space if you are installing a single unit. The illustration shows the ear on the left side. Simply rotate the the panel 180° to mount it to the other side.

2x Support brackets

The T-shaped support brackets attach underneath the two Studio Fiber units where the two units meet at the front and the rear to provide support

Screws

8 x M4 10mm	5 x M3 5mm	4 x M4 8mm
Rack ear screws	Support bracket screws	Blanking panel screws

Preparing the Blackmagic Studio Fiber Converter for installation into a rack:

1. Position the blanking panel on one of the sides of your Studio Fiber Converter, depending on whether you would like the unit to sit on the left or right side of the rack shelf. The front face of the blanking panel should be parallel with the front panel of the unit.

2. Attach the blanking panel to the side of your Studio Fiber Converter near the front using three of the supplied blanking panel screws.

3. Use three of the supplied rack ear screws to attach a rack ear to the other side of your Studio Fiber Converter. Your converter is now ready to be installed into a rack using the mounting holes on the brackets you have just attached and some standard rack screws.

Preparing two Blackmagic Studio Fiber Converters for side by side installation into a rack:

1. Turn the two converters over so that they are upside down and placed side by side, and remove two rubber feet from the edges of each converter where they meet.

2. Attach the two supplied T-shaped support brackets to the base of the two Studio Fiber units at the front and the back where the two units meet, using the screw holes provided and the supplied mounting screws.

3. Turn the attached units back over and attach the rack ears to the outer edges near the front of both converters, using the supplied mounting screws. Your converters are now ready for installing into a rack, using the brackets you have just attached and some standard rack screws.

Camera Unit Connections

Connections are located on Blackmagic Camera Fiber Converter's rear and side panels. When the connections are not in use, the rubber caps should be replaced to ensure weather sealing in rain and other outside environments. This is especially true for the SMPTE fiber connection, as dust particles can very quickly collect on the polished edge of the glass fibers which can disrupt signal flow. It's always a wise choice to remove the caps on both the cable and unit connector immediately before connection, and then replace the caps immediately after disconnection.

Camera Power Connection

Power is primarily supplied to the camera unit and your camera from the studio converter via a SMPTE hybrid fiber cable. This also powers all accessories that may be attached to the camera, for example Blackmagic URSA Studio Viewfinder.

However, you can also power the Blackmagic Camera FIber Converter via the camera if your camera has its 12V XLR connector plugged into a power supply. This is not normally required, but is an option if you have your camera positioned further than 2 kilometers away from the studio unit where power may not be as reliable over the SMPTE fiber cable. This is also helpful if you have a box lens attached that requires a stronger power draw that is sustainable over lengthy cable distances.

PTZ Interface

The DE-9 serial connector allows you to connect to a PTZ motorized head. For example, if your Blackmagic URSA Broadcast is attached to a camera crane using a pan, tilt, zoom head that is controlled remotely. PTZ commands are embedded in the SDI signal passed through from Blackmagic Studio Fiber Converter.
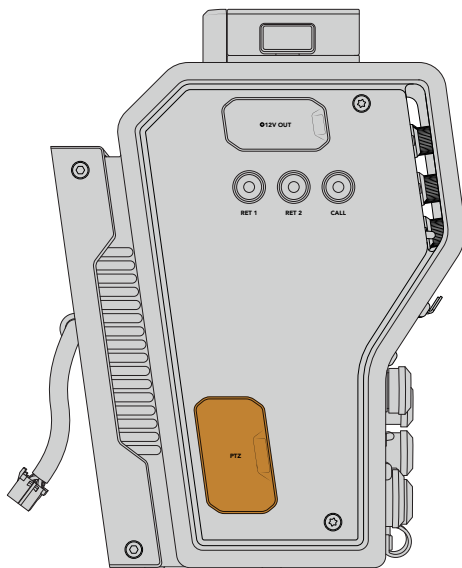
PTZ Interface

Talkback Connection

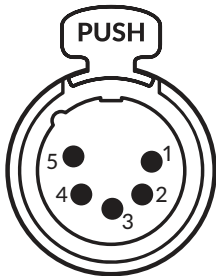The two female 5 pin XLR connectors let you plug in two headsets, which allows two people to communicate via talkback simultaneously. For example, the camera operator's headset can be plugged into the first XLR connector, and a crane operator or fellow crew member, such as a sound operator, could plug into the second XLR headset connector. A pinout diagram for the headset XLR connector is included below.

Headset XLR Pinout Diagram

External views	Pins	Signal	I/O	Specifications
5-pin XLR 'headset' connector	1	Intercom MIC (Y)	In	Carbon (-20 dBu, unbalanced) Dynamic (-60 dBu, balanced/unbalanced)
	2	Intercom MIC (X)	In	Manual (-20/-40/-60 dBu, balanced/unbalanced)
	3	GND	–	GND
	4	Intercom left	Out	11 dBu (VR Max, 250 Ω Load)
	5	Intercom right	Out	11 dBu (VR Max, 250 Ω Load)

The corresponding intercom controls are located above each headset connection.

For more information on how to use the intercom controls, refer to the 'Operating the Blackmagic Camera Fiber Converter' section.
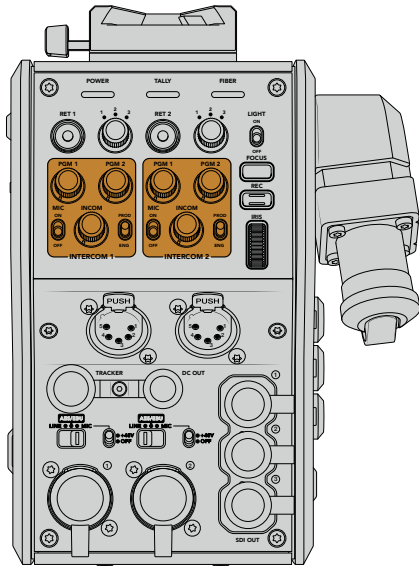
The intercom controls are used to mix talkback audio levels
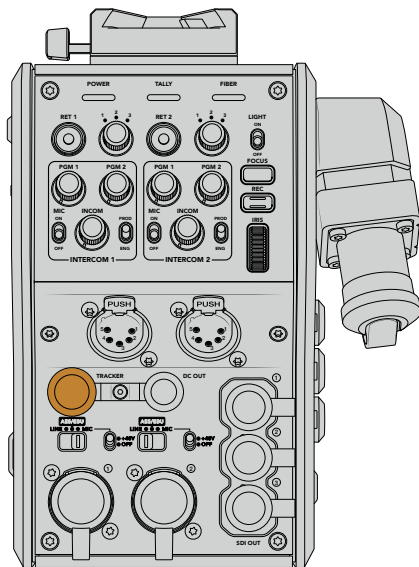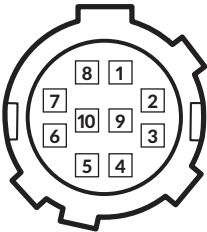
Tracker Interface connector

Tracker Interface

The 10 pin Hirose connector provides a multiplexed output for talkback and tally signals, plus data such as teleprompter information. This output is commonly used by support crew operating production equipment such as a camera crane.

A pinout diagram is provided in this section if you want to build your own cable.

Tracker Output Pinout Diagram

External view	Pins	Signal	I/O	Specifications
	1	Tracker left	Out	Tracker output, -20 dBu unbalanced
	2	GND (Talk)	–	GND for tracker talk
	3	GND (Receive/PGM/tally)	–	GND for receive/PGM/tally
	4	Tracker right	Out	Tracker output, -20 dBu unbalanced
	5	Unregulated	Out	+11.9V to 14V dc, 500 mA (max)
	6	GND (Unregulated)	–	GND for unregulated
	7	Tracker talk (X)	In	Tracker talk 0 dBu /-20 dBu, high impedance balanced
	8	Tracker talk (Y)	In	
	9	G Tally	Out	On: GND Off: High impedance (open collector)
	10	R Tally	Out	On: GND Off: High impedance (open collector)

10 pin hirose 'tracker' connector

DC Connection

You can power additional accessories, for example an external monitor, via the DC out connector.
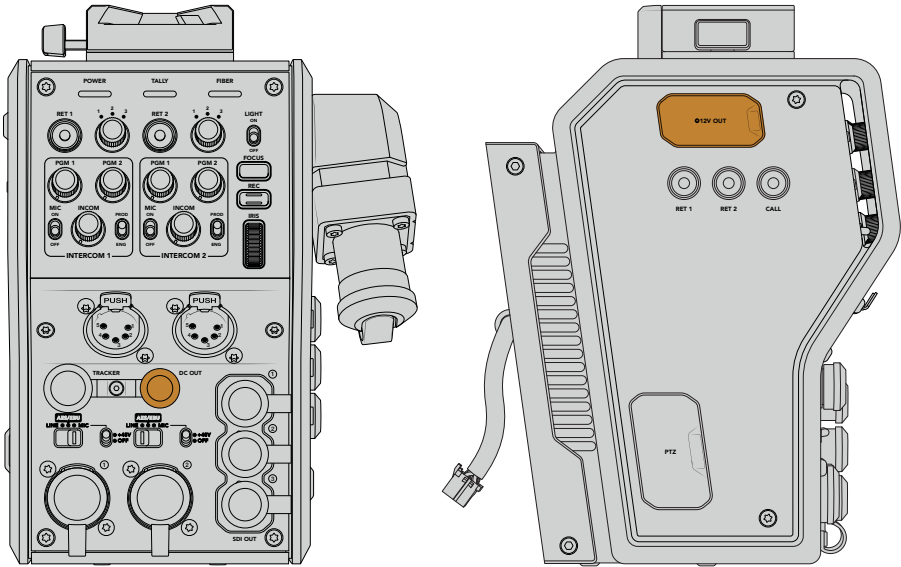
The DC out connector lets you power additional accessories, such as a monitor or external recording equipment

D-Tap Output

D-Tap Output

The +12V output on the left side panel is often referred to as a 'D-tap' or 'P-tap' and lets you power accessories like a monitor or a large box lens. The output supports box lenses that require up to +11.9 to 14 Volts direct current at 2 amps.

Reference Output and Operation

The reference output can be used to connect a reference signal to your camera via a BNC cable.

To connect a reference signal to your camera:
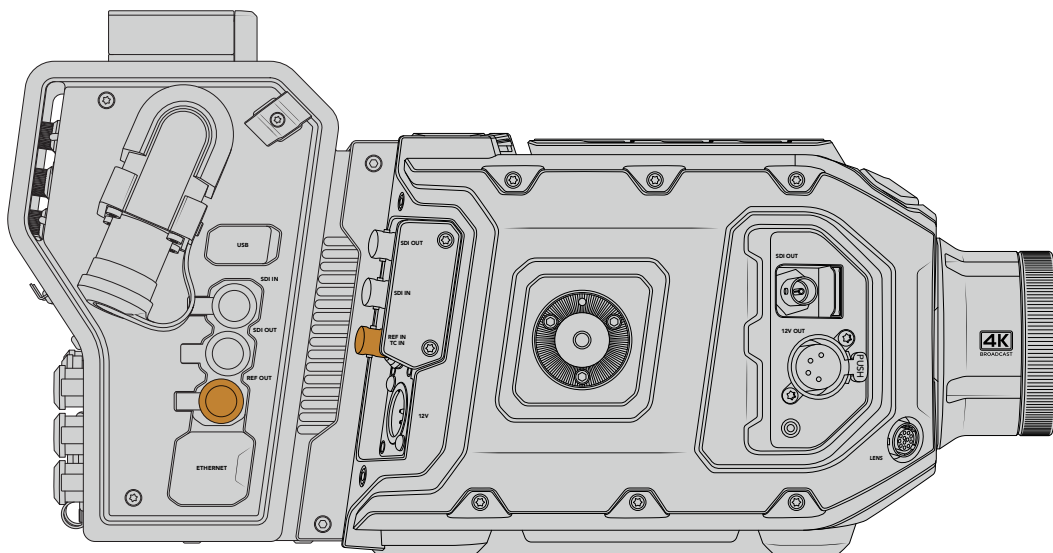
1   Connect the reference output from the Blackmagic Camera Fiber Converter, marked 'REF OUT', to the reference input on your camera marked 'REF IN' using a small BNC cable. (Add a tech writer note here to 'Check if a small SDI cable is supplied for reference')

2   Set your camera's reference setting to the reference input.

Any HD tri-level or black burst sync signal plugged into the Studio Fiber Converter will feed through to the camera unit via the SMPTE fiber cable. A sync reference signal lets you genlock video equipment to a common reference so all equipment share the exact same timing. This means all video sources are synced and will switch smoothly.

ATEM switchers have built in re-synchronizers so if you are using all Blackmagic Design equipment, then you don't need to worry about connecting a sync reference. The reference signal is embedded in the SDI program return feed from the ATEM switcher, so all you need to do is make sure the program input is selected in your URSA Broadcast or URSA Mini's reference setting in the settings menu.

If you are using Blackmagic Design equipment, such as URSA Broadcast and an ATEM switcher, with other SDI equipment and want to maintain sync between them, you can connect the ATEM switcher's reference signal via the Camera Fiber Converter's reference output.


If you're using an external referance singnal, connect the referance output tfrom the camera fiber unit to your URSA Broadcast reference input.'

Studio Unit Connections

The rear panel of the Blackmagic Studio Fiber Converter provide SDI return feed and reference BNC connectors, intercom and tally DB-25 connector, PTZ 9 pin serial port, audio outputs, and Ethernet. The optical fiber slot lets you plug in an optional optical fiber SFP module for future options and features to be released at a later date.

All SDI inputs support 12G-SDI for video formats up to Ultra HD 2160p60.
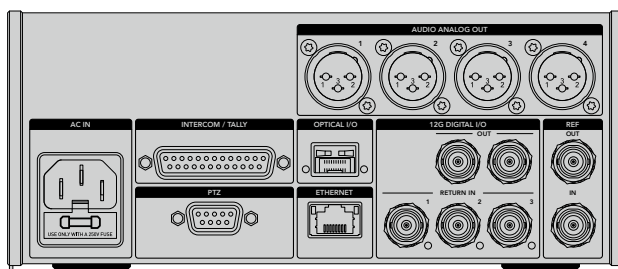
12G-SDI Output

The two 12G-SDI outputs are for connecting the camera signal from the studio unit to any of your switcher's camera SDI inputs. The second connector can be used to output the same signal to other video equipment, for example a Blackmagic Videohub router, SmartView monitor or a HyperDeck Disk Recorder.
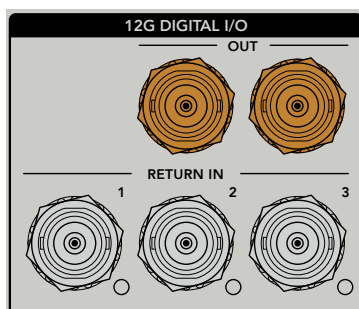
The 12G-SDI outputs allow for signals from 720p50 up to 2160p60

Return SDI Inputs

The 12G-SDI return feed BNC connectors give you the option to plug in up to three return SDI feeds. For example, the program feed from a switcher is normally connected to return 1, and other sources like a second camera output, HyperDeck playback, or even a teleprompter can be connected to return feeds 2 and 3. If you are using an ATEM switcher, the program return connected to return 1 will also include tally, talkback, reference and camera control signals.
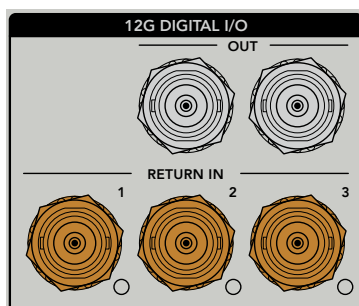
The return SDI inputs allow you to connect up to three return feeds from your switcher. These feeds will be fed to your camera so that they can be viewed by the camera operator, or fed out via SDI to other equipment.

> **NOTE** If you connect Ultra HD to the return inputs, the Ultra HD video will be down converted to 1080p at the same frame rate, so the output from the camera unit will be HD. Down converting the Ultra HD return signals to HD allows for greater bandwidth so you can send multiple return sources.

Reference Input and Output

You can lock other video equipment to the program output of your ATEM switcher, or a common external reference signal using the reference input and output.

For example, if you want to lock equipment to the reference signal embedded in an ATEM switcher's program return feed, plug the reference BNC output from the studio unit to your SDI equipment.
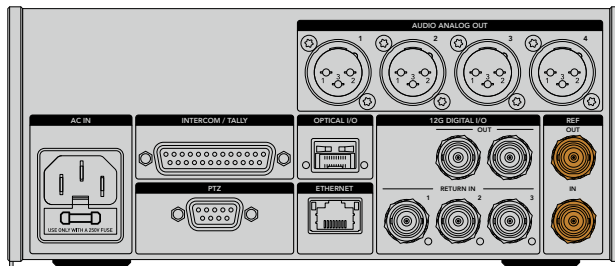
Use the 'ref in' connection to send traditional reference timing from other broadcast equipment to your camera

> **TIP** If you have multiple devices that need to be locked to the reference output, then you can use a distribution amplifier, such as a Blackmagic Mini Converter SDI Distribution to split the reference output from the studio unit into multiple signals.

If you are not using an ATEM switcher and need to lock equipment to a common external reference signal, plug the externally generated signal into the reference BNC input. This sends the reference to the camera unit via the SMPTE fiber cable. The reference BNC output from the studio unit can be used to loop the reference source to other equipment.

Talkback Interface

The DB-25 intercom and tally connector lets you connect to third party intercom and tally systems. A pin out diagram is provided below if you need to build a custom cable.
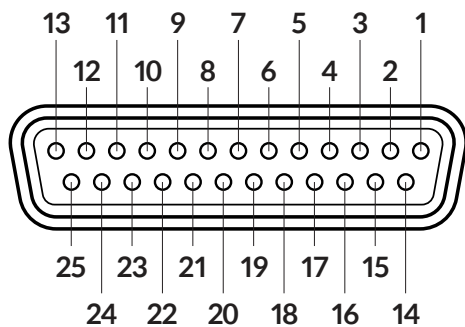
The external view of the 25 pin 'intercom/tally' connector
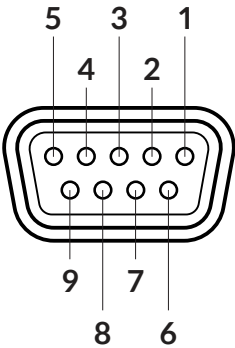
Talkback Pinout Diagram

Pins	Signal	Specifications
1	ENG(R) IN+	Engineering channel input
2	ENG(R) IN-	0dBu balanced
3	ENG GND	GND for ENG
4	ENG(T) OUT +	Engineering channel output
5	ENG(T) OUT -	0dBu balanced
6	PGM IN+	-20dBu
7	PGM IN-	-20dBu
8	PGM GND	-20dBu
9	GND	GND for aux
10	N/C	–
11	Red Tally IN	On = 5-24Vdc, Off= 0Vdc
12	Red Tally GND	–
13	GND	Chassis GND
14	PROD(R) IN+	Production channel input
15	PROD(R) IN-	0dBu balanced
16	PROD GND	–
17	PROD(T) OUT+	Production channel output
18	PROD(T) OUT-	0dBu balanced
19	N/C	–
20	N/C	–
21	N/C	–
22	N/C	–
23	N/C	–
24	Green Tally IN	On = 5-24Vdc, Off= 0Vdc
25	Green Tally GND	–

PTZ Interface

Both the studio unit and camera unit has a 9 pin DE-9 connector so you can connect a PTZ controller at the studio end, and the remote head at the camera end. The PTZ commands are embedded in the SDI signal connected between the units via the SMPTE fiber cable.

PTZ Interface Pinout Diagram

External view	Pins	Signal
	1	GND
	2	RS422 Tx-
	3	RS422 Rx+
	4	GND
	5	N/C
	6	GND
	7	RS422 Tx+
	8	RS422 Rx-
9-pin 'PTZ' connector	9	GND

Audio Outputs

The four XLR audio outputs on the studio unit give you the option to output the audio plugged into inputs 1 and 2 from your URSA Broadcast camera, and the two XLR audio inputs on the camera unit.
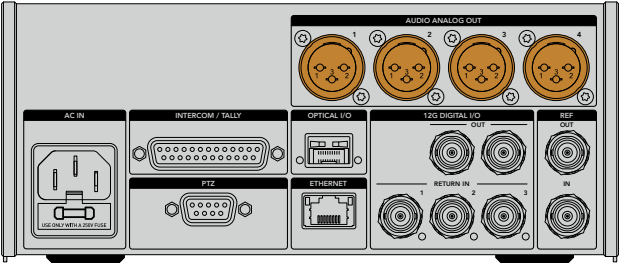
Outputs 1 and 2 on the studio unit correspond to XLR inputs 1 and 2 on URSA Broadcast.

Outputs 3 and 4 on the studio unit correspond to XLR inputs 1 and 2 on the Blackmagic Camera Fiber Converter.

Updating Internal Software

From time to time Blackmagic Design releases updates that can enhance and enable features on your Blackmagic Fiber Converters. We recommend checking the Blackmagic Design website regularly to ensure your fiber converters are using the latest internal software. Update your Fiber Converters using the Blackmagic Camera Setup Utility software.

The USB-C ports on the Blackmagic Fiber converters let you update their internal software.

