



RED EPIC[®]

OPERATION GUIDE

BUILD V1.7.10

EPIC-M & EPIC-X



WWW.RED.COM

RED EPIC® OPERATION GUIDE

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EPIC-M / EPIC-X

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COMPLIANCE

INDUSTRIAL CANADA EMISSION COMPLIANCE STATEMENTS

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FEDERAL COMMUNICATIONS COMMISSION (FCC) STATEMENT



This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

NOTE: This device complies with Part 15 of the FCC Rules.

Operations subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable interference.

CAUTION: If the device is changed or modified without permission from RED, the user may void his or her authority to operate the equipment.

AUSTRALIA AND NEW ZEALAND STATEMENT

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to EN 55022:2006

JAPAN STATEMENTS



This is a Class B product based on the standard of the Voluntary Control Council for Interference (VCCI) for information technology equipment. If this equipment is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス B 情報技術装置です。この装置は家庭環境で使用することを目的としていますが、ラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをしてください。

EUROPEAN UNION COMPLIANCE STATEMENTS

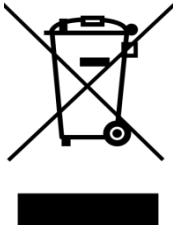


RED declares that the equipment described in this document is in conformance with the requirements of the European Council EMC Directive 2004/108/EC, Low Voltage Directive 2006/95/EC, RoHS Directive 2002/95/EC and WEEE Directive 2002/96/EC.

This declaration is based upon compliance of the product to the following standards:

- EN 55022, Information Technology Equipment - Radio Disturbance Characteristics
- EN 55024, Information Technology Equipment - Immunity Characteristics
- EN 61000-3-2, Limits for harmonic current emissions
- EN 61000-3-3, Limits for harmonic current emissions
- EN 60950-1, Information Technology Equipment – Safety

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The Waste Electrical and Electronic Equipment (WEEE) mark applies only to countries within the European Union (EU) and Norway. This symbol on the product and accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product to designated collection points where it will be accepted free of charge. Alternatively, in some countries you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling. Please contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

For business users in the European Union, if you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

Responsible party:

Red Digital Cinema®

34 Parker

Irvine, CA 92618

USA

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BEFORE YOU START

Congratulations on your purchase of a RED EPIC® camera. Please read the attached safety instructions, and only then unpack the camera body and any accessories. If there is any physical damage or missing components for either your camera body or any accessories, please file a support ticket at www.RED.com/support.



Figure 1: RED EPIC Camera

IMPORTANT SAFETY INSTRUCTIONS

READ BEFORE USING YOUR CAMERA

- A. Heed all cautions and warnings in these instructions.
- B. Read these instructions before operating the camera and accessories.
- C. Follow these instructions while operating the camera and accessories.
- D. Keep these instructions with the camera and accessories at all times.
- E. DO NOT attempt to modify, dismantle or open your camera, lens or other accessory as doing so may expose you to electric shock and serious injury. There are no user-serviceable parts inside. Alteration or repairs made to the camera, lens or other accessory, except by a RED authorized service facility, will void the Limited Warranty. Users are not permitted to make design changes or otherwise modify the operation of the camera, lenses or other accessories, without the express written approval of RED DIGITAL CINEMA.
- F. Only use attachments/accessories specified by RED.
- G. Install camera and accessories in accordance with the manufacturer's instructions.
- H. Avoid imaging of laser beams as they may cause damage to the sensor.
- I. DO NOT use the camera or accessories near water. Avoid exposing your camera to moisture. The unit is not waterproof, so contact with water could cause permanent damage to the unit as well as electric

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shock and serious injury to the user. DO NOT use the camera in the rain or under other conditions with high moisture without appropriate protection, and immediately remove power source if camera or accessories are exposed to moisture.

WARNING: To reduce the risk of fire or electric shock, do not expose the camera or accessories to rain or moisture.

- J. DO NOT expose your camera to excessive vibration or impact (shock). Be careful not to drop your camera. Internal mechanisms may be damaged by severe shock. Mechanical alignment of optical elements may be affected by excessive vibration.
- K. **ELECTROMAGNETIC INTERFERENCE:** The use of devices using radio or other communication waves may result in the malfunction or interference with the unit and/or with audio and video signals.
- L. Clean only using a dry cloth. When cleaning your camera, remember that it is not waterproof and moisture can damage electronic circuitry. DO NOT rinse or immerse any element of the camera, lens or other accessory, keep them dry at all times. DO NOT use soaps, detergents, ammonia, alkaline cleaners, and abrasive cleaning compounds or solvents. These substances may damage lens coatings and electronic circuitry.
- M. Maintain sufficient ventilation - DO NOT block any ventilation openings or obstruct cooling fan airflow.