Updating Blackmagic Camera Fiber Converter

Your Camera Fiber Converter will need to be powered when updating, so we recommend keeping the converter connected to URSA Broadcast during the update process.
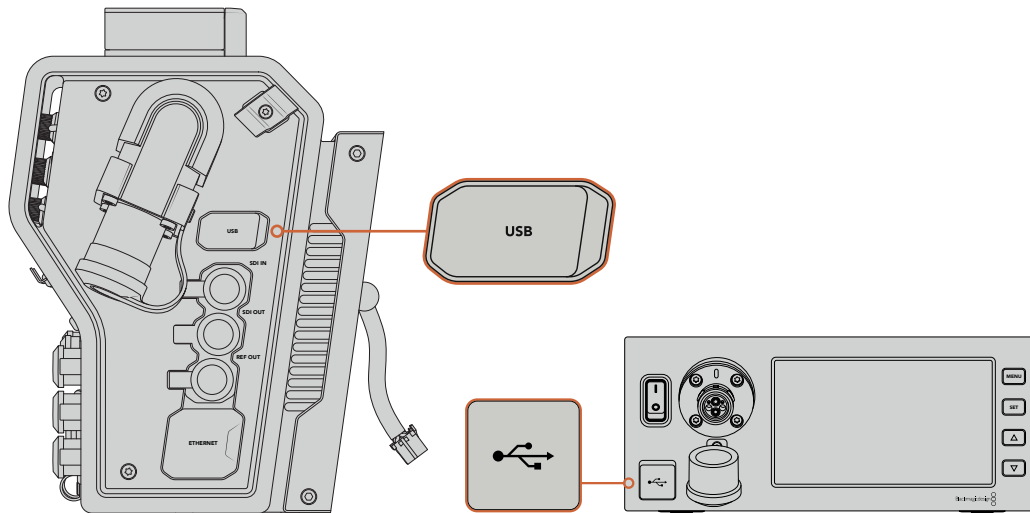
It's important that you unplug the SMPTE Fiber cable from your Camera Fiber Converter, and power your camera via the supplied URSA camera Power Supply instead for consistent power.

Blackmagic Camera Fiber Converter has a USB-C connector on the right side of the unit for updating its internal software. Connect your computer to this USB connector and launch Blackmagic Camera Setup Utility. You will be prompted to update if your computer detects that your Camera Fiber Converter is using an outdated version. Follow the on screen prompts to update your converter's internal software.

Updating Blackmagic Studio Fiber Converter

Your Studio Fiber Converter will need to be powered when updating, so we recommend keeping the IEC power cable plugged into the power connector on the studio unit's rear panel during the update process.

Blackmagic Studio Fiber Converter has a USB-C connector on the front of the unit for updating its internal software. Connect your computer to this USB connector and launch Blackmagic Camera Setup Utility. You will be prompted to update if your computer detects that your Studio Fiber Converter is using an outdated version. Follow the on screen prompts to update your converter's internal software.

Interchangeable Lens Mount

Blackmagic URSA Broadcast is shipped with its own custom B4 mount attached, however you are not locked into using B4 lenses as the camera has an interchangeable lens mount. This means you can remove the original B4 mount and attach an optional PL, EF, or F mount. Blackmagic Design PL, EF, and F lens mount kits are available from Blackmagic Design resellers.

NOTE A B4 mount is available for Blackmagic URSA Mini Pro but this is not the same as the B4 mount on URSA Broadcast camera and is designed for a different sensor. Use only the B4 mount that originally came with your URSA Broadcast camera.
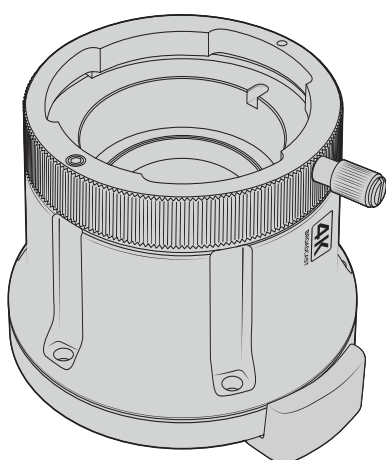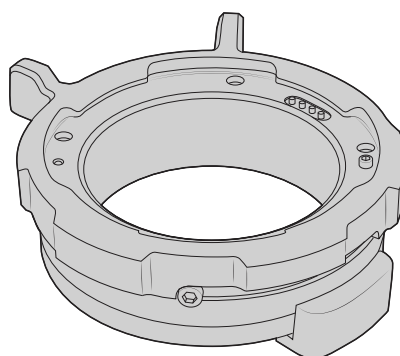
Broadcast B4 mount   PL mount
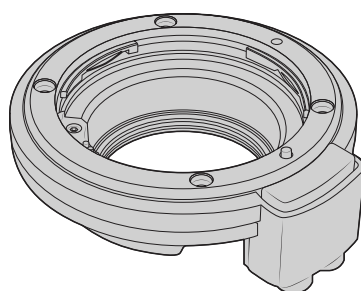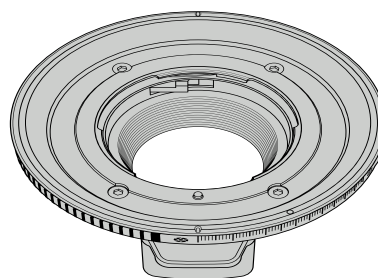
EF mount   F mount

With the ability to interchange four separate mounts, you have the freedom to use different lenses based on the type of assignments you're working on. For example, the EF mount lets you use high quality stills lenses, the B4 mount is perfect if you want to use par-focal zoom lenses for electronic news gathering or wedding shoots, while the PL mount lets you use high end, robust cinema lenses designed for absolute precision and repeatable control. The F mount gives you access to a huge range of Nikkon lenses manufactured from 1959 to today.

Attaching each mount is as simple as unscrewing the original B4 mount and replacing it with the new mount.

Removing the B4 Mount

To remove the B4 mount, simply unscrew the five M3 Hex screws using a 2mm Hex driver.
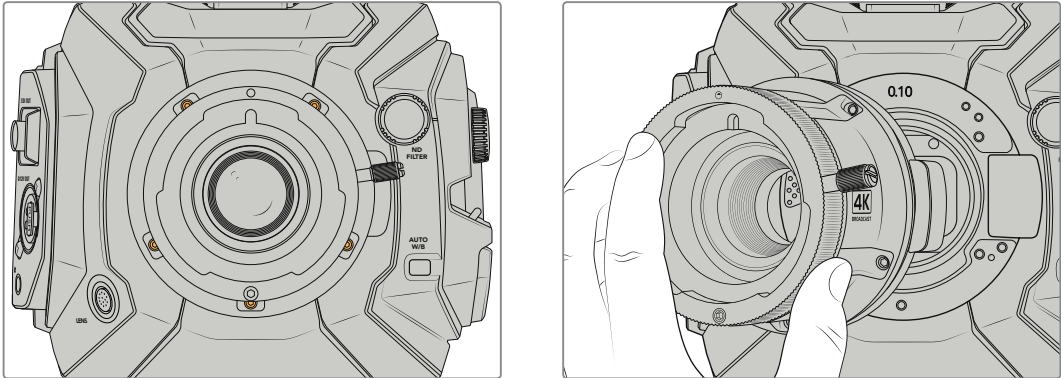
The original B4 mount is easily removed by unscrewing the five
M3 Hex screws and gently lifting the mount from the camera body

> **NOTE** When removing the original B4 mount, make sure the 0.10mm and shim underneath the mount always stays attached to your camera.

Keep reading this section for details about the PL, B4, and EF lens mount kits and how to install each mount to your URSA Broadcast.

Blackmagic URSA Mini Pro EF Mount

The EF mount lets you attach EF stills lenses to your URSA broadcast.

The EF mount kit includes:
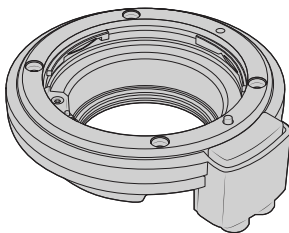
1x EF mount

The EF mount lets you attach common EF stills lenses.

1 x Shim set

The shim set includes the following thicknesses:

0.50mm	0.18mm	0.10mm
0.30mm	0.15mm	0.05mm
0.20mm	0.12mm	0.025mm
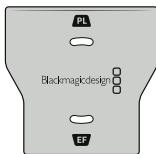
1x Baffle tool

The baffle in the EF mount is not removable, however we have included a baffle tool in the EF kit as a spare item you can use if you also have the PL mount.
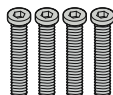
4 x 2mm Hex M3 x 18mm mount screws

The four M3 x 18mm Hex screws are exclusive to the EF mount so you can keep the screws together with the respective mount.

Tools Required

When attaching the EF mount, you will need a 2mm Hex driver. While it's not absolutely required, we recommend using a torque wrench able to accurately set a maximum torque of 0.45Nm to reduce the potential of over tightening the screws.
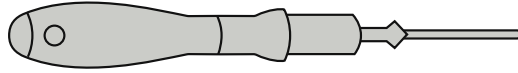
2mm Hex driver

Attaching the EF Mount
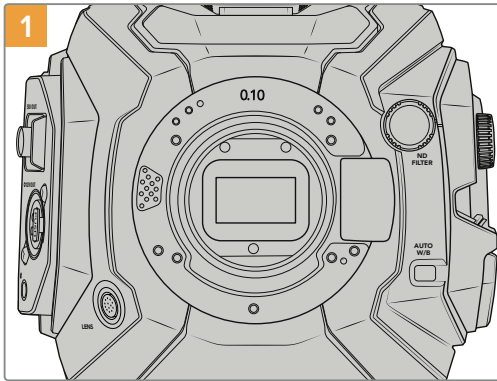
Place Blackmagic URSA Broadcast vertically on a solid, clean bench top to ensure that the mount can be inserted vertically. If changing from the PL to the EF mount, ensure that you have removed the PL baffle before inserting the EF mount.
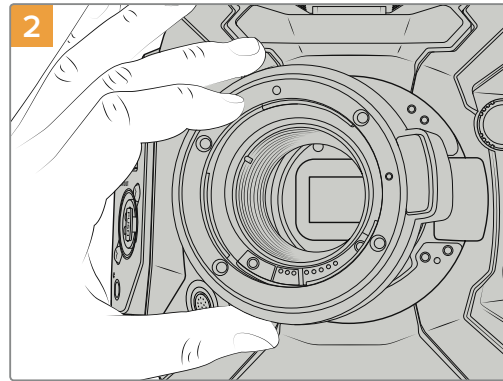
Carefully place the Blackmagic URSA Mini Pro EF mount onto the camera body ensuring the red dot is at the 12 o'clock position.

Loosely turn the four mounting screws until initial contact is made with the shoulder of the lens mount.

Using the 2mm Hex driver, or torque wrench with 2mm Hex key, apply one full turn of pressure to mounting screw 1, followed by one full turn to screw 2, and repeat for screw 3 and then 4. Continue to apply one full turn to each screw in the sequence above until all screws have reached the maximum torque of 0.45Nm.

NOTE When removing the EF mount, simply follow the instructions in reverse order from step 4 to step 1.

To attach an EF mount lens:

1 Align the dot on your lens with the dot on the camera mount. Many lenses have a visual indicator, for example a blue, red or white dot.

2 Insert the lens into the mount and twist clockwise until it locks into place.

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.
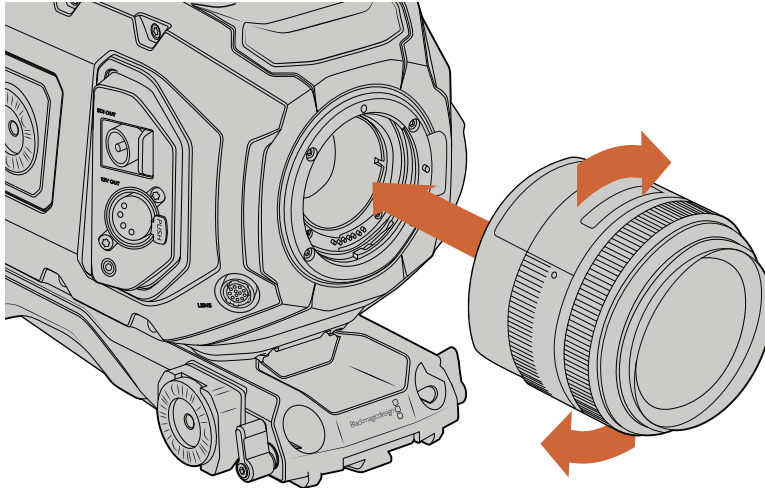
Attaching and removing an EF mount lens

Blackmagic URSA Mini Pro F Mount

With the Blackmagic URSA Mini Pro F Mount attached to your URSA Broadcast, you can use F mount lenses. Nikon's F mount system stretches back to 1959, and F mount lenses are still made today. This means that with the Blackmagic URSA Mini Pro F mount, you have access to a huge range of vintage and contemporary lenses.
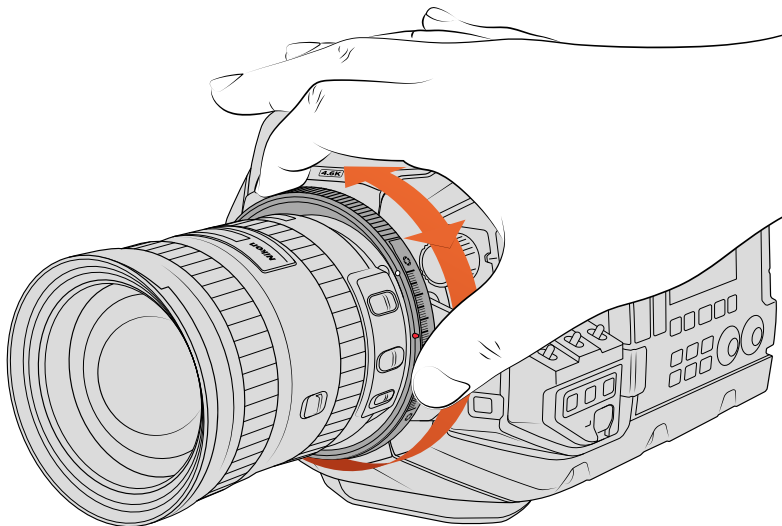
Use URSA Mini Pro F mount's iris adjustment ring to smoothly change the aperture of F mount lenses.

It's worth noting that the F mount is a mechanical mount. This means it does not offer electronic focus or iris control. Instead, the F mount features a mechanical iris adjuster. This moves the the iris pin present in most Nikon lenses to achieve smooth cine style iris adjustment.

With an F mount mounted, simply move the iris adjuster on Blackmagic URSA Mini Pro F mount to achieve your prefered exposure. The red dot on the F mount and the markings on the iris adjuster let you mark iris settings to easily return to particular exposure or depth of field settings.

> **NOTE** When removing the F mount, simply follow the instructions in reverse order from step 4 to step 1.

Nikon AF-D lenses

When using Nikon AF-D series lenses, it is necessary to lock your lens aperture to its smallest setting, such as f/22, to use the full range of Blackmagic URSA Mini Pro F mount's iris adjustment ring.
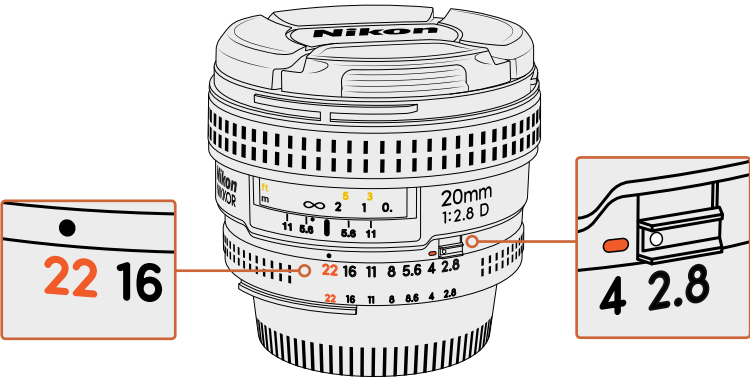
Setting and locking AF-D lenses to their smallest aperture is easiest before mounting to your camera.

The F mount kit includes:
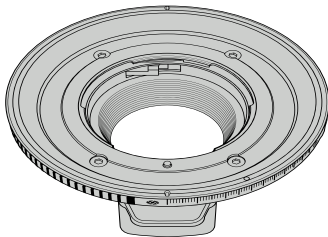
1x F mount

The F mount lets you attach common F stills lenses.

1 x Shim set

The shim set includes the following thicknesses:

0.50mm	0.18mm	0.10mm
0.30mm	0.15mm	0.05mm
0.20mm	0.12mm	0.025mm
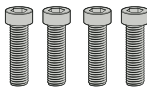
4 x 2mm Hex M3 x 18mm mount screws

The four M3 x 18mm Hex screws are used in the EF and F mount so it is best to keep the screws together with the respective mount.

The F mount kit also comes with a full spare sets of screws in case the originals are misplaced.

Tools Required

When attaching the F mount, you will need a 2mm Hex driver. While it's not absolutely required, we recommend using a torque wrench able to accurately set a maximum torque of 0.45Nm to reduce the potential of over tightening the screws.
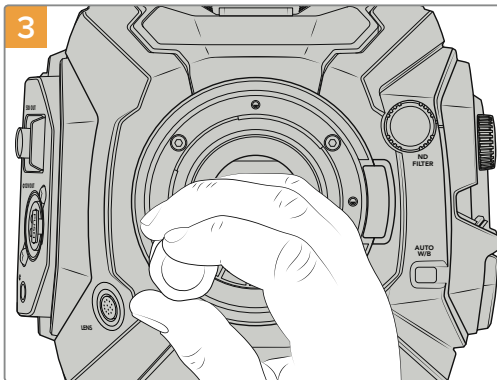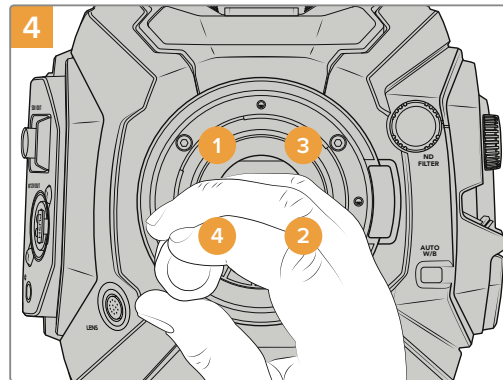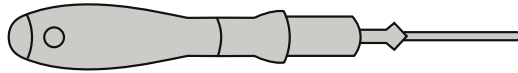

2mm Hex driver

Attaching the F Mount
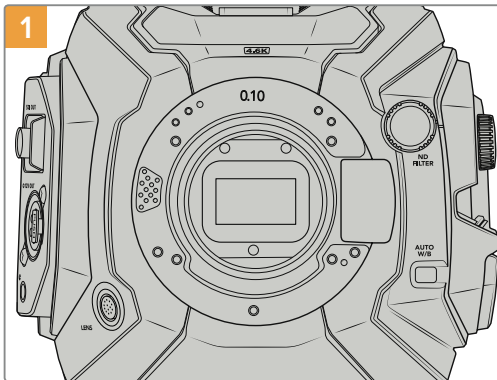
Place Blackmagic URSA Broadcast vertically on a solid, clean bench top to ensure the mount can be attached vertically. If changing from the PL to the F mount, ensure that you have removed the PL baffle before inserting the F mount.
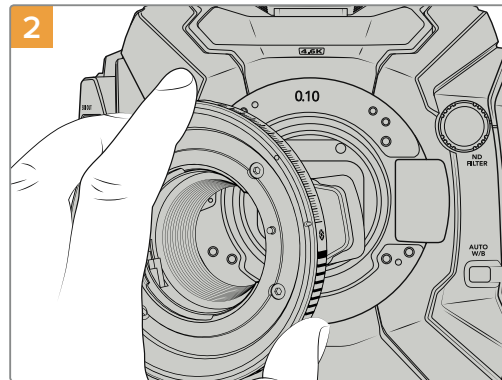
Carefully place the Blackmagic URSA Mini Pro F mount onto the camera body ensuring the white dot is at the 2 o'clock position.

Loosely turn the four mounting screws until initial contact is made with the shoulder of the lens mount.

Using the 2mm Hex driver, or torque wrench with 2mm Hex key, apply one full turn of pressure to mounting screw 1, followed by one full turn to screw 2, and repeat for screw 3 and then 4. Continue to apply one full turn to each screw in the sequence above until all screws have reached the maximum torque of 0.45Nm.

NOTE Because of the way URSA Mini Pro F mount works, a small number of F mount lenses are not compatible.

These are Nikkor AF-S E series lenses, which do not offer mechanical iris control, and Nikon PC-E tilt-shift lenses like the 24mm f/3.5D PC-E and 85mm PC-E.

To attach a F mount lens:
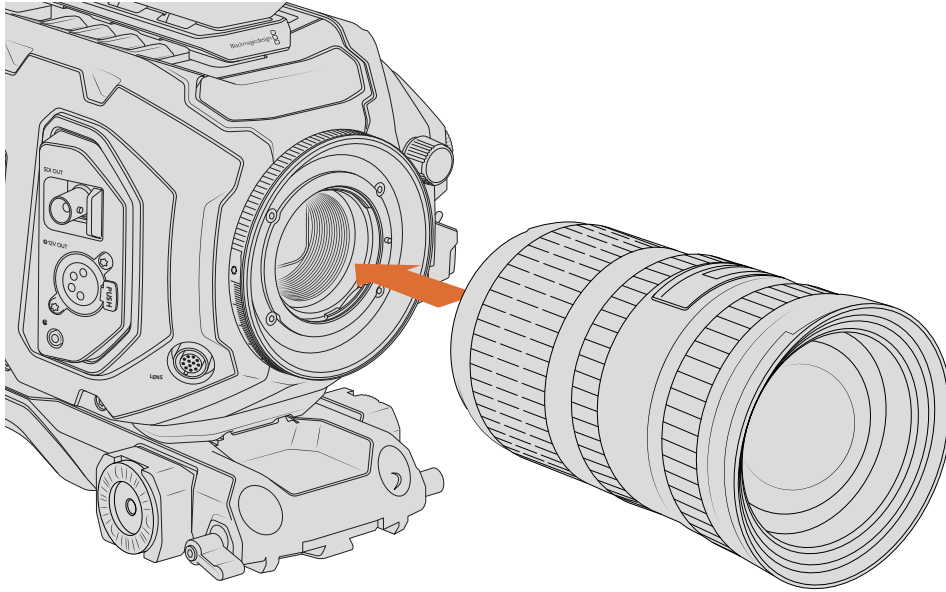
Attaching and removing a F mount lens on Blackmagic
URSA Broadcast with the optional F mount fitted

1   Align the dot on your lens with the dot on the camera mount. Many lenses have a visual
indicator, for example a blue, red or white dot.

2   Insert the lens into the mount and twist counterclockwise until it locks into place.

3   To remove the lens, hold down the locking button, rotate the lens clockwiseuntil its dot
or indicator reaches the 2 o'clock position, and gently remove.

NOTE: Blackmagic URSA Mini Pro F mount features a mechanical iris adjustor. To use
older style F mount lenses with built in focus rings with this mount, your lenses aperture
will need to be set and locked to its smallest setting, such as f/22.

Blackmagic URSA Mini Pro PL Mount

Attaching the PL mount to your URSA Broadcast lets you use high end precision cinema lenses
and Super 16mm PL lenses for feature film and television production.

TIP: Many Super 16 lenses match well with URSA Broadcast's sensor size, giving you
the same field of view and depth of field characteristics as Super 16 when using them
on URSA Broadcast with a PL mount.

The PL mount kit includes:
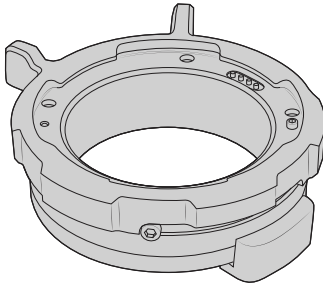
1x PL mount

The PL mount is shipped with a protective dust cap.

1 x Shim set

The shim set includes the following thicknesses:

0.50mm	0.18mm	0.10mm
0.30mm	0.15mm	0.05mm
0.20mm	0.12mm	0.025mm
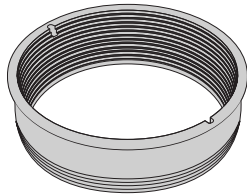
1x PL baffle

The PL mount baffle helps to control and direct the light entering the sensor.
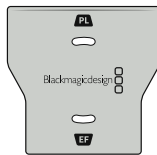
1x Baffle tool

Use the PL baffle tool to tighten the baffle in your camera.

5 x 2mm Hex M2.5 x 22mm mount screws

The five M2.5 x 22mm Hex screws are exclusive to the PL mount so you can keep the screws together with the respective mount.

Tools Required

When attaching the PL mount, you will need a 2mm Hex driver. While it's not absolutely required, we recommend using a torque wrench able to accurately set a maximum torque of 0.45Nm to reduce the potential of over tightening the screws.
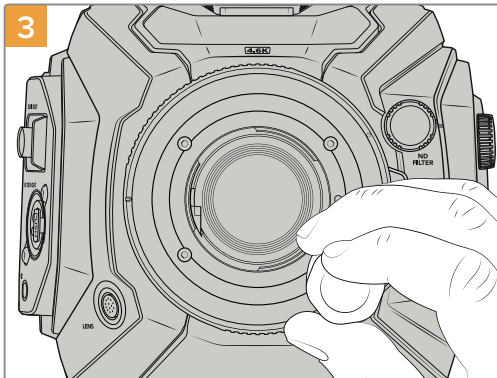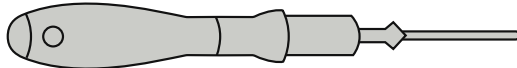
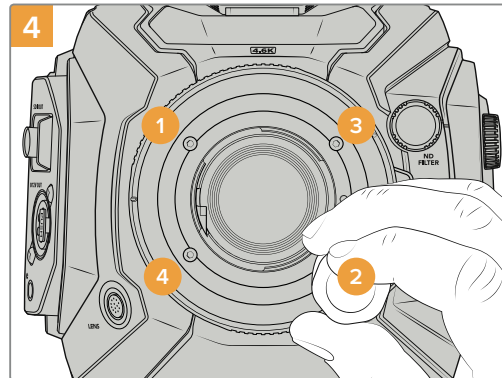2mm Hex driver

Attaching the PL Mount
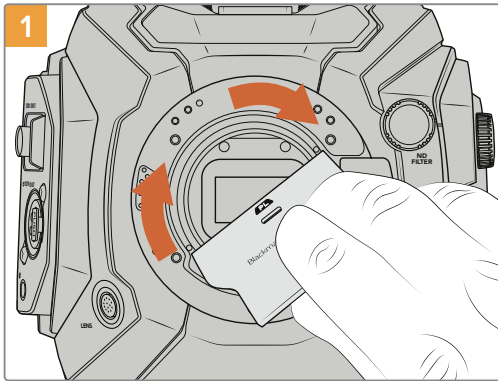
Gently insert the PL baffle into the center of the lens mount and turn until it is finger tight. Use the wide end of the baffle tool to tighten the baffle slightly. You need just enough pressure to keep it in place.
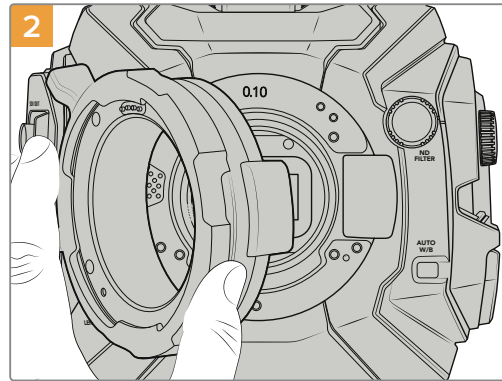
Your camera should have a 0.10mm plastic shim, and a 0.10mm and 0.50mm metal shim fitted. Ensure the pins on the PL mount for Cooke /i Technology are located at the 12 o'clock position.
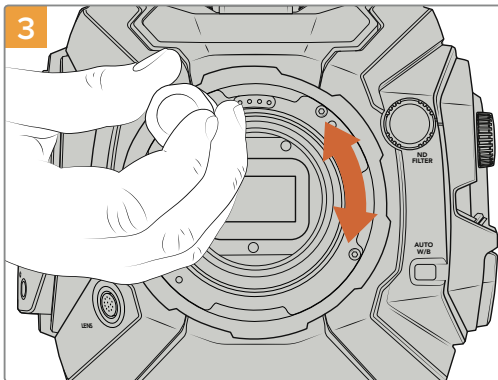
Loosely turn the five mounting screws until initial contact is made with the shoulder of the lens mount. To access all five screws, you will need to rotate the PL locking ring, as some holes are obscured when the ring is either open or closed.


Using the 2mm Hex driver, or torque wrench with 2mm Hex key, apply one full turn of pressure to mounting screw 1, followed by one full turn to screw 2. Repeat for screws 3 and 4, then 5. Continue to apply one full turn to each screw in the sequence above until all screws have reached the maximum torque of 0.45Nm.

NOTE When removing the PL mount, simply follow the instructions in reverse order from step 4 to step 1. Don't forget to remove the PL baffle and store it securely with the PL mount.

To attach a PL mount lens:

1 Open your camera's PL locking ring by rotating it counterclockwise until it stops.

2 Align one of the lens' four flange notches with the locating pin on the camera mount. Be sure to align the lens for easy viewing of the lens marks.

3 Tighten the PL locking ring by rotating it clockwise. If attaching a PL lens with a servo unit to URSA Broadcast, you can also connect the 12 pin broadcast connector for servo control.

4   To remove the lens, rotate the locking ring counterclockwise until it stops, then gently remove the lens by pulling it directly out from the camera body. There is no need to rotate the lens.
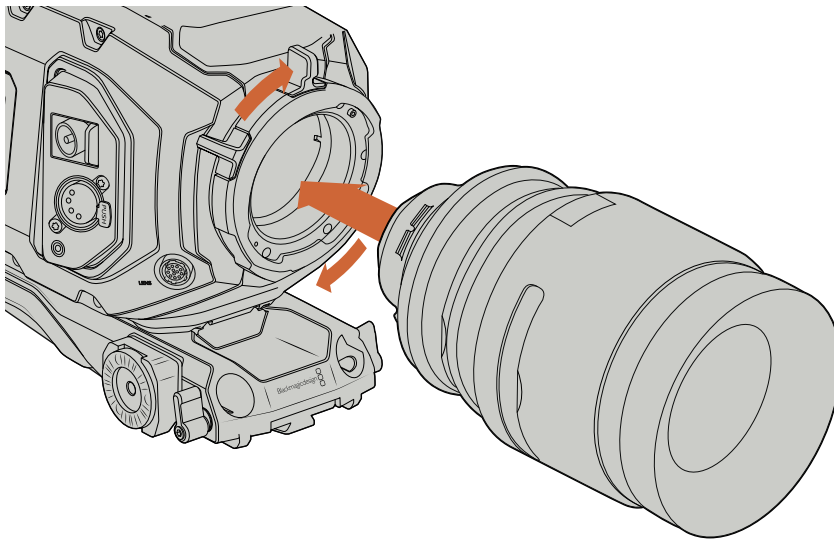
Attaching and removing a PL lens

Cooke Lenses /i Technology Support

The optional Blackmagic Design PL mount available for URSA Broadcast and URSA Mini Pro 4.6K features four pins at the 12 o'clock position that are used to communicate with lenses featuring Cooke's /i Technology interface. The lenses that support this interface include lenses from Canon, Cooke, Fujinon, Leica and Zeiss. This lets you record lens information in your clips' metadata such as the lens model, focal length, aperture setting, focus distance and other lens specific information.
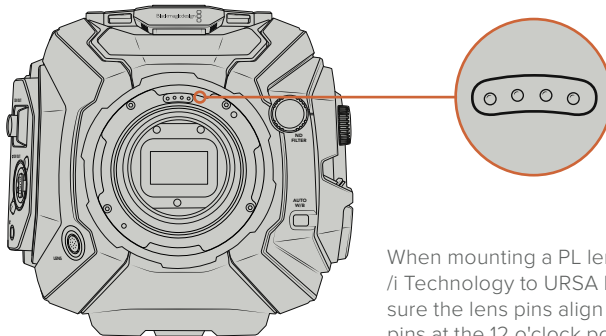
When mounting a PL lens with /i Technology to URSA Broadcast, make sure the lens pins align with the mount pins at the 12 o'clock position

The information that is recorded as metadata via Cooke's /i Technology interface can be very helpful in post production and VFX. Knowing the lenses used in production and their precise settings can be helpful in the event that the setup needs to be replicated at a later date.

This detailed information can also be utilised by powerful applications such as DaVinci Resolve and Blackmagic Fusion for a wide variety of advanced functions. For example, the recorded metadata can be used to simulate the specific lens in 3D space, or correct lens distortions.

PL Mount Servo Lenses

URSA Broadcast supports control of PL 35mm lenses with servo handgrips. When the lens is plugged in to the 12-pin broadcast connector on the camera, URSA Broadcast will provide power and control signals to your lens in the same way it does with B4 lenses. For more information refer to the 'Using Servo Zoom Lenses' section in this manual.

Blackmagic URSA Broadcast B4 Mount

The Broadcast B4 mount is the mount that your URSA Broadcast camera originally ships with. If you have removed the mount to fit the optional Blackmagic URSA PL, EF, or F mount, follow these instructions to reattach your B4 mount.

### Tools Required

When attaching the B4 mount, you will need a 2mm Hex driver. While it's not absolutely required, we recommend using a torque wrench able to accurately set a maximum torque of 0.45Nm to reduce the potential of over tightening the screws.
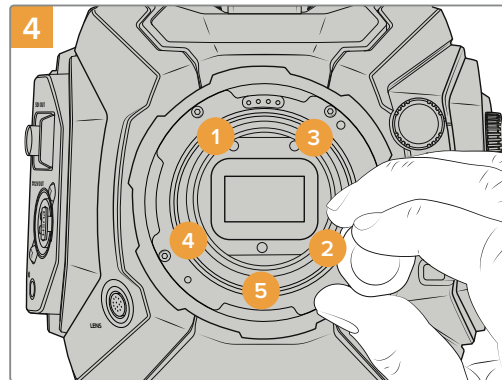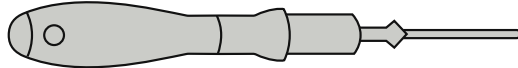

2mm Hex driver

Attaching the B4 Lens Mount
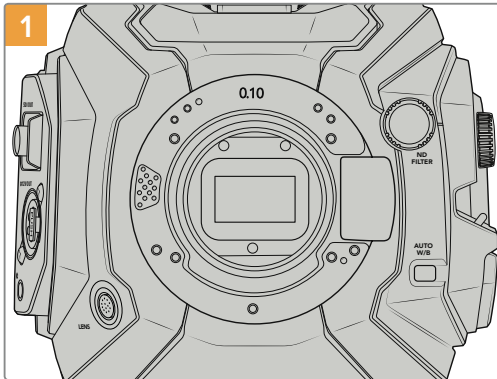
Place Blackmagic URSA Broadcast vertically on a solid, clean bench top to ensure that the mount can be inserted vertically.
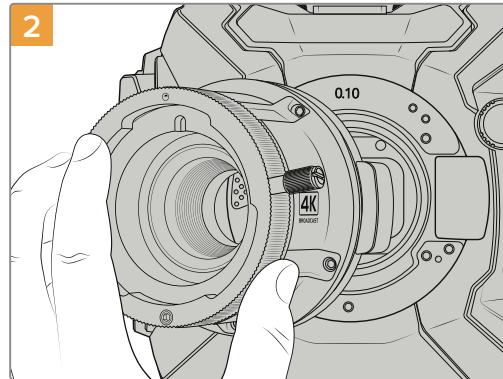
Keeping the original .10mm shim in place, gently put the Blackmagic URSA Broadcast B4 mount onto the camera body ensuring the red dot is at the 12 o'clock position.
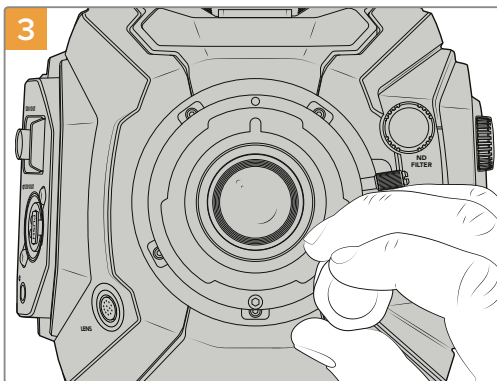
Loosely turn the five mounting screws until initial contact is made with the shoulder of the lens mount.
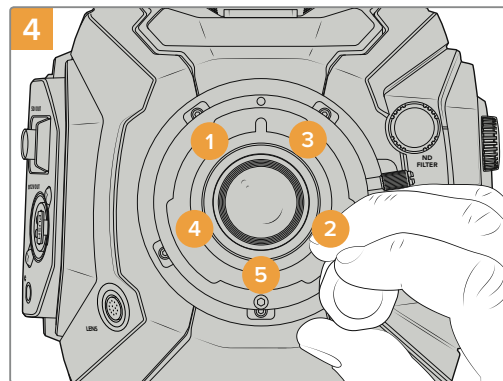
Using the 2mm Hex driver, or torque wrench with 2mm Hex key, apply one full turn of pressure to mounting screw 1, followed by one full turn to screw 2. Repeat for screws 3 and 4, then 5. Continue to apply one full turn to each screw in the sequence above until all screws have reached the maximum torque of 0.45Nm.

NOTE When removing the B4 mount, simply follow the instructions in reverse order from step 4 to step 1.

Shimming Lens Mounts

What is a Shim?

Shims are thin disks of varying thickness that let you make fine adjustments to the distance between your lens and URSA Broadcast's sensor. This distance is commonly known as the flange focal distance, or back focus, and can change slightly due to variables such as lens age and the environmental conditions of your shoot.
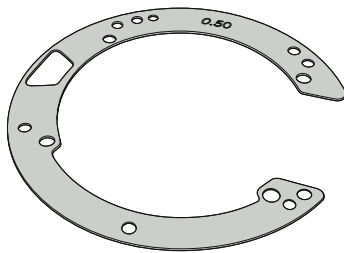
URSA Broadcast Shim

Shims are placed between the lens mount and the camera body so the distance from your subject to the sensor matches the focus marks on your lens. These are most commonly used for PL lenses. These cine lenses are manually focused and have very accurate focal distance markings on their barrels. Shims are also used for URSA Broadcast's interchangeable lens mount.

Your Blackmagic URSA Broadcast is supplied with a 0.10mm shim already installed. The Blackmagic URSA Mini Pro 4.6K Shim Kit contains additional shim sets of various thicknesses, and can be purchased from your local Blackmagic Design reseller. A set of shims is also included with all mount kits and are compatible with URSA Broadcast. Use shim thicknesses depending on your back focus requirements.

Blackmagic URSA Mini Pro Shim Kit

Your URSA Broadcast camera ships three shims, a 0.10 mm plastic shim and 0.10 and 0.50 mm metal shims. These shims set the proper focal distance for your URSA Broadcast camera's B4, EF, and F mount lenses. Very occasionally, you will need to use additional shims to suit PL lenses that require very specific clearances to maintain accurate focus marks. Blackmagic URSA Mini Pro Shim Kit includes the following additional tools. Other thicknesses are included in the kit in case you need to re-shim your camera to suit PL lenses that may require slightly different clearances to maintain accurate focus marks.

The shim kit includes:
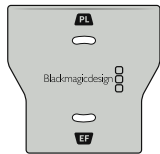
1x Baffle tool

Use the baffle tool to loosen or tighten the PL baffle when removing or attaching the PL mount to your URSA Broadcast.

1 x Shim set

The shim set includes the following thicknesses:

0.50mm	0.18mm	0.10mm
0.30mm	0.15mm	0.05mm
0.20mm	0.12mm	0.025mm

Shimming mounts

To shim your camera's mounts you'll need a torque wrench able to accurately set a maximum torque of 0.45Nm, with a 2.0mm Hex key and driver.
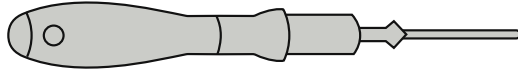
Torque wrench
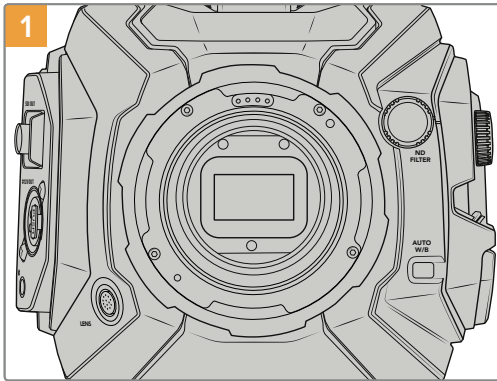
Place URSA Broadcast vertically on a solid, clean bench top and remove your lens or dust cap. The filter covering the sensor will be exposed for the duration of the shimming process, so it's important to keep the filter as clean as possible. Be careful not to touch the filter while shimming mounts.
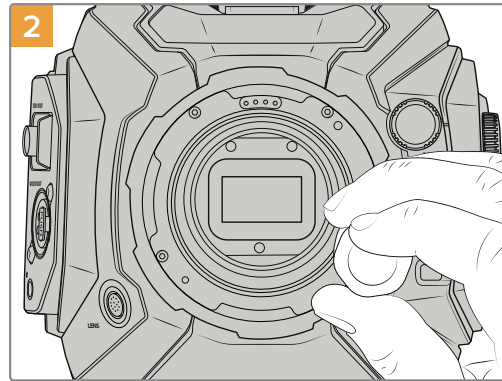
Remove the screws holding your mount in place using a 2.0mm Hex driver. For more information on removing particular mounts, see the 'interchangeable lens mount' section in this manual.
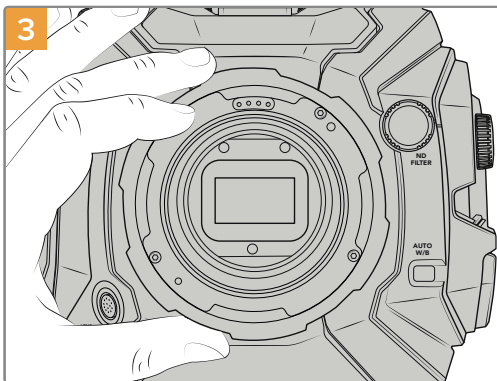
Carefully lift the lens mount away from the camera body. Keep the screws safely located close to the lens mount.
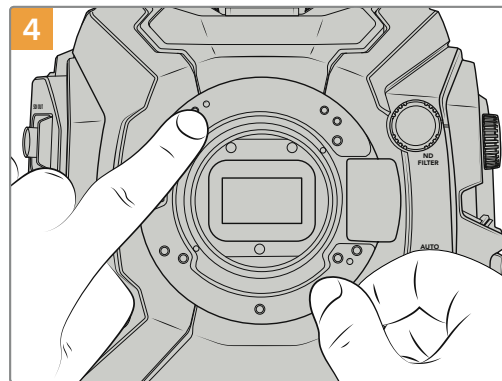
Note the alignment of the existing shim with the alignment pin at the 11 o'clock position.

5
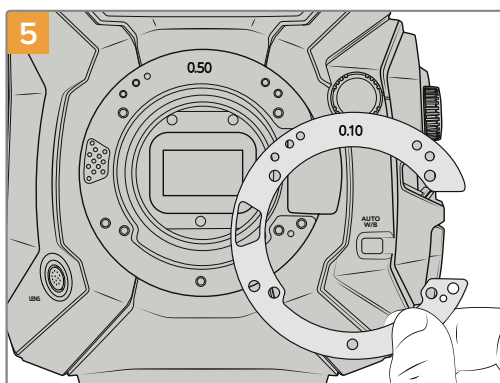
Add or remove shims to slightly change the depth of your mount. It is a good idea to start with a small shim thickness such as a 0.10mm.