CAUTION: Proper camera ventilation requires a minimum .5" (1,25cm) clearance between the camera ventilation openings and external surfaces. Verify airflow is not impeded by objects that block or cover the ventilation openings. Failure to permit adequate airflow may result in overheating of the camera, degraded operation and in extreme situations, damage to the camera.

- N. DO NOT operate or store near any heat sources such as radiators, heat registers, stoves, or any other apparatus that produce heat. Store in a protected, level and ventilated place. Avoid exposure to temperature extremes, damp, severe vibration, strong magnetic fields, direct sunlight or local heat sources during storage. Remove any batteries from the camera before storage. Recommended storage and usage temperatures for your camera, lenses and other accessories are:
 - a. Operating range: 0°C to +40°C (32°F to 104°F)
 - o Storage range: -20°C to +50°C (-4°F to 122°F)

If there are any performance issues with your camera or accessories when operating within this temperature range, please file a support ticket on www.RED.com/support.

- O. The Side Handle, Side SSD Module, rear modules and Lens Mount are **NOT HOT SWAPPABLE** – meaning you cannot remove or install them while the camera is powered on. Before installing or removing any of these accessories, you MUST power down the camera. Failure to do so may result in damage to the accessory and / or camera brain that will not be covered under warranty.
- P. Do not bypass the third prong of the grounding-type plug on the power cord of the AC Power Adapter. A grounding-type plug has two blades and a third “grounding” prong. The third prong is provided for your safety. A grounding-type plug shall be connected to an outlet with a protective earthen connection. If the grounding-type plug does not fit into your outlet, do not attempt to modify the plug or outlet, consult a qualified electrician.
- Q. Protect all power cords from being pinched, walked on or driven over by a vehicle. Replace any power cords suspected of sustaining damage due to crushing or other forms physical damage.

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CAUTION: The power cord plug for the AC Power Adapter is used as the power disconnect. To disconnect all power from the AC Power Adapter, unplug the power cord plug from the wall outlet. During use, the power cord plug should remain easily accessible at all times.

R. Lithium Ion batteries may be subject to special handling requirements pursuant to federal and local laws. Please refer to specific shipping instructions included with your battery regarding proper transport of your battery. Do not handle your battery if it is damaged or leaking. Disposal of batteries must be in accordance with local environmental regulations. For example, California law requires that all rechargeable batteries must be recycled by an authorized recycle center. Storing batteries fully charged or in high temperature, conditions may permanently reduce the life of the battery. Available battery capacity may also be temporarily lessened after storage in low temperature conditions.

WARNING: Do not expose the battery to excessive heat.

WARNING: Danger of explosion if an incorrect battery is charged with the RED Charger or is used to power the camera and accessories. Replace only with the same or equivalent type battery.

CAUTION: Refer all service and repair to qualified RED service personnel. To reduce the risk of electric shock, and damage to the camera or accessories, DO NOT attempt to perform any servicing other than any procedures that are recommended in the operating instructions.

THEORY OF OPERATION

The RED EPIC digital cinema camera provides high performance digital imaging over a wide range of frame rates and optical formats including Super 35mm, 35mm and Super 16mm. The camera is supplied as standard with a PL mount, and may be configured with mounts and 19 mm rods to accommodate most cinematography lenses, matte boxes and follow focus systems. Adaptors for 15mm offset studio and 15mm lightweight rods are also available.

In addition to compatibility with existing PL mount cinematography lenses, a select range of S35mm (APS-H) PL mount prime and zoom lenses are available from RED.

Other lens mounts, including Canon EF are available, permitting the use of Canon photographic lenses. Lens mounts can report lens iris, focus and zoom data when mated to an appropriate lens. In addition, the iris settings for select Canon lenses may be driven from the camera. Lenses with small image circles may have restricted sensor coverage at wide angle.

Lens mounts may be exchanged in the field, however it is highly recommended that this be performed in a dust-free environment, as the optical path will be exposed to the elements during this process.

A B4 mount to PL mount adaptor is also available to permit