6
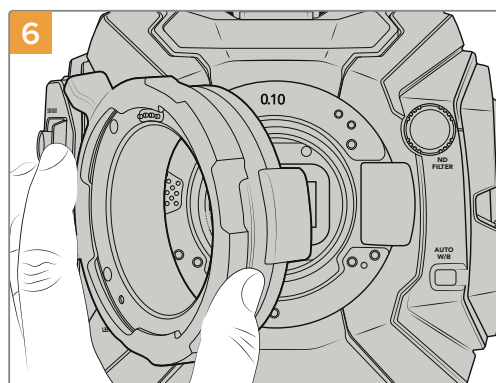
Place your lens mount onto the camera body, tighten screws and remount your lens and check if your lens focus marks are now in alignment with the focal distance. If not then continue steps 1 to 6, adjusting shimming a small amount at a time until your lens is hitting hits marks.

URSA Mini SSD Recorder

Blackmagic URSA Mini SSD Recorder is an optional module which attaches to the rear of URSA Broadcast. This recorder allows you to record footage, including 4.6K RAW files, to high capacity and inexpensive solid state drives, or 'SSDs'.
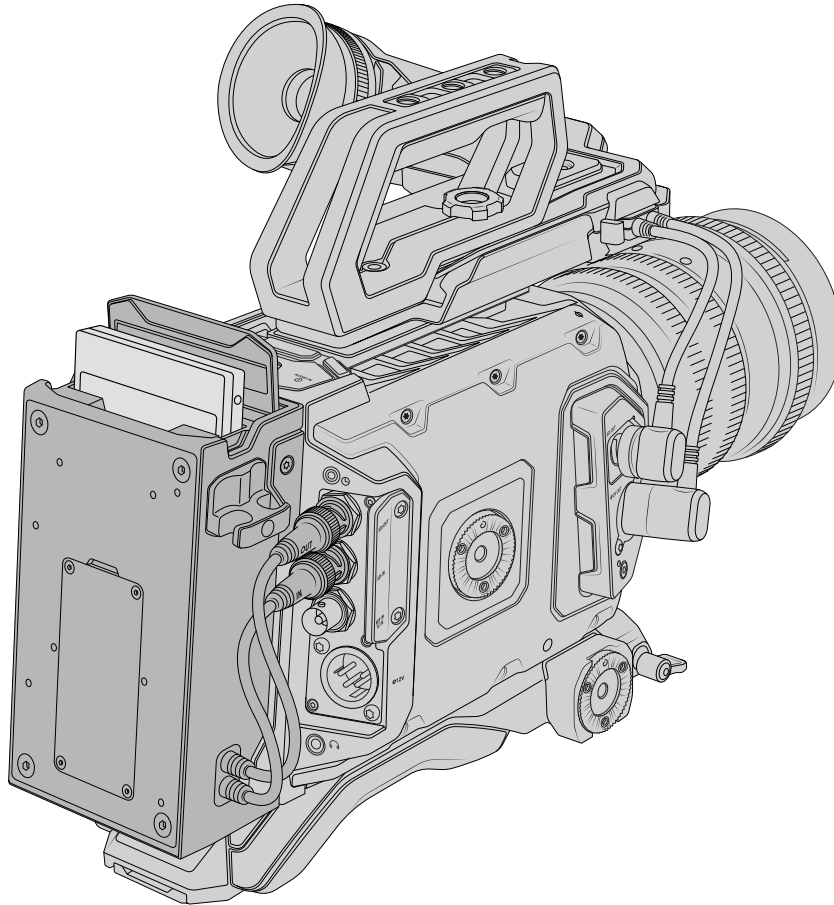
When attaching URSA Mini SSD Recorder, you will need the following tools:

- 1 x phillips head screwdriver
- 1 x T10 torx screwdriver
- 1 x 2mm hex key driver

To attach the URSA Mini SSD Recorder to your URSA Broadcast you will need a large phillips head screwdriver , a T10 torx driver, and a 2mm hex key driver

Mounting and connecting URSA Mini SSD Recorder

URSA Mini SSD Recorder mounts to the back of URSA Broadcast directly behind the camera body, using your camera's rear SDI in and SDI out BNCs to pass data to and from URSA Mini SSD recorder. It's worth noting that because the recorder uses these SDI inputs and outputs, you can't simultaneously connect your camera to an ATEM switcher.

> **TIP** URSA Mini SSD Recorder features a passthrough cable for your camera's battery power supply, so you can attach V-mount or gold mount batteries to the rear of the camera behind the recorder.
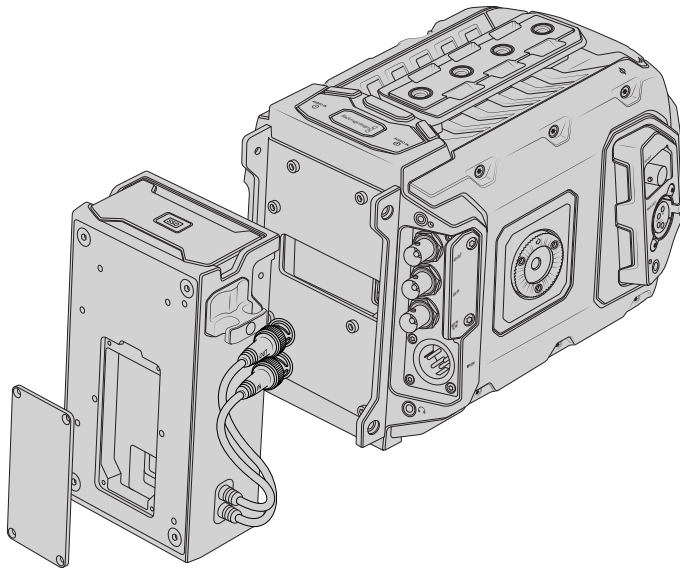
> **NOTE** Before installing URSA Mini SSD Recorder, you'll need to update your camera's internal software to version 4.8 or higher using Blackmagic Camera Setup Utility. For more information on updating your camera firmware see the section 'Blackmagic Camera Setup Utility' in this manual.

To mount and connect URSA Mini SSD Recorder:
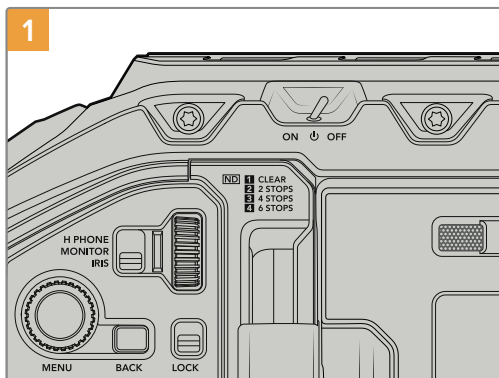
Power off URSA Broadcast by moving the 'power' switch to 'off'.
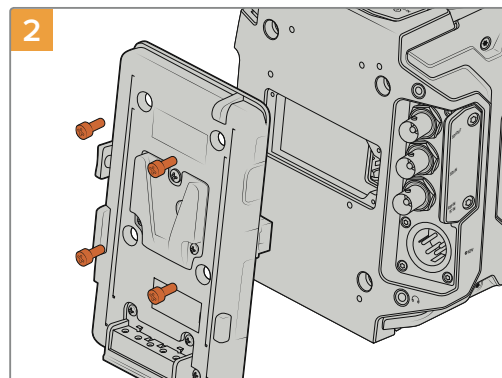
Unmount any battery plates currently fitted to your camera. For more information on mounting and unmounting battery plates, see the section 'mounting batteries' in this manual.

3
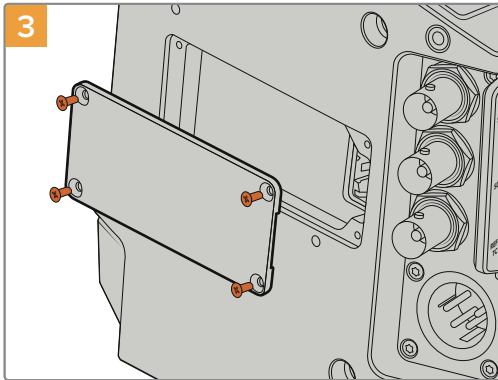
If no battery was fitted to your camera, you may need to remove the cover over the molex socket on your camera's rear panel. Use a philips head screwdriver to remove the four M3 screws holding the cover in place.

4
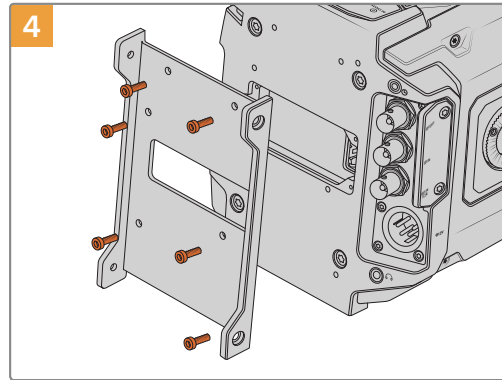
Attach URSA Mini SSD Recorder's mounting bracket using 6 x T10 torx screws.

5
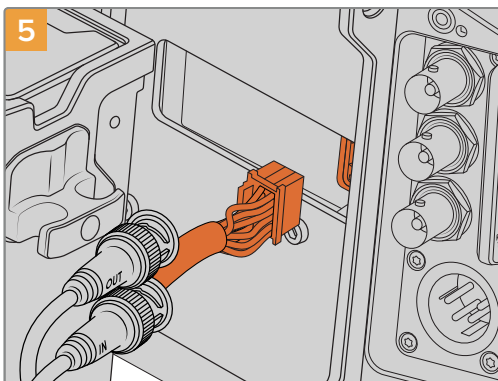
Plug the molex connector on URSA Mini SSD Recorder into the molex socket on your camera's rear panel.

6
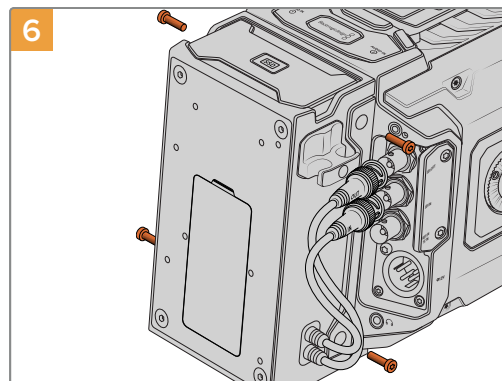
Attach URSA Mini SSD Recorder to the mounting bracket using 2 x T10 torx screws on the left and right side of the brackets.

7
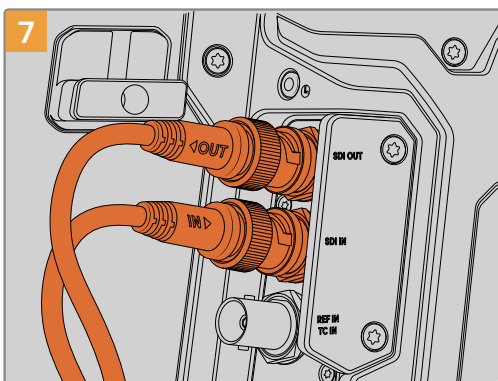
Connect the SSD Recorder's SDI In and SDI out cables to the SDI inputs and outputs on the back of your camera. The SSD Recorder's cables are marked 'in' and 'out' to help match them to the appropriate connector on your camera.

8
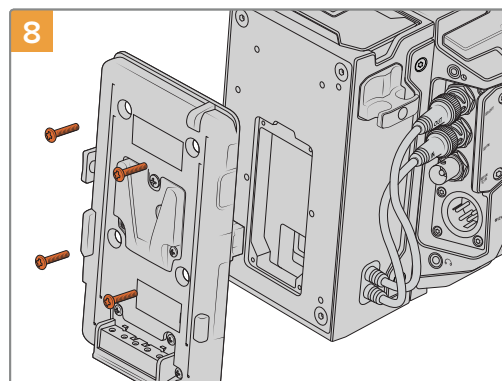
If you want to use a battery plate with URSA Mini SSD Recorder, use a 2mm hex key driver to remove the four M3 screws holding the molex socket cover panel in place. Once the molex socket is uncovered, attach a battery plate using the steps outlined in the section 'mounting batteries' in this manual.

Using URSA Mini SSD Recorder

When URSA Mini SSD Recorder is connected and an SSD is loaded, the recorder takes over from URSA Broadcast's number '2' storage slot. You'll see an 'SSD' indicator over slot 2 on your camera's storage manager when URSA Mini SSD recorder is in use.

When an SSD is inserted into URSA Mini SSD Recorder, your camera's storage manager will display 'SSD' and 'recorder' indicators over storage slot 2.

This means that recording, playback and storage management is exactly the same for SSDs as it is for CFast or SD cards. For general information on storage management, as well as specific instructions for choosing SSDs, see the 'storage media' section of this manual.

Status LEDs

URSA Mini SSD Recorder has two status lights on its left panel, 'SDI' and 'SSD.' The brightness of these indicators can be set to 'low,' 'medium,' 'high' or 'off.' in your camera's 'setup' menu.

SDI

The top LED, marked 'SDI' indicates URSA Mini SSD Recorder's connection to your camera.

The LED provides the following indicators

- **Off**
  If the SDI indicator is off, URSA Mini SSD Recorder is not receiving power. If your camera is powered on and this indicator doesn't light, check the molex connection to URSA Mini SSD Recorder.
- **Orange**
  URSA Mini SSD Recorder is powered but the SDI connector is not plugged in, or plugged in incorrectly.
- **White**
  URSA Mini SSD Recorder is powered and the SDI link is connected properly.

SSD

The 'SSD' indicator shows the status of the SSD currently inserted. This LED provides the following status indicators:

- **Green**
  Your URSA Mini SSD Recorder will show a short green light when you insert an SSD into it. This is shown while it is verifing the SSD. When the indicator turns off your SSD Recorder is ready to record. The status light will also be green while footage is being played back from the SSD.
- **Red**
  Your URSA Mini SSD Recorder will show a red light while it is recording to SSD. When the space on your SSD is running low the red light will begin to flash slowly.

A fast flashing red light indicates that SSD is dropping frames. If this happens please check that you are using a disk from our recommended list of SSDs and that you are recording at a data rate that is compatible with your media.

- **Orange**
  If a problem has occurred while mounting the SSD the status light will go Orange. This may be the result of an improperly formatted or incompatible SSD. See your See the 'storage media' section in this manual for a list of compatible SSDs and formatting instructions.

TIP If the 'SSD' LED indicates a drive mounting error it may need to be 'initialized' on a mac or PC using disk utility or disk management.

Updating URSA Mini SSD Recorder's internal software

Update your URSA Mini SSD Recorder using the Blackmagic Camera Setup Utility software. The SSD Recorder will need to be powered when updating, so we recommend keeping the SSD Recorder connected to URSA Broadcast during the update process. This also means your camera will need to supply consistent power, so be sure to plug into external power.

URSA Mini SSD Recorder has a USB-C connector on the underside of the module for updating its internal software. Connect your computer to this USB connector and launch Blackmagic Camera Setup Utility. You will be prompted to update if your computer detects that your URSA Mini SSD Recorder is using outdated version. Follow the on screen prompts to update your URSA Mini SSD Recorder's internal software.
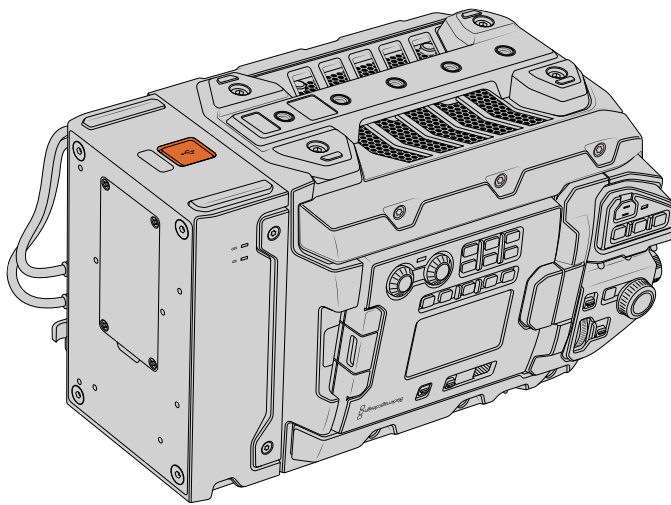
Use the USB-C connector on the underside of
URSA Mini SSD Recorder to update the internal software

NOTE Refer to the 'Blackmagic Camera Setup Utility' section in this manual for more information.

TIP We recommend updating all your Blackmagic URSA equipment at the same time for optimized performance.

Understanding Studio Camera Control

Blackmagic URSA Broadcast can be used as a studio camera and controlled from an ATEM switcher using the Camera Control feature in ATEM Software Control. This lets you add a camera with large sensor picture quality and amazing dynamic range to your broadcast studio and control it just as you would any studio camera.

ATEM Camera 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 URSA Broadcast's 12G SDI input, your camera will detect the control packets in the SDI link and allow you to control features in the camera itself.

Connecting your URSA Broadcast

1   Connect your Blackmagic URSA Broadcast's 12G-SDI Out to any SDI In on the ATEM switcher.

2   Connect any one of the ATEM switcher's SDI outputs, except down converted or multi view outputs, to your URSA Broadcast's 12G-SDI input. Camera control signals are not sent via the multi view and down converted SDI outputs.

3 On your URSA Broadcast, navigate to 'ATEM Camera ID' in the 'setup' menu and set your camera's ATEM ID to match the switcher input. For example, if URSA Broadcast 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.

4 In the 'setup' menu select your 'reference source'. Unless you have a genlock signal being sent to all of your cameras and your switcher, we recommend setting 'reference source' to 'program' when attached to ATEM.

5 Navigate to the 'monitor' menu and ensure that you have selected 'clean feed' for 'main SDI' to ensure that you don't see overlays or the focus box on the SDI output to the ATEM switcher.
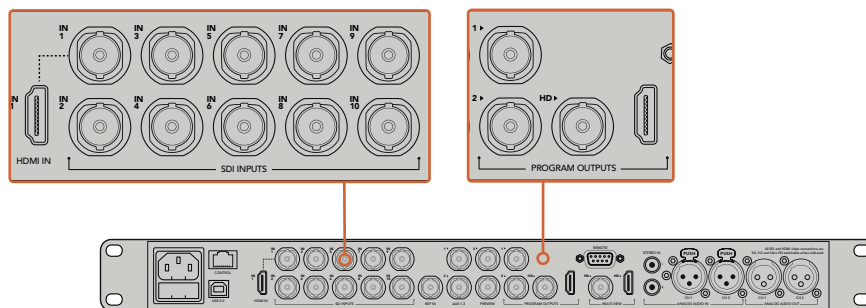
Connect your URSA Broadcast to any of the ATEM switcher's SDI inputs

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.

Click on the settings icon to select the Aux output for camera control

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.

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

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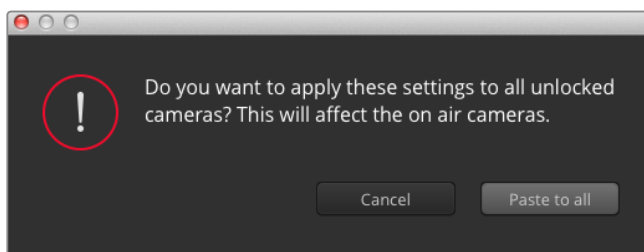
When applying Paste to all, a warning message will appear asking you to confirm your action. This is so you don't accidentally paste new settings to any unlocked cameras that are currently on air

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.

> **NOTE** When connected to ATEM ensure that you have Auto Exposure switched off. If you require Iris, zoom or focus control ensure that you have a lens that can be controlled electronically by the camera.

When using a compatible lens, set the auto exposure setting to 'manual trigger' as detailed in the 'camera settings' section of this manual.

If you're using a B4 or PL lens connected via the broadcast 12 pin connector on URSA Broadcast, make sure the lens iris switch on the handgrip is set to 'A' or 'auto'.

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.
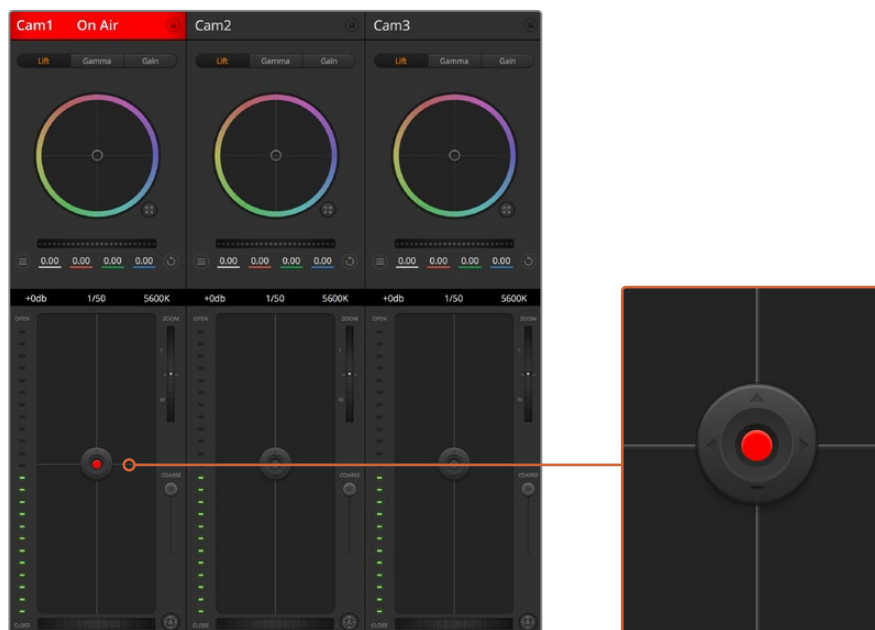
The iris/pedestal control illuminates red when its respective camera is on air

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 effect. For example, EF lenses do not have built in servos that can zoom the lens electronically so will not be zoomable with ATEM camera control.

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 left 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. On B4 lenses with servo zoom control, you will need to set the switch at the bottom of the handgrip to 'servo'.
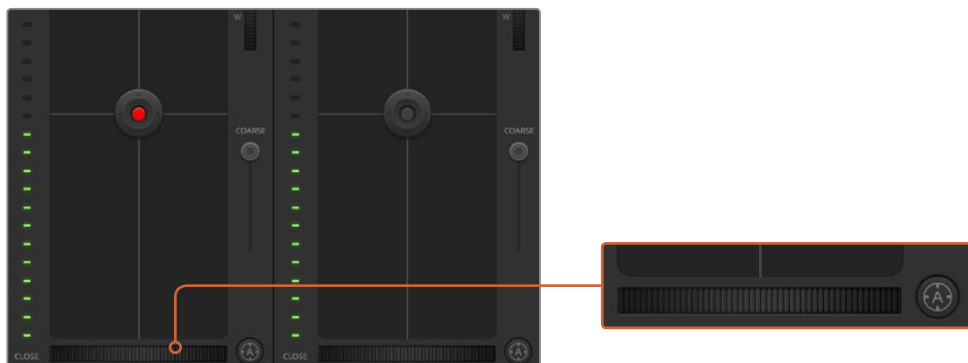
Click on the auto focus button or drag the manual focus adjustment left or right to focus a compatible lens

Manual Focus Adjustment

When you want to manually focus your lens using ATEM Camera Control, 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.

Manual focus control is only available from your switcher when using B4 and PL lenses with servo focus controls. As EF lenses do not have servo focus this option is not available when using EF lenses.

Camera Gain

When operating in varying light conditions, you might want to increase or decrease your camera's gain to avoid under exposing your images. To do this click the left arrow to decrease gain and the right arrow to increase gain.

Your ATEM switcher will display gain in dB. This corresponds to the gain settings on your camera in the following way:

Gain
-6
0
+6
+12

The gain settings are displayed using dB indicators

Shutter Speed Control

Shutter speed control is used to change your URSA Broadcast's shutter speed.

 The shutter speed control is located 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 clicking the left or right arrow.
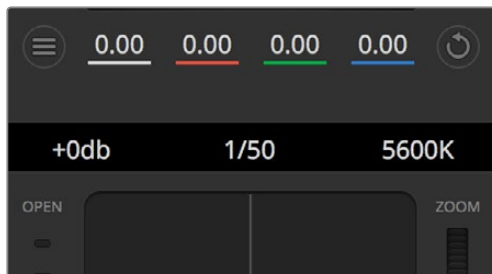
Hovering your mouse pointer over the gain, shutter speed and white balance indicators reveal arrows you can click on to adjust their respective settings

NOTE As ATEM shutter speed control takes priority over the shutter speed selected on your URSA Broadcast, your camera's shutter speed controls are disabled when connected to an ATEM switcher.

It's worth mentioning that when your URSA Broadcast is connected to an ATEM switcher, the shutter speed setting will not be visible in your camera's touchscreen status display, but will be visible in an URSA Viewfinder, if attached. The status display setting will be implemented in a future software update.

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 URSA Broadcast features a DaVinci Resolve primary color corrector built in. If you have used DaVinci Resolve, then creatively, grading in your URSA Broadcast will be identical so you can use your color grading experience for live production. 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.
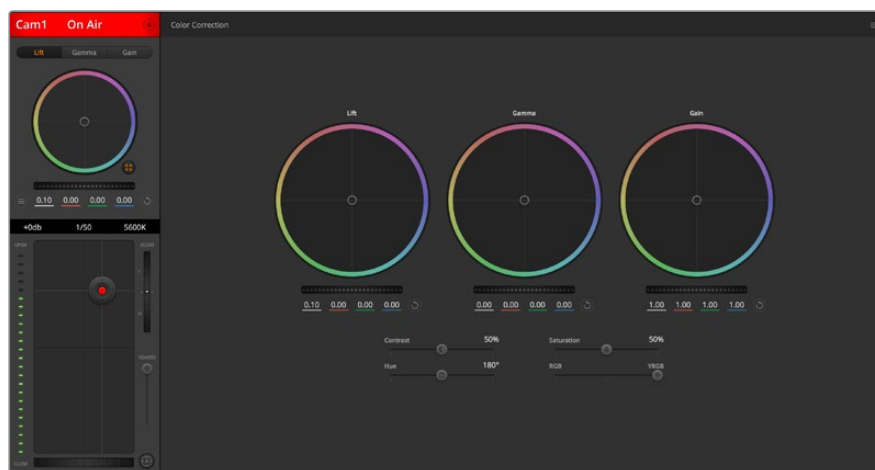
Click on the DaVinci Resolve primary color corrector button to expand the color correction window and adjust settings

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.

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

Master Wheels

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.

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

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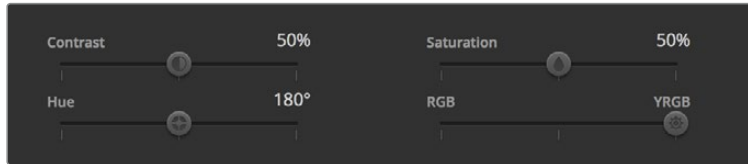
Drag the sliders left or right to adjust Contrast, Saturation, Hue and Lum Mix settings

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 URSA Broadcast 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 URSA Broadcast 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 URSA Broadcast. If a setting is accidentally adjusted from your URSA Broadcast, camera control will automatically reset that setting to maintain synchronization.

> **TIP** Even if you disconnect its 12G-SDI input, your URSA Broadcast will keep using any image adjustments made with DaVinci Resolve color correction. This lets you change camera angles without needing to dial in your image settings again. To return your URSA Broadcast to its default color settings, simply power cycle your URSA Broadcast after disconnecting its 12G-SDI input.

Using DaVinci Resolve

Shooting with your Blackmagic URSA Broadcast is only part of the process of creating film and television content, and just as important is the process of media backup and management as well as editing, color correction and encoding final master files. Your Blackmagic URSA Broadcast includes a version of DaVinci Resolve for Mac OS and Windows so you have a complete solution for shooting and post production!
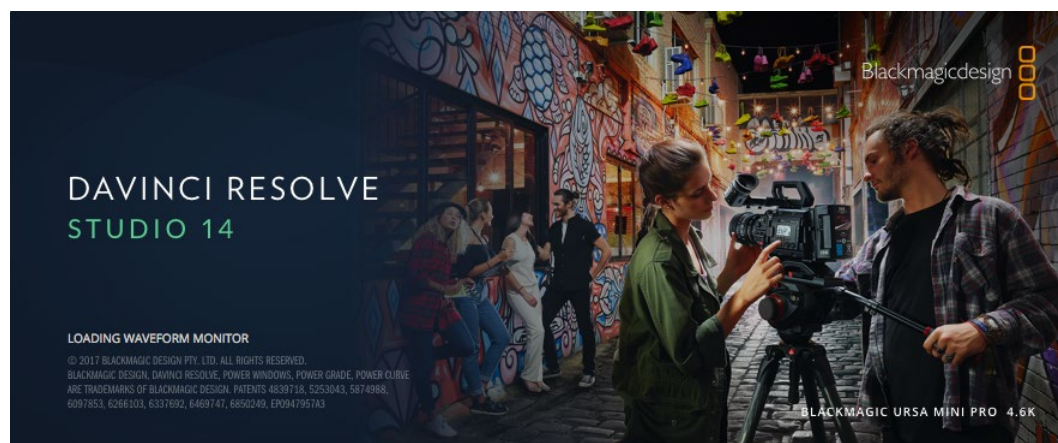
NOTE We recommend using the latest version of DaVinci Resolve for accurate color treatment of clips shot using URSA Broadcast. For example, version 14.3 or later will ensure accurate color for URSA Broadcast's DNxHD, ProRes and RAW files.

After connecting your CFast or SD card to your computer, you can use DaVinci Resolve's 'clone' tool, in the 'media' page, to create running backups as you shoot. This is recommended as any type of media is susceptible to becoming damaged or developing a fault so creating backups ensures your shots will be immune to loss. Once you have used DaVinci Resolve to back up your media, you can then add your clips to the DaVinci media pool, then edit, color correct, and finish your production without ever having to leave DaVinci Resolve.

DaVinci Resolve is the same tool used on most major blockbuster movies, so it's much more than a simple NLE software tool, as it has extremely advanced technology built in for high end digital film. You get the advantage of this technology when you use DaVinci Resolve to edit and color correct your work.

Included here is information on how to get started using DaVinci Resolve with your camera files. Of course, DaVinci Resolve is extremely advanced and includes a lot more features than you immediately see when first looking at its user interface. To learn more about how to use DaVinci Resolve, please check for the DaVinci Resolve instruction manual pdf file on the DaVinci Resolve software disk, or check online for the many training courses and tutorial videos available.

Importing your Clips

To start editing your clips, you'll first need to import them into the media pool:

1 Launch DaVinci Resolve. If this is the first time you've opened DaVinci Resolve, wait for the Project Manager to appear, and double click the 'untitled project' icon in the project manager window.

If you have enabled the multi-user environment in previous versions of DaVinci Resolve, then the log in window will appear. To login as one of the listed users, double click the user icon. To add a new user, click 'add new' at the bottom left of the log in window and create a new user by entering a user name and clicking 'setup new user'.

Then double-click the user icon to proceed to the Project Manager. Now click 'new project', enter a title for your project and click 'create'. This will add your new project to the project manager. Double click on your project to open it.

2 You'll now see the 'media' page with a 'media storage' browser at the top left. The 'media storage' browser displays all your linked media folders from where you'll drag your clips and drop them into the media pool.

3 If your clip folder doesn't appear in the library, you'll need to add it. This is easily done by right clicking inside the 'media storage' browser area, selecting a drive or folder path and clicking 'open'.

4 In the 'media storage' browser, click on your newly added clip folder. Now simply drag your clips from your storage folder and drop them into the media pool. If the untitled project settings are different to your clip settings, you'll be prompted to either change the project settings to match your clips, or leave the settings as they are. To get started quickly, click 'change'. Now your project settings match your clips.

To import your clips, simply drag them from the 'media storage' browser and drop them into the media pool. You can also drag and drop files from your desktop

TIP For information on ingesting RAW files with DaVinci Resolve, see "working with RAW files" at the end of this section.

Editing your Clips

With your clips in the media pool, click on the 'edit' tab to open the edit page.

Now you can start building your edit!

1   You'll first need to create a new timeline. Right click anywhere within the media pool and choose Timelines > New Timeline. When the dialog box appears, click the 'create' button.
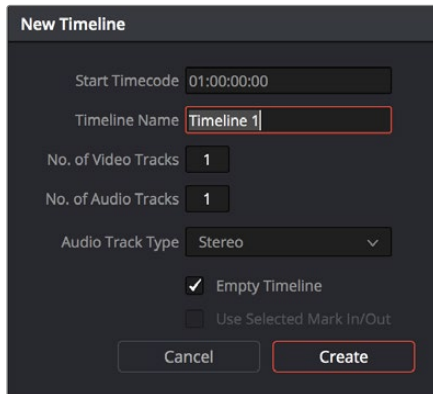
To start editing your clips, you'll need to create a new timeline.
The timeline is the stage upon which all your editing will take place

2   Double click a clip in the media pool to open the clip in the source viewer. Use the mouse pointer to scrub the play head in the source viewer left and right until you find the start frame you want for the clip. Mark the in point with the 'I' shortcut. Do the same for the end frame using the 'O' shortcut.

3   Go to the timeline and position the timeline play head where you want your clip to be inserted.

4   To insert the clip onto the timeline, click inside the source viewer then drag the mouse pointer across to the timeline viewer. A list of edit options will appear. Select the type of edit you want.

Your clip will be placed onto the timeline using the edit type you selected. You'll find a description of each edit type and how to use them in the DaVinci Resolve manual.

A faster way to add clips to your edit is by dragging them from the media pool and dropping them directly onto the timeline where you can adjust your in and out points, position your clips, try different plug in effects, titles, and more. This particular workflow is like using the timeline as an artist's palette.

The 'edit' page. You can trim your clips, change their order, move them around and add transitions between them using the timeline editor

Trimming Clips

When editing clips you'll want to trim them to include only the specific actions you want in each shot. There are various ways, but the easiest is to adjust the clips' in and out points on the timeline:

1 After adding clips to your timeline, hover your mouse pointer over the start of a clip until the pointer becomes a 'trim' icon.

2 When the 'trim' icon appears, click on the start of your clip and drag it forwards or backwards to trim the in point. Watch the timeline monitor as you trim to find the edit point.

3 Now click and drag the end of your clip to adjust the out point.

The zoom slider is located above the timeline, to the right of the tools that are centered in the toolbar. By dragging the slider left and right you can zoom in and out of your timeline to make fine adjustments.
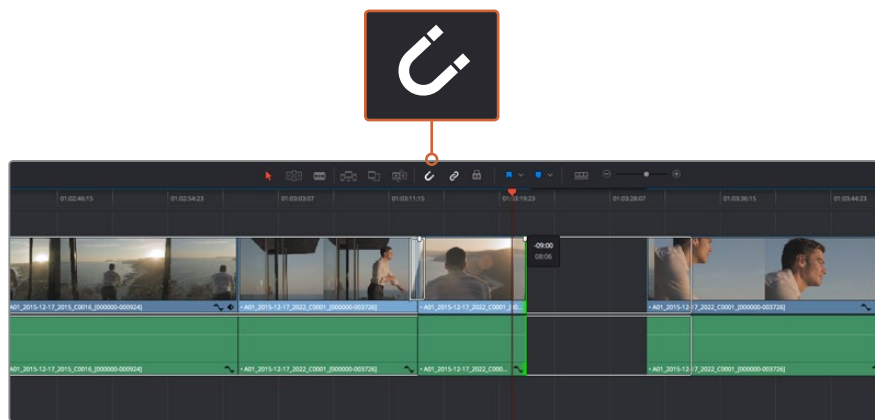
Trim your clips by dragging their start and end points left or right, and press the 'snapping' button in the toolbar to turn snapping on or off

Snapping is a helpful feature to keep your clips held tightly against each other, but can be disabled for greater precision when fine tuning edits. Press the 'N' key to quickly turn snapping on or off.

Mapping Keyboard Shortcuts

If you are familiar with keyboard shortcuts used in other editing software, you can setup DaVinci Resolve to use the same shortcuts. You also have the ability to create your own custom sets of keyboard shortcuts to increase speed and optimize your workflow.

To map your own keyboard shortcuts:

1 Open DaVinci Resolve> Preferences and select the 'user' panel at the top, then select 'keyboard mapping' from the settings list.

2 Select the shortcut you want to change from the categories provided, for example timeline cut and paste shortcuts will be in the 'edit' category.

3 Click on the shortcut once to highlight the setting. Double click on the shortcut to enable the change.

4 Press your new shortcut keys on the keyboard. If you make a mistake you can easily undo the change by clicking the 'undo' icon next to the setting.

5 Click 'save' to confirm your new shortcut setting.
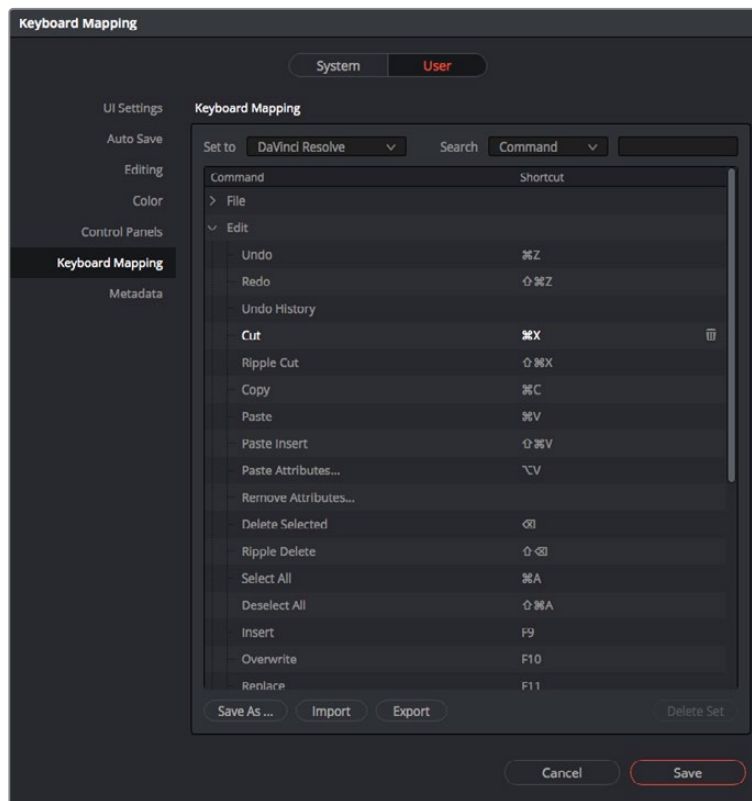
Use the 'set to' drop down menu to choose one of the keyboard
shortcuts you may already be familiar with from other editing software

Adding Transitions

A transition is a visual effect used to bridge one clip to another in a pleasing way, for example
dissolves, wipes, dips to color, and more. These can add a layer of excitement to your edit.
Transitions don't always have to be joining two clips, for example you can apply a dissolve
transition to the end of one clip to create a quick and easy fade to black.
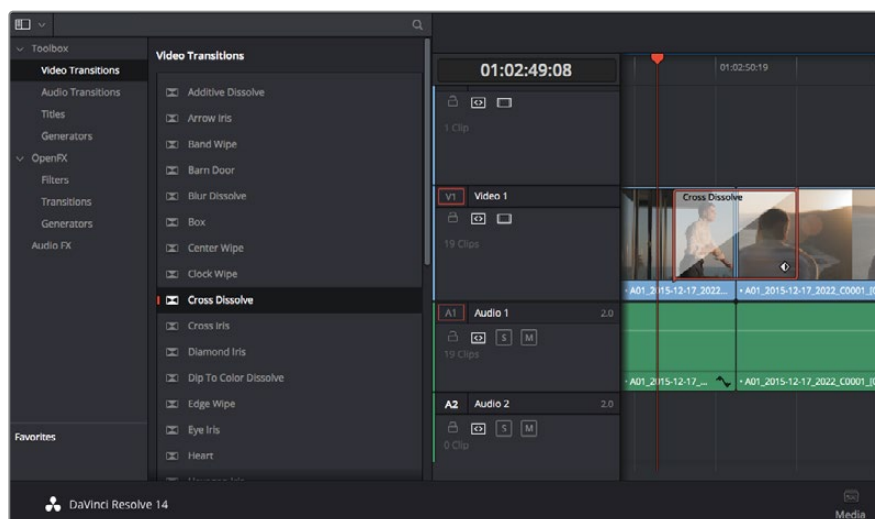
The transitions palette contains many types of transition effects

To add a dissolve transition between two clips:

1   Make sure there are two clips edited right next to one another on the timeline. Click the 'effects library' button in the UI toolbar at the top of the 'edit' page, and make sure the 'toolbox' panel is open.

2   Click on the 'cross dissolve' transition, drag it to your timeline and hover it over the edit point between two clips. You'll see the mouse pointer highlight both the end section of the first clip, and the start of the second. Drop the transition onto the clips. It's important both clips have enough length before and after their edit points to make room for the dissolve.

You now have a smooth transition mixing from one clip to the other. If you want to adjust the length of the transition you can lengthen or shorten its start and end point using a similar approach to trimming a clip. Hover your mouse pointer over the start or end of the transition until the transition 'trim' icon appears, then drag it left or right.
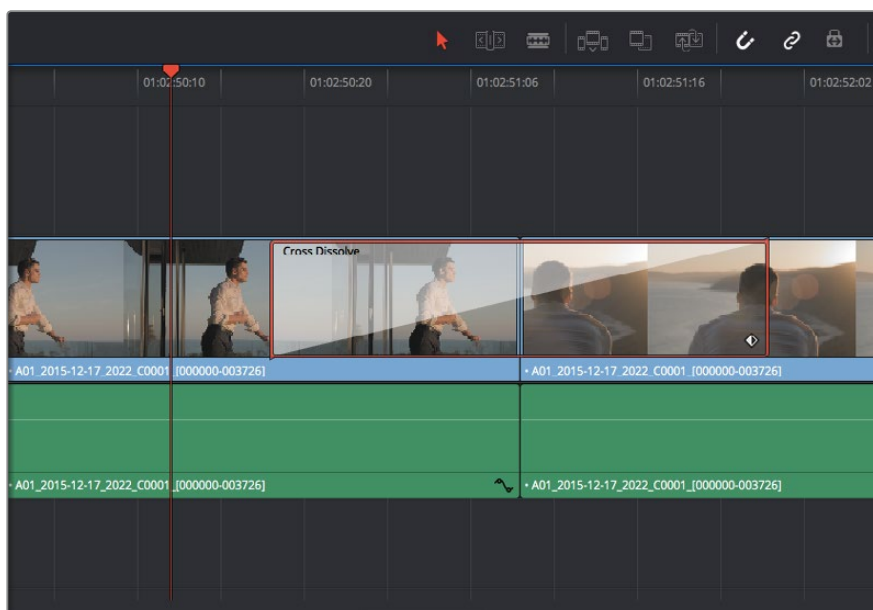
Simply drag and drop transitions between adjoining clips

Adding Titles

You can place a title on any video track just as you would a clip. If you run out of tracks you can easily add new ones by right clicking next to an existing track name and selecting 'add track'.

To create a title:

1   Scroll down towards the middle of the toolbox in the 'effects library' located underneath the media pool and you'll see the 'titles' generators. Use the scroll bar to reveal more 'titles' options.

2   Drag and drop a text title on the empty video track above the clip you want the title to appear. You can even drop your title next to a clip on Video 1 if you just want it to appear over black. To see the title, make sure the timeline playhead is on the title.

3   Double click on the title clip. The 'inspector' will appear showing you the settings for your title. Type your title into the 'text' field.

You can choose from a variety of fonts and adjust the appearance of your title by changing settings such as color, size, alignment, position, and more. Transitions can be added to titles, just like they can for clips.
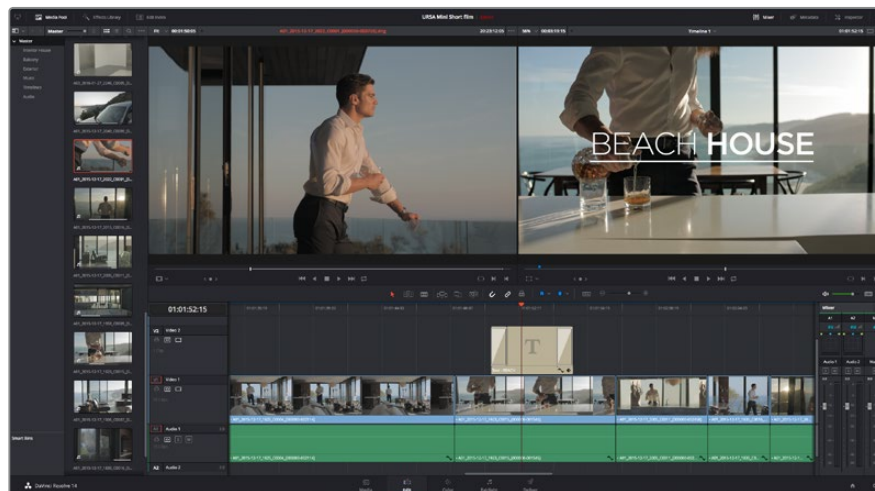
Drag a title type from the 'titles' palette and drop it on an empty track

Color Correcting your Clips

Once you have edited your sequence of clips, you can start color correcting. This is best begun after you have finished editing your sequence so you can maintain a consistent look, but part of the fun of DaVinci Resolve is being able to move between the edit and color page to make fine adjustments and discover new creative choices.

With the 'color' page you get absolute control over the look of your clips

First, click on the 'color' tab to open the 'color' page.

You'll see the color wheels, curves palettes and general color correction tools as well as the preview and nodes window. Don't feel overwhelmed by the vast array of features in front of you, they are all there to help you get the most amazing looking pictures. The DaVinci Resolve manual will show you exactly what the tools are for and how to use them in easy to follow steps. You'll learn the same techniques the professionals use in high end color correction facilities.

Generally, the first thing you'll want do is optimize the shadows, mid tones and highlights in your clips. In other words adjust the 'lift', 'gamma' and 'gain' settings. This will help get your pictures looking their brightest and best with a clean, uniform starting point from where you can begin grading the 'look' of your film.

Using Scopes

Most colorists make creative color choices by focusing on the emotion and the look they want their program to have and then simply work using the monitor to achieve that look. You can look at everyday objects and how different types of light interact with them to generate ideas on what you can do with your images and a little practice.
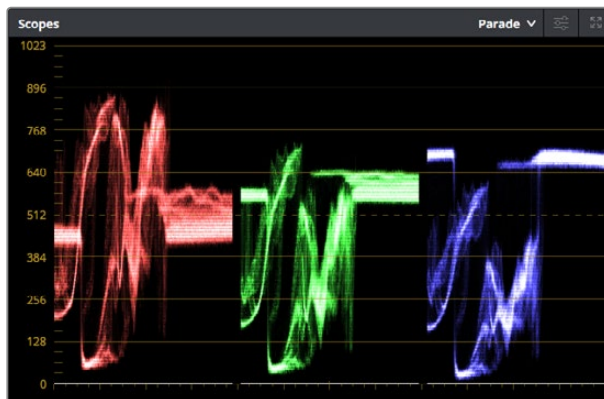
The parade scope helps you optimize
highlights, mid tones and shadows

The 'lift', 'gamma', 'gain' and 'offset' color wheels give
you total control over the color and tonal balance of your clips.
To make a uniform adjustment to all colors for each tonal region,
drag the dial underneath the color wheels back and forth

Another way to color grade is to use the built in scopes to help you balance shots. You can open a single video scope by clicking the 'scope' button, which is the second from the right on the palette toolbar. You can choose to display a waveform, parade, vectorscope and histogram. Using these scopes you can monitor your tonal balance, check the levels of your video to avoid crushing your blacks and clipping the highlights, plus monitor any color cast in your clips.

The 'color wheels' palette contains the 'lift', 'gamma' and 'gain' controls which will generally constitute your first adjustment. These should resemble controls you've seen in other applications for doing color and contrast adjustments. For more accurate control of each color using a mouse, you can change the color wheels to 'primaries bars' which let you adjust each color and luminance channel for the lift, gamma and gain controls separately. Simply select 'primaries bars' from the drop down menu near the top right of the color wheels.

1   Adjusting the 'lift'
With your first clip selected on the color timeline, click on the 'lift' dial underneath the first color wheel. Slide it back and forth and watch how it affects your image. You'll see the brightness of the dark regions of your picture increase and decrease.

Set it to where you want the dark areas to look their best. If you decrease the lift too much, you'll lose details in the blacks and you can use the parade scope to help avoid this. The optimal position for blacks on the waveform is just above the bottom line of the parade scope.

2   Adjusting the 'gain'
Click on the 'gain' dial and slide it back and forth. This adjusts the highlights which are the brightest areas of your clip. The highlights are shown on the top section of the waveform on the parade scope. For a brightly lit shot, these are best positioned just below the top line of the waveform scope. If the highlights rise above the top line of the waveform scope, they will clip and you will lose details in the brightest regions of your image.

3   Adjusting the 'gamma'
Click on the 'gamma' dial underneath the color wheel and slide it back and forth. As you increase the gamma you'll see the brightness of the image increase. Notice the middle section of the waveform will also move as you adjust the gamma. This represents the mid tones of your clip. The optimal position for mid tones generally falls between 50 to 70% on the waveform scope. However, this can be subjective based on the look you are creating and the lighting conditions in the clip.

You can also use the curves palette to make primary color corrections. Simply click to create control points on the diagonal line inside the curve graph, and drag them up or down to adjust the master RGB contrast at different areas of image tonality. The optimum points to adjust are the bottom third, mid, and top third of the curve line.

There are many more ways of doing primary color correction in DaVinci Resolve. Check the DaVinci Resolve manual to learn how to use them all.
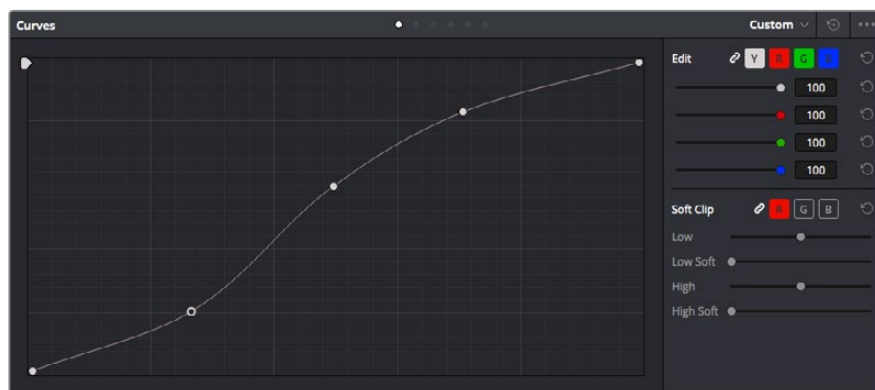
The curves palette is another tool you can use to make primary color corrections, or enhance specific areas of your clip when using a power window

Secondary Color Correction

If you want to adjust a specific part of your image then you need to use secondary corrections. The adjustments you have been doing up until now using the color wheels and lift, gamma and gain adjustments affect the whole image at the same time and so they are called primary color corrections.

However if you need to adjust specific parts of your image, say for example you wanted to improve the color in the grass in a scene, or you wanted to deepen the blue in a sky, then you can use secondary corrections. Secondary color corrections are where you select a part of the image and then adjust just that part. With nodes, you can stack multiple secondary corrections so you can keep working parts of your image until everything is just right! You can even use windows and tracking to allow the selections to follow movement in your images.

Qualifying a Color

Often you'll find a specific color in your clip can be enhanced, for example grass by the side of a road, or the blue in a sky, or you may need to adjust color on a specific object to focus the audience's attention on it. You can easily do this by using the HSL qualifier tool.
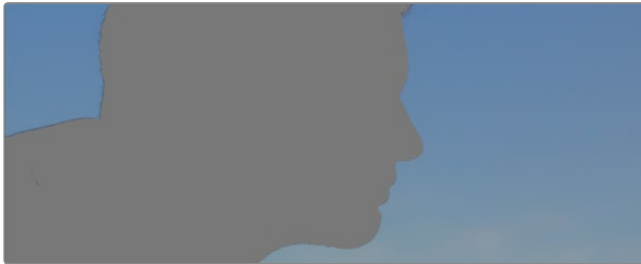
Using the HSL qualifier to select colors in your image is helpful when you want to make areas of your image 'pop', to add contrast, or to help draw the audience's attention to certain areas of your shot

To qualify a color:

1   Add a new serial node.

2   Open the 'qualifier' palette and make sure the 'color range' sample eyedropper tool is selected.

3   Click on the color in your clip you want to affect.

4   Usually you'll need to make some adjustments to soften the edges of your selection and limit the region to only the desired color. Click on the 'highlight' button to see your selection.

5   Adjust the 'width' control in the 'hue' window to broaden or narrow your selection.

Experiment with the high, low and softness controls to see how to refine your selection. Now you can make corrections to your selected color using the color wheels or custom curves.

Sometimes your selection can spill into areas of the shot you don't want to affect. You can easily mask out the unwanted areas using a power window. Simply create a new window and shape it to select only the area of color you want. If your selected color moves in the shot, you can use the tracking feature to track your power window.

Adding a Power Window

Power windows are an extremely effective secondary color correction tool that can be used to isolate specific regions of your clips. These regions don't have to be static, but can be tracked to move with a camera pan, tilt or rotation, plus the movement of the region itself.

Use power windows to mask out areas you don't want to be affected by the HSL qualifier secondary adjustments

For example, you can track a window on a person in order to make color and contrast changes just to that person without affecting his or her surroundings. By making corrections like this you can influence the audience's attention on areas you want them to look at.

To add a power window to your clip:

1   Add a new serial node.

2   Open the 'window' palette and select a window shape by clicking on a shape icon. Your selected window shape will appear on the node.

3   Resize the shape by clicking and dragging the blue points around the shape. The pink points adjust the edge softness. You can position the shape by clicking the center point and moving it to the area you want to isolate. Rotate the window using the point connected to the center.

Now you can make color corrections to your image in just the area you want.
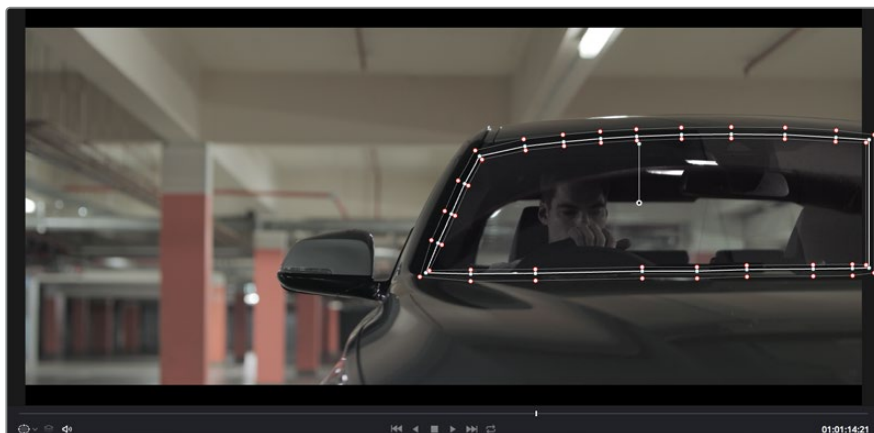
Power windows let you make secondary corrections to specific parts of your image

Tracking a Window

The camera, object or area in your shot may be moving, so to make sure your window stays on your selected object or area, you'll need to use DaVinci Resolve's powerful tracking feature. The tracker analyzes the pan, tilt, zoom and rotation of the camera or object in your clip so you can match your windows to that movement. If this isn't done, your correction can move off the selected target and call attention to itself, which you probably don't want.

You can track objects or areas in your clip using the tracker feature so power windows can follow the action

To track a window to a moving object:

1   Create a new serial node and add a power window.

2   Go to the start of your clip and position and size the window to highlight just the object or area you want.

3   Open the 'tracker' palette. Select the pan, tilt, zoom, rotate, and perspective 3D settings appropriate for the movement in your clip by checking or unchecking the relevant 'analyse' checkboxes.

4   Click on the 'forward' arrow to the left of the checkboxes. DaVinci Resolve will now apply a cluster of tracking points on your clip and then step through the frames to analyze the movement. When the tracking is done, your power window will follow the path of the movement in your clip.

Most of the time automatic tracking is successful, but scenes can be complex and sometimes an object can pass in front of your selected area, interrupting or affecting your track. This can be solved manually using the keyframe editor. Refer to the DaVinci Resolve manual to find out more.

Using Plugins

While making secondary color corrections you can also add OpenFX plugins to create fast, interesting looks and effects using the 'color' page, or imaginative transitions and effects on your clips on the 'edit' page. OFX plugins can be purchased and downloaded from third party suppliers.

After installing a set of plugins, you can access them on the color page by opening the OpenFX inspector to the right of the 'node editor' Simply click the 'OpenFX' button to open the OpenFX inspector, create a new serial node and drag and drop a plugin onto the new node. If the plugin has editable settings, you can adjust these in the adjoining 'settings' panel.

In the 'edit' page you can add plugin generators and transitions to clips by opening the 'OpenFX' panel in the 'effects library' and dragging your selected plugin onto the video track above your clip on the timeline.

OFX plugins are a quick and easy way to create an imaginative and interesting look

Mixing Your Audio

Mixing Audio in the Edit Page

Once you have edited and color corrected your project, you can begin to mix your audio. DaVinci Resolve has a helpful set of features for editing, mixing and mastering audio for your project directly in the 'edit' page. For projects requiring more advanced audio tools, the Fairlight page provides you with a full audio post production environment, and if you are already familiar with the edit page and want to move straight to Fairlight, skip this section and move onto the next.

Adding Audio Tracks

If you are working in the edit page and want to mix a basic sound edit with lots of sound effects and music, you can easily add more audio tracks when you need them. This can be helpful when building your sound, and separating your audio elements into individual tracks, for example, dialogue, sound effects and music.

To Add an Audio Track to the Edit Page:

1   Right click next to the name of any audio track on your timeline and select 'add track'. This will add a track to the bottom of the track list. Alternatively select 'add tracks' and select the location you would like the new track placed.

2   Select the type of audio track you want, such as stereo, mono, 5.1 or adaptive.

Your new audio track will appear on the timeline.

Adjusting Audio Levels in the Timeline

Each clip of audio in the timeline has a volume overlay that lets you set that clip's level by simply dragging it up or down with the pointer. This overlay corresponds to the Volume parameter in the Inspector.
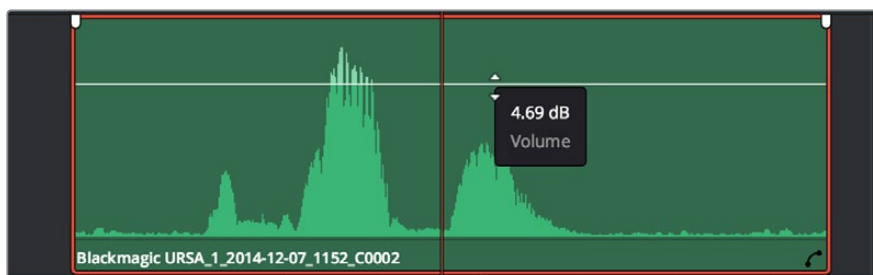
Dragging a volume overlay to adjust the clip level

For projects requiring more advanced audio tools, the Fairlight page provides you with a full audio post production environment.

The Fairlight Page

The 'Fairlight' page in DaVinci Resolve is where you adjust your project audio. In single monitor mode, this page gives you an optimized look at the audio tracks of your project, with an expanded mixer and custom monitoring controls that make it easy to evaluate and adjust levels in order to create a smooth and harmonious mix. Don't feel overwhelmed by the vast array of features in front of you, they are all there to help you deliver the best audio quality for your project.

This guide provides a basic overview of the features on the Fairlight page, but to learn more about all the details for each feature, refer to the DaVinci Resolve manual. The DaVinci Resolve manual provides details on the purpose of each tool and describes how to use them in easy to follow steps.

The Audio Timeline

Track Header

At the left of each track is a header area that displays the track number, track name, track color, audio channels, fader value and audio meters. The track header also contains different controls for locking and unlocking tracks, plus solo and muting controls. These controls can help to keep your tracks organized, and let you preview individual tracks one at a time.

Tracks

Each track on the Fairlight page is divided into lanes, which show each individual channel of clip audio for editing and mixing. The edit page hides these individual audio channels, displaying only a single clip in the timeline to make it easier to edit multi channel sources without needing to manage a huge number of tracks.
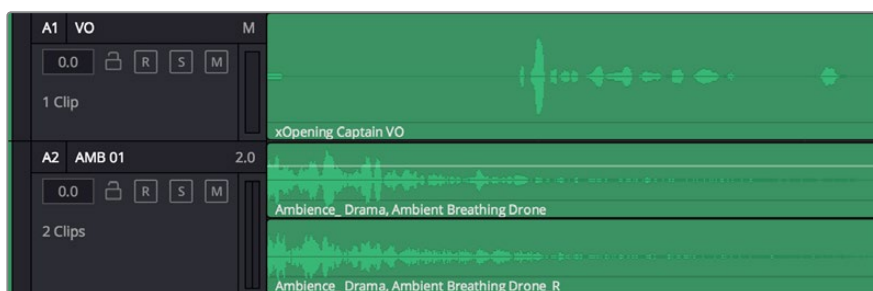
The track header on track A1 indicates a mono track with a single lane for mono audio, whilst track A2 indicates a stereo track with two lanes to accommodate stereo audio

What is a Bus?

A bus is essentially a destination channel to which you can route multiple audio tracks from the timeline, so that they are mixed together into a single signal that can be controlled via a single channel strip.

Main Bus

'Main busses' are typically the primary output of a program and each new project you create starts out with a single 'main bus', to which all tracks are routed by default. The 'main bus' combines all of the tracks in the timeline into one signal so that you can adjust the overall level of the audio mix once you have adjusted the level of each individual track.

Sub Bus

'Sub busses' allow you to combine multiple tracks of audio that belong to the same category such as dialogue, music or effects so that everything in that category can be mixed as a single audio signal. For example, if you have five dialogue tracks, you can route the output of all five dialogue tracks to a 'submix bus', and the level of all dialogue can then be mixed with a single set of controls. This submix can be rendered separately or sent to the main bus for render.

The Mixer

Each audio track in your timeline corresponds to an individual channel strip in the Mixer, and by default there's a single strip on the right for the 'main bus' labeled 'M1'. Additional channel strips will appear on the right hand side with a set of controls for each additional 'main' and 'submix bus' you create. A set of graphical controls allows you to assign track channels to output channels, adjust EQ and dynamics, set levels and record automation, pan stereo and surround audio, and mute and solo tracks.

The audio mixer, with channel strips corresponding
to the tracks in the timeline

Using the Equalizer to Enhance your Audio

After adjusting the audio levels of your audio clips in your project, you may find that the audio needs further finessing. In some cases you may find that the dialogue, music and sound effects are competing for the same frequency on the audio spectrum, making your audio too busy and unclear. This is where using EQ can help, as it allows you to specify the parts of the audio spectrum that each track occupies. You can also use an equalizer to help remove unwanted elements from your audio by isolating and reducing the level on particular frequencies that contain low rumbles, hums, wind noise and hiss, or simply to improve the overall quality of your sound so it is more pleasing to listen to.

DaVinci Resolve provides EQ filters that can be applied at a clip level to each individual clip or at the track level to affect entire tracks. Each audio clip in the timeline has a four band equalizer in the inspector panel, and each track has a 6 band parametric equalizer in the mixer panel. The graphical and numeric controls for boosting or attenuating different ranges of frequencies, and different filter types allow you to define the shape of the EQ curve.
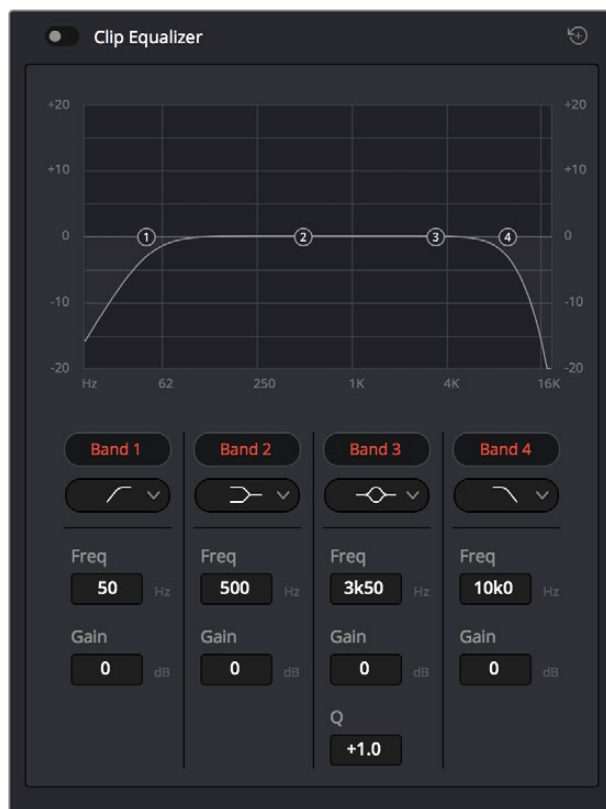
The four band equalizer can be applied
to every clip in the timeline

Outer bands let you make band filter adjustments using hi-shelf, lo-shelf, hi-pass and lo-pass filters. A pass filter affects all the frequencies above or below a particular frequency, by removing those frequencies completely from the signal. For example, a high pass filter will allow the high frequencies to pass through the filter whilst cutting the low frequencies.
Any frequencies outside the cutoff frequency are cut gradually in a downward sloping curve.

A shelf filter is less aggressive, and is useful when you want to shape the overall top end or low end of the signal without completely removing those frequencies. The shelf filter boosts or cuts the target frequency and every frequency either above or below it evenly, depending on whether you use a high shelf or low shelf.

The middle sets of band controls let you make a wide variety of equalization adjustments, and can be switched between lo-shelf, bell, notch, and hi-shelf filtering options.

Bell

Bell filters boost or cut frequencies around a given center point of the bell curve, and as the name suggests the shape of the curve is like a bell.

Notch

Notch filters allow you to specifically target a very narrow range of frequencies. For example, removing a mains hum at 50 or 60Hz.

Lo-Shelf

Low shelf filters boost or cut the target frequency at the low end, and every frequency below it

Hi-Shelf

High shelf filters boost or cut the target frequency at the high end, and every frequency above it

To add EQ to an individual clip:

1   Select the clip in the timeline that you want to add the EQ filter to.

2   Click on the inspector and then click the 'clip equalizer' enable button.

To add EQ to a track:

1   Double-click in the EQ section for one of your tracks in the mixer to open the equalizer for that track.

2   Select the band filter type from the drop down menu for the band you want to adjust.

The EQ section in the mixer panel indicating an
EQ curve has been applied to track one
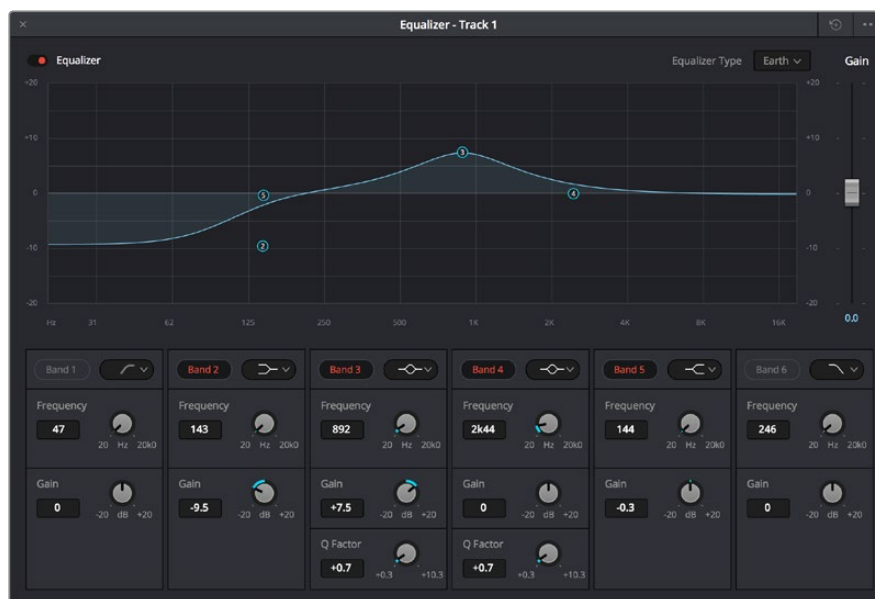
The 6 Band parametric equalizer that can be applied to every track

Once you have added EQ to your clip or track, you can adjust the EQ for each band. Note that controls may vary depending on which band filter type is selected.

To adjust the EQ for a band filter:

1. Select the band filter type from the drop down menu for the band you want to adjust.

2. Adjust the 'frequency' value to select the center frequency of the EQ adjustment.

3. Adjust the 'gain' value to boost or attenuate the frequencies governed by that band.

4. Use the 'Q factor' value to adjust the width of affected frequencies.

Use the reset button to reset all controls in the EQ window to their defaults.

Fairlight has many controls you can use to improve the quality of each audio track. You can add more tracks and arrange buses to organize them, plus add effects like delay or reverb, and generally perfect your audio mix.

Mastering your Edit

So now you've edited, graded your clips and mixed your audio, you'll want to export a render of your edit in the 'deliver' page. This page lets you select the range of clips you want to export, plus the format, codec and resolution you want. You can export in many types of formats such as QuickTime, AVI, MXF and DPX using codecs such as 8-bit or 10-bit uncompressed RGB/YUV, ProRes, DNxHD, H.264 and more.

The 'deliver' page is where you export your edit. You can select
from many different video formats and codecs

To export a single clip of your edit:

1. Click on the 'deliver' tab to open the deliver page.

2. Go to the 'render settings' window on the top left of the page. In the 'format' settings, select 'single clip'. You can now choose from a number of export presets, for example YouTube, Vimeo and audio presets, or you can set your own export settings manually by leaving it set to the default 'custom' preset and entering your own parameters. For this example, select YouTube, then click on the arrow next to the preset and select the 1080p video format.

   The frame rate will be locked to your project frame rate setting.

3 Underneath the presets you will see the timeline filename and the target location for your exported video. Click the 'browse' button and choose the location where you want to save your exported file.

4 Immediately above the timeline, you'll see an options box with 'entire timeline' selected. This will export the entire timeline, however you can select a range of the timeline if you want to. Simply choose 'in/out range' and then use the 'i' and 'o' hot key shortcuts to choose the in and out points in your timeline.

5 Go to the bottom of the 'render settings' and click on the 'add to render queue' button.

Your render settings will be added to the render queue on the right side of the page. Now all you have to do is click 'start render' and monitor the progress of your render in the render queue.

When your render is complete you can open the folder location, double click on your new rendered clip and watch your finished edit.

Working with RAW files

When you first import RAW files, DaVinci Resolve will decode the sensor data contained in the files using the gain, white balance and tint settings used on the camera at the time of shooting. If you're happy with the look of these settings, you can start editing right away.

The great thing about shooting RAW is that you're not tied to these settings at all!

The breadth of available post processing options when working with RAW files mean that you'll develop your own workflow over time. Experimenting with the 'clip RAW' settings for each clip will show you just how powerful and flexible working with RAW can be.

RAW clips give you maximum flexibility in post production. While ProRes and DNx files, for example, convert your camera's sensor data into their respective codecs, RAW clips keep the original sensor data without conversion. This lets you make adjustments to clips, such as white balance and exposure, as if you were changing the original camera settings. Working with the original sensor data also retains more tonal information within shadows and highlights, which is useful for recovering details, for example in blown out skies and dark areas of the picture.

It's worth shooting in RAW if you are after the highest possible quality, or for shots where there is an extreme variance between highlights and shadows and you may need to push and pull those regions as much as possible in the grade.

RAW files can be large and processor intensive, but you can set DaVinci to automatically create proxy files to help your computer with real time playback. For more details on how to get the most out of your RAW files in your grade and how to set up a real time workflow, refer to the DaVinci Resolve manual.

Clip Raw Settings

Once your RAW clips are loaded into the media pool, you can drop them on a timeline in the edit page and then make adjustments to each clip in the color page.

To make individual adjustments to RAW settings on a per clip basis:

1 Open the 'edit' page, then drag and drop your selected clips into a new timeline.

2 Open the color page and click on the camera icon to open the 'camera raw' palette.

3 Select 'clip' from the 'decode using' dropdown menu.
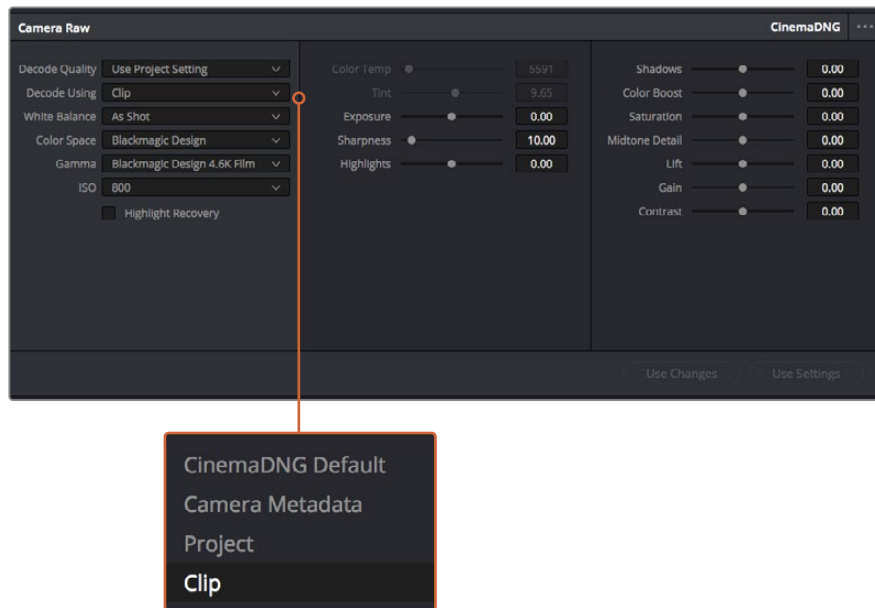
Select 'clip' from the 'decode using' drop down menu, to make adjustments to RAW settings for individual clips

Project Raw Settings

If you need to make a setting change that is common to all the clips, for example a global change to the white balance or ISO setting, you can set the clips to use the project RAW settings and make global changes from there.

To set project RAW settings:

1 Enter the project settings menu by clicking 'file,' and selecting 'project settings.'

2 In the 'Camera RAW' tab, you'll see a small arrow in the top right corner with one of several RAW formats next to it. This should be set to CinemaDNG. When you first drop a RAW clip shot on your URSA Broadcast into a new timeline, this setting will be set to CinemaDNG automatically.

3 Select 'project' in the 'Decode Using' drop down menu.

4 Set the white balance setting to 'custom'.

5 Set the color space to 'Blackmagic Design'. This will also set the gamma setting to Blackmagic Design Film.

Now you can adjust the camera settings for your clips such as white balance, ISO, sharpening, and more. This will affect all clips on your timeline.

For a full description of all of the RAW settings available, refer to the DaVinci Resolve manual.

Adjusting exposure

If you're familiar with the DaVinci Resolve workflow for other Blackmagic cameras, it's worth noting that URSA Broadcast's 'gain' setting is treated a bit differently to the 'ISO' setting on Blackmagic digital cinema cameras.

URSA Broadcast's 'gain' settings are applied at your camera sensor, rather than via software. This is a similar method to how traditional broadcast cameras work, and can slightly reduce noise at some sensitivity settings. However, it also means that it's not possible to adjust URSA Broadcast's clip 'gain' after filming.

You'll notice that the 'ISO' box in DaVinci Resolve's clip RAW settings will display the equivalent ISO to your camera's 'gain' setting for the clip, but this value will be greyed out and you will not be able to change it.

Due to the wide dynamic range of RAW footage, however, you can still make changes that are functionally equivalent to changing camera gain by adjusting your clip exposure. Simply adjust the 'exposure' value to add or subtract up to five stops of exposure. Each 'stop' is equivalent to one sensitivity step, for example 1 additional stop of exposure is the equivalent of going from -6 to 0 db of gain, or 200 to 400 ISO, however you have much finer adjustment here and can go to 0.01 of a stop!
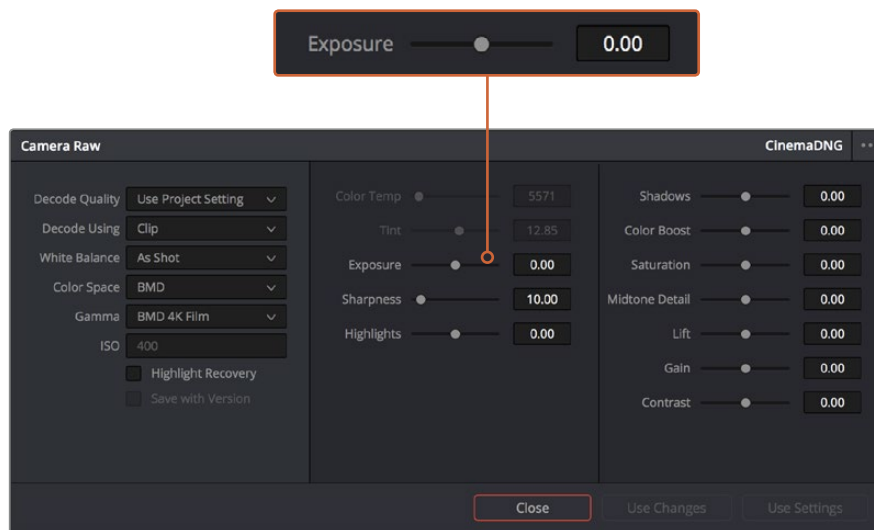
Use the 'exposure' controls, such as the slider in the 'edit cinemaDNG codec settings' menu to compensate for gain settings.

Blackmagic Camera Setup Utility

Updating Camera Software – Mac

After downloading the Blackmagic Camera Setup utility software and unzipping the downloaded file, open the resulting disk image to reveal the Blackmagic Camera Setup Installer.

Launch the installer and follow the on screen instructions. After the installation has finished, go to your applications folder and open the Blackmagic Cameras folder, where you'll find this manual, the Blackmagic Camera setup utility, plus a documents folder containing readme files and information. You'll also find an uninstaller for when updating to later versions of Blackmagic Camera Setup.
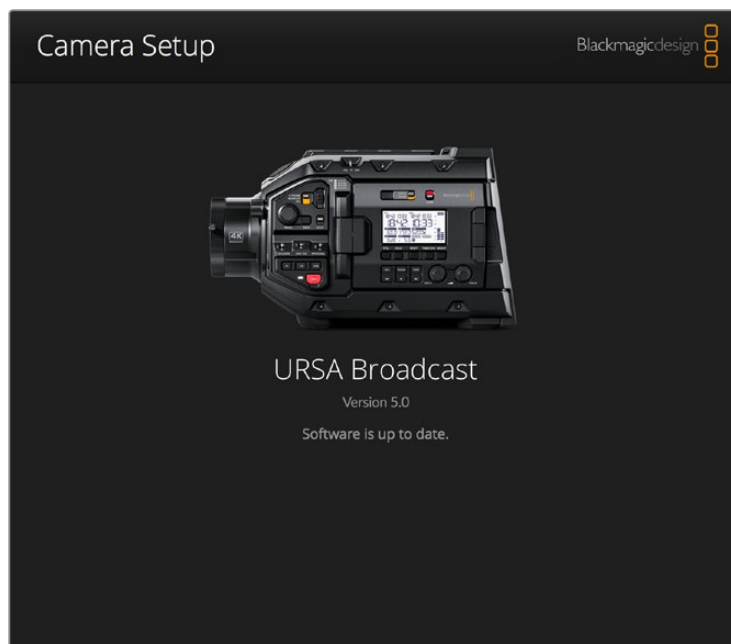
Updating Camera Software – Windows

After downloading the Blackmagic Camera Setup utility software and unzipping the downloaded file, you should see a Blackmagic Camera Setup folder containing this PDF manual and the Blackmagic Camera Setup Installer. Double-click the installer and follow the on screen prompts to complete the installation.

In Windows 10, click the start button and select 'all apps'. Scroll down to the Blackmagic design folder. From here you can launch Blackmagic Camera Setup.

In Windows 8.1, select the down arrow icon from the 'start' screen, and scroll down to the Blackmagic Design folder. From here you can launch Blackmagic Camera Setup.

How to Update the Camera Software

After installing the latest Blackmagic Camera Setup utility on your computer, connect a USB cable between the computer and your Blackmagic URSA Broadcast. The USB port is located on the left side panel above the memory card slots. Simply open the rubber cap to access the port.

Launch the Blackmagic Camera Setup utility and follow any on screen prompt to update the camera software.
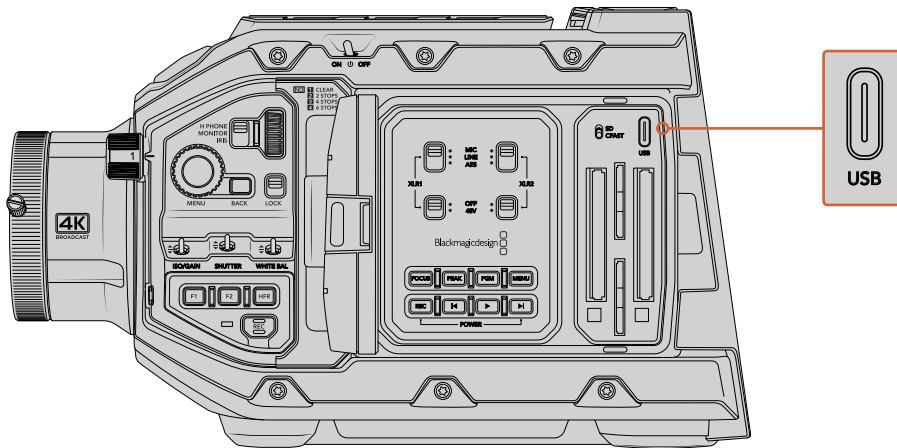
The USB-C port is used to update the camera software and can be found above the memory card slots, next to the media selection switch on Blackmagic URSA Broadcast

Working with Third Party Software

Working with Files from CFast 2.0 and SD cards
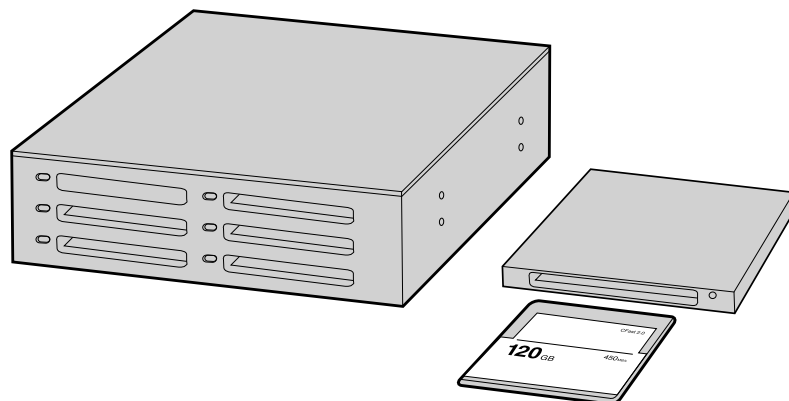
Edit directly from your CFast card by removing it from your camera and mounting it on your computer using a CFast 2.0 reader/writer or CFast drive

To import your clips from a CFast 2.0 or SD card:

1 Remove the CFast card or SD card your Blackmagic URSA Broadcast.

Mount the card to your Mac or Windows computer using a card reader/writer.

2 Double click on the CFast card to open it and you should see folders that contain your CinemaDNG RAW image files or a list of QuickTime movie files. Depending on the format you chose to record in, you might have a mixture of files, but they will all use the same naming convention.

3 Now you can simply drag the files you want from the CFast card onto your desktop or another hard drive, or you can access the files straight from the CFast card using your editing software. CinemaDNG RAW files are saved to the CFast card as separate DNG images for each frame. This is an open format and you can use many software applications to view your RAW images as a video sequence.

4 Before you unplug the card from your computer, it's always a good idea to eject safely using either Mac OS or Windows first.

With dual card mode recordings, simply transfer your CinemaDNG clip folders from both cards to the same folder on your storage drive. Make sure the clips from both cards are contained in the same folder.

Working with 3rd Party Software

To edit your clips using your favorite editing software, you can copy your clips to an internal/external drive or RAID and then import your clips into the software. Or import your clips directly from your card using a card reader/writer or CFast drive.

Using Final Cut Pro X

To edit Apple ProRes 422 HQ clips using Final Cut Pro X, you need to create a new project and set a suitable video format and frame rate. This example uses ProRes 422 HQ 1080p25.
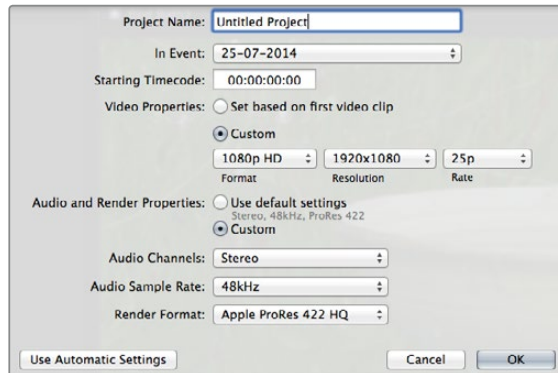
Final Cut Pro X project settings

1 Launch Final Cut Pro X, go to the 'menu' bar and select 'file/new project'. A window will open containing project settings.

2 Name your project and select the 'custom' checkbox.

3 Set the 'video properties' settings to 1080p HD, 1920x1080 and 25p.

4 Set your 'audio' and 'render properties' settings to 'stereo, 48kHz, and Apple ProRes 422 HQ'

5 Click OK.

To import your clips into your project, go to the 'menu' bar and select 'file/import/media'. Choose your clips from your media card.

You can now drag your clips onto the timeline for editing.

Using Avid Media Composer

To edit your DNxHD clips using Avid Media Composer 8, create a new project and set a suitable video format and frame rate. For this example, clips are set using DNxHD 1080i59.94.
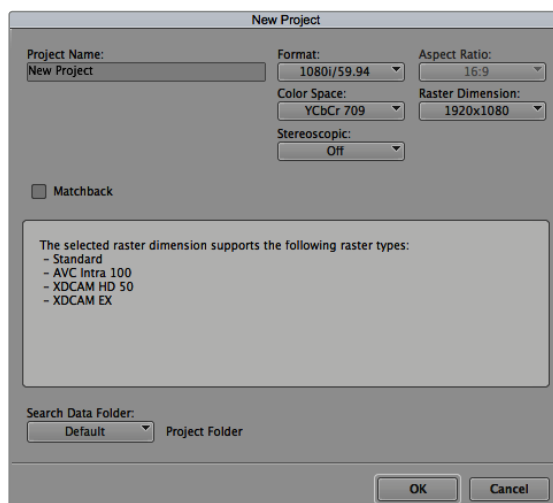
Setting the project name and project options in Avid Media Composer 8

1   Launch Media Composer and the 'select project' window will appear.

2   Click the 'new project' button.

3   In the 'new project' window name your project.

4   Go to the 'format' drop down menu and select 1080i/59.94.

5   Go to the 'color space' drop down menu and select YCbCr 709.

6   Go to the 'raster dimension' drop down menu and select 1920x1080. Click OK.

7   Select 'tools>background services' and click the 'start' button if background services are not already running and then click 'OK.'

8   Select the media bin where you wish to import your files.

9   Select 'file>AMA link…' and select the files that you wish to import and then click 'OK.'

When the clips appear within the media bin you can drag your clips onto the timeline and begin editing.

Using Adobe Premiere Pro CC

To edit your Apple ProRes 422 HQ clips using Adobe Premiere Pro CC, you need to create a new project and set a suitable video format and frame rate. For this example, clips are set using ProRes 422 HQ 1080p25.
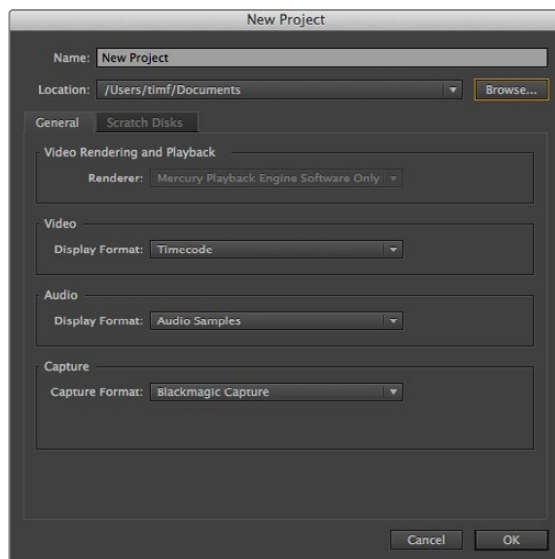
Setting the project name and project options
in Adobe Premiere Pro CC, (2014)

1   Launch Adobe Premiere Pro CC. In the 'welcome' window select 'create new/new project'. A window will open containing project settings.

2   Name your project. Choose the location for your project by clicking 'browse' and selecting your desired folder. Once you've selected your location folder click OK in the welcome window.

3   Go to the Adobe Premiere Pro CC 'menu' bar, select 'file/import' and choose the clips you want to edit. Your clips will appear in the project window.

4   Drag the first clip you wish to edit onto the 'new item' icon at the bottom right of the project window. A new sequence will be created matching your clip settings.

You can now drag your clips onto the sequence timeline for editing.

Using Autodesk Smoke 2013

To edit your clips using Autodesk Smoke 2013, create a new project and set a suitable video format, bit depth, frame type and frame rate. This example uses ProRes 422 HQ 1080p25.

Autodesk Smoke 2013

1   Launch Smoke and the 'project and user settings' window will appear. Click on the 'new' button under the project heading.

2   The 'create new project' window will open. Name your project.

3   From the resolution dropdown menu, select 1920x1080 HD 1080.

4   Make sure bit depth is set to 10-bit and frame type is 'progressive'.

5   From the 'config template' dropdown menu select 1920x1080@25000p.cfg.

6   Leave the 'preferred format' set to ProRes 422 HQ and click 'create'.

7   Click on the 'new' button under the 'user' heading.

8   When the 'create new user profile' window opens, type your user name and click 'create'.

9   When the 'project and user settings' window reopens, click the 'start' button.

10   From the menu bar, select 'file>import>file' and select your clips to import.

11   Once the clips appear in the media library you can drag your clips onto the timeline and begin editing.
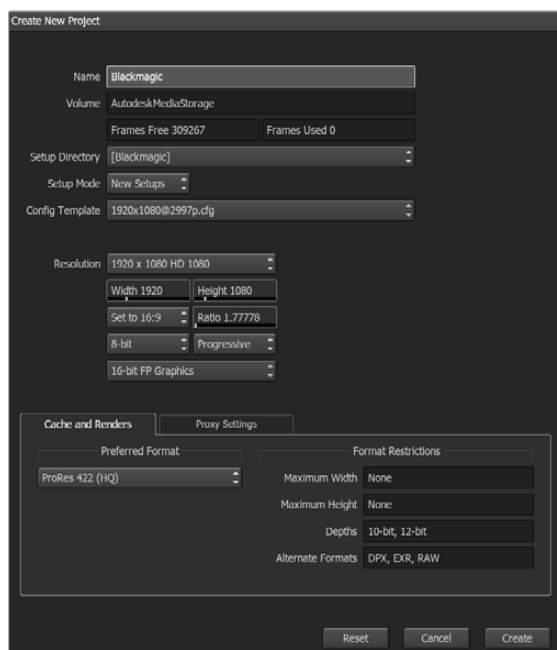
Setting the project name and project options in Autodesk Smoke 2013

Developer Information

Blackmagic SDI Camera Control Protocol

Version 1.2

If you are a software developer you can use the SDI Camera 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

The Blackmagic SDI Camera Control Protocol is used by ATEM switchers, Blackmagic 3G-SDI Arduino Shield and Blackmagic Camera Remote to provide Camera Control functionality with supported Blackmagic Design cameras. Please refer to the 'Understanding Studio Camera Control' chapter section of this manual, or the ATEM Switchers Manual and SDK manual for more information. These can be downloaded at www.blackmagicdesign.com/support.

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 prioritize 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	1	0.0 = near, 1.0 = far
	0.1	Instantaneous autofocus	void	–	–	–	trigger instantaneous autofocus
	0.2	Aperture (f-stop)	fixed16	–	-1	16	Aperture Value (where fnumber = sqrt(2^AV))
	0.3	Aperture (normalised)	fixed16	–	0	1	0.0 = smallest, 1.0 = largest
	0.4	Aperture (ordinal)	int16	–	0	n	Steps through available aperture values from minimum (0) to maximum (n)
	0.5	Instantaneous auto aperture	void	–	–	–	trigger instantaneous auto aperture
	0.6	Optical image stabilisation	boolean	–	–	–	true = enabled, false = disabled
	0.7	Set absolute zoom (mm)	int16	–	0	max	Move to specified focal length in mm, from minimum (0) to maximum (max)
	0.8	Set absolute zoom (normalised)	fixed16	–	0	1	Move to specified focal length: 0.0 = wide, 1.0 = tele
	0.9	Set continuous zoom (speed)	fixed16	–	-1	+1.0	Start/stop zooming at specified rate: -1.0 = zoom wider fast, 0.0 = stop, +1 = zoom tele fast

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
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] = Color space	–	–	0 = YUV
	1.1	Gain	int8		1	16	1 = 100 ISO, 2 = 200 ISO, 4 = 400 ISO, 8 = 800 ISO, 16 = 1600 ISO
	1.2	Manual White Balance	int16	[0] = color temp	2500	10000	Color temperature in K
			int16	[1] = tint	-50	50	tint
	1.3	Set auto WB	void	–	–	–	Calculate and set auto white balance
	1.4	Restore auto WB	void	–	–	–	Use latest auto white balance setting
	1.5	Exposure (us)	int32		1	42000	time in us
	1.6	Exposure (ordinal)	int16	–	0	n	Steps through available exposure values from minimum (0) to maximum (n)
	1.7	Dynamic Range Mode	int8 enum	–	0	2	0 = film, 1 = video, 2 = extended video
	1.8	Video sharpening level	int8 enum	–	0	3	0 = off, 1 = low, 2 = medium, 3 = high
	1.9	Recording format	int16	[0] = file frame rate	–	–	fps as integer (eg 24, 25, 30, 50, 60, 120)
				[1] = sensor frame rate	–	–	fps as integer, valid when sensor-off-speed set (eg 24, 25, 30, 33, 48, 50, 60, 120), no change will be performed if this value is set to 0
				[2] = frame width	–	–	in pixels
				[3] = frame height	–	–	in pixels
				[4] = flags	–	–	[0] = file-M-rate
					–	–	[1] = sensor-M-rate, valid when sensor-off-speed-set
					–	–	[2] = sensor-off-speed
					–	–	[3] = interlaced
					–	–	[4] = windowed mode
	1.10	Set auto exposure mode	int8	–	0	4	0 = Manual Trigger, 1 = Iris, 2 = Shutter, 3 = Iris + Shutter, 4 = Shutter + Iris
	1.11	Shutter angle	int32	–	100	36000	Shutter angle in degrees, multiplied by 100
	1.12	Shutter speed	int32	–	24	2000	Shutter speed value as a fraction of 1, so 50 for 1/50th of a second
	1.13	Gain	int8	–	-128	127	Gain in decibel (dB)
	1.14	ISO	int32	–	0	2147483647	ISO value

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
Audio	2.0	Mic level	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	2.1	Headphone level	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	2.2	Headphone program mix	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	2.3	Speaker level	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	2.4	Input type	int8	–	0	2	0 = internal mic, 1 = line level input, 2 = low mic level input, 3 = high mic level input
	2.5	Input levels	fixed16	[0] ch0	0	1	0.0 = minimum, 1.0 = maximum
				[1] ch1	0	1	0.0 = minimum, 1.0 = maximum
	2.6	Phantom power	boolean	–	–	–	true = powered, false = not powered
Output	3.0	Overlay enables	uint16 bit field	–	–	–	bit flags: [0] = display status, [1] = display frame guides. Some cameras don't allow separate control of frame guides and status overlays.
	3.1	Frame guides style (Camera 3.x)	int8	[0] = frame guides style	0	8	0 = HDTV, 1 = 4:3, 2 = 2.4:1, 3 = 2.39:1, 4 = 2.35:1, 5 = 1.85:1, 6 = thirds
	3.2	Frame guides opacity (Camera 3.x)	fixed16	[1] = frame guide opacity	0.1	1	0.0 = transparent, 1.0 = opaque
	3.3	Overlays (replaces .1 and .2 above from Cameras 4.0)	int8	[0] = frame guides style	–	–	0 = off, 1 = 2.4:1, 2 = 2.39:1, 3 = 2.35:1, 4 = 1.85:1, 5 = 16:9, 6 = 14:9, 7 = 4:3
				[1] = frame guide opacity	0	100	0 = transparent, 100 = opaque
				[2] = safe area percentage	0	100	percentage of full frame used by safe area guide (0 means off)
				[3] = grid style	–	–	bit flags: [0] = display thirds, [1] = display cross hairs, [2] = display center dot
Display	4.0	Brightness	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	4.1	Overlay enables	int16 bit field	–	–	–	0x4 = zebra
				–	–	–	0x8 = peaking
				–	–	–	
	4.2	Zebra level	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	4.3	Peaking level	fixed16	–	0	1	0.0 = minimum, 1.0 = maximum
	4.4	Color bars display time (seconds)	int8	–	0	30	0 = disable bars, 1-30 = enable bars with timeout (s)
	4.5	Focus Assist	int8	[0] = focus assist method	–	–	0 = Peak, 1 = Colored lines
				[1] = focus line color	–	–	0 = Red, 1 = Green, 2 = Blue, 3 = White, 4 = Black

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
Tally	5.0	Tally brightness	fixed16	–	0	1	Sets the tally front and tally rear brightness to the same level. 0.0 = minimum, 1.0 = maximum
	5.1	Front tally brightness	fixed16	–	0	1	Sets the tally front brightness. 0.0 = minimum, 1.0 = maximum
	5.2	Rear tally brightness	fixed16	–	0	1	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	2	0 = internal, 1 = program, 2 = external
	6.1	Offset	int32	–	–	–	+/- offset in pixels
Confi-guration	7.0	Real Time Clock	int32	[0] time	_	_	BCD - HHMMSSFF (UCT)
				[1] date	_	_	BCD - YYYYMMDD
	7.1	System language	string	_	_	_	ISO-639-1 two character language code
	7.2	Timezone	int32	_	_	_	Minutes offset from UTC
	7.3	Location	int64	[0] latitude	_	_	BCD - s0DDdddddddddddd where s is the sign: 0 = north (+), 1 = south (-); DD degrees, dddddddddddd decimal degrees
				[1] longitude	_	_	BCD - sDDDdddddddddddd where s is the sign: 0 = west (-), 1 = east (+); DDD degrees, dddddddddddd decimal degrees
Color Correction	8.0	Lift Adjust	fixed16	[0] red	-2	2	default 0.0
				[1] green	-2	2	default 0.0
				[2] blue	-2	2	default 0.0
				[3] luma	-2	2	default 0.0
	8.1	Gamma Adjust	fixed16	[0] red	-4	4	default 0.0
				[1] green	-4	4	default 0.0
				[2] blue	-4	4	default 0.0
				[3] luma	-4	4	default 0.0
	8.2	Gain Adjust	fixed16	[0] red	0	16	default 1.0
				[1] green	0	16	default 1.0
				[2] blue	0	16	default 1.0
				[3] luma	0	16	default 1.0
	8.3	Offset Adjust	fixed16	[0] red	-8	8	default 0.0
				[1] green	-8	8	default 0.0
				[2] blue	-8	8	default 0.0
				[3] luma	-8	8	default 0.0
	8.4	Contrast Adjust	fixed16	[0] pivot	0	1	default 0.5
				[1] adj	0	2	default 1.0
	8.5	Luma mix	fixed16	–	0	1	default 1.0
	8.6	Color Adjust	fixed16	[0] hue	-1	1	default 0.0
				[1] sat	0	2	default 1.0
	8.7	Correction Reset Default	void	–	–	–	reset to defaults

Group	ID	Parameter	Type	Index	Minimum	Maximum	Interpretation
Media	10.0	Codec	int8 enum	[0] = basic codec	–	–	0 = RAW, 1 = DNxHD, 2 = ProRes
				[1] = codec variant	–	–	RAW: 0 = Uncompressed, 1 = lossy 3:1, 2 = lossy 4:1
					–	–	ProRes: 0 = HQ, 1 = 422, 2 = LT, 3 = Proxy, 4 = 444, 5 = 444XQ
	10.1	Transport mode	int8	[0] = mode	–	–	0 = Preview, 1 = Play, 2 = Record
				[1] = speed	–	–	-ve = multiple speeds backwards, 0 = pause, +ve = multiple speeds forwards
				[2] = flags	–	–	1<<0 = loop, 1<<1 = play all, 1<<5 = disk1 active, 1<<6 = disk2 active, 1<<7 = time-lapse recording
				[3] = active storage medium	–	–	0 = CFast card, 1 = SD
PTZ Control	11.0	Pan/Tilt Velocity	fixed 16	[0] = pan velocity	-1.0	1.0	-1.0 = full speed left, 1.0 = full speed right
				[1] = tilt velocity	-1.0	1.0	-1.0 = full speed down, 1.0 = full speed up
	11.1	Memory Preset	int8 enum	[0] = preset command	–	–	0 = reset, 1 = store location, 2 = recall location
			int8	[1] = preset slot	0	5	–

Example Protocol Packets

Operation	Packet Length	destination (0)	length (1)	command (2)	reserved (3)	category (4)	parameter (5)	type (6)	operation (7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
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				

Blackmagic Embedded Tally Control Protocol

Version 1.0 (30/04/14)

This section is for third party developers or anybody who may wish to add support for the Blackmagic Embedded Tally Control Protocol to their products or system. It describes the protocol for sending tally information embedded in the non-active picture region of a digital video stream.

Data Flow

A master device such as a broadcast switcher embeds tally information into its program feed which is broadcast to a number of slave devices such as cameras or camera controllers. The output from the slave devices is typically fed back to the master device, but may also be sent to a video monitor.

The primary flow of tally information is from the master device to the slaves. Each slave device may use its device id to extract and display the relevant tally information.

Slave devices pass through the tally packet on their output and update the monitor tally status, so that monitor devices connected to that individual output may display tally status without knowledge of the device id they are monitoring.

Assumptions

Any data alignment / padding is explicit in the protocol. Bit fields are packed from LSB first.

Blanking Encoding

One tally control packet may be sent per video frame. Packets are encoded as a SMPTE 291M packet with DID/SDID x51/x52 in the active region of VANC line 15. A tally control packet may contain up to 256 bytes of tally information.

Packet Format

Each tally status consists of 4 bits of information:

```
uint4
     bit 0:     program tally status (0=off, 1=on)
     bit 1:     preview tally status (0=off, 1=on)
     bit 2-3:   reserved (0x0)
```

The first byte of the tally packet contains the monitor device tally status and a version number.

Subsequent bytes of the tally packet contain tally status for pairs of slave devices. The master device sends tally status for the number of devices configured/supported, up to a maximum of 510.

```
struct tally
     uint8
          bit 0:     monitor device program tally status (0=off, 1=on)
          bit 1:     monitor device preview tally status (0=off, 1=on)
          bit 2-3:   reserved (0b00)
          bit 4-7:   protocol version (0b0000)
     uint8[0]
          bit 0:     slave device 1 program tally status (0=off, 1=on)
          bit 1:     slave device 1 device preview tally status (0=off, 1=on)
          bit 2-3:   reserved (0b00)
          bit 4:     slave device 2 program tally status (0=off, 1=on)
          bit 5:     slave device 2 preview tally status (0=off, 1=on)
          bit 6-7:   reserved (0b00)
```

uint8[1]

    bit 0:   slave device 3 program tally status (0=off, 1=on)

    bit 1:   slave device 3 device preview tally status (0=off, 1=on)

    bit 2-3:   reserved (0b00)

    bit 4:   slave device 4 program tally status (0=off, 1=on)

    bit 5:   slave device 4 preview tally status (0=off, 1=on)

    bit 6-7:   reserved (0b00)

. . .
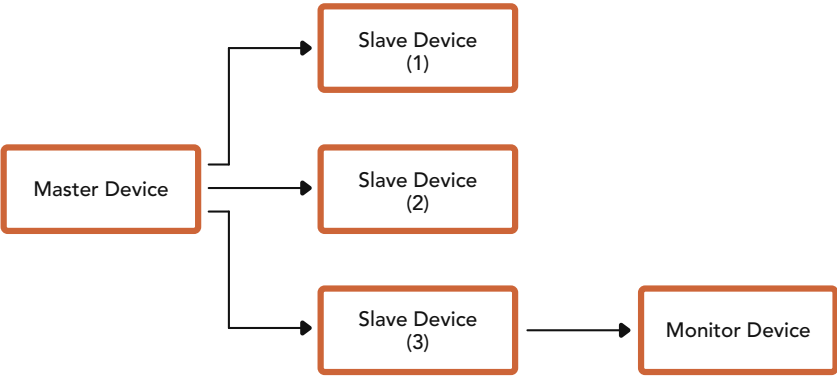
Byte	7 MSB	6	5	4	3	2	1	0 LSB
0	Version (0b0)	Version (0b0)	Version (0b0)	Version (0b0)	Reserved (0b0)	Reserved (0b0)	Monitor Preview	Monitor Program
1	Reserved (0b0)	Reserved (0b0)	Slave 1 Preview	Slave 1 Program	Reserved (0b0)	Reserved (0b0)	Slave 0 Preview	Slave 0 Program
2	Reserved (0b0)	Reserved (0b0)	Slave 3 Preview	Slave 3 Program	Reserved (0b0)	Reserved (0b0)	Slave 2 Preview	Slave 2 Program
3	…							

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 center 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 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 Utility software is installed on your computer, open the About Blackmagic Camera Utility window.

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

How to Get the Latest Software Updates

After checking the version of Blackmagic Camera Utility software installed on your computer, please visit the Blackmagic Design 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.

Regulatory Notices and Safety Information

Regulatory Notices

Disposal of waste of electrical and electronic equipment within the European union.

The symbol on the product indicates that this equipment must not be disposed of with other waste materials. In order to dispose of your waste equipment, it must be handed over to a designated collection point for recycling. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city recycling office or the dealer from whom you purchased the product.

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

Operation is subject to the following two conditions:

1 This device may not cause harmful interference.

2 This device must accept any interference received, including interference that may cause undesired operation.

Safety Information

The supplied AC to 12V DC power supply must be connected to a mains socket outlet with a protective earth connection.

This equipment is suitable for use in tropical locations with an ambient temperature of up to 40ºC. During sunny conditions, consider shading of the camera to prevent exposure of the camera or Lithium battery to extended periods of sunlight. Keep Lithium batteries away from all sources of heat.

The 12V DC output connector is suitable to provide power to the Blackmagic URSA Viewfinder or Blackmagic URSA Studio Viewfinder. When connecting other accessories to this connector, ensure that the power consumption is less than 18W.

No operator serviceable parts inside. Refer servicing to your local Blackmagic Design service centre.

Warranty

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 obliged 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.

Exposing URSA Viewfinder to direct sunlight could damage the viewfinder display as the viewfinder optics act as a magnifying glass. Image retention or burn-in could happen on OLED panels when static or high contrast images, such as frame guides, are displayed on the panels for extended periods. To avoid this, ensure the IR sensor for face detection is not covered deliberately and disconnect the viewfinder when not in use for prolonged periods. Image retention is not covered by this product warranty.

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 DURING THE WARRANTY PERIOD IS THE WHOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER. BLACKMAGIC DESIGN WILL NOT BE LIABLE 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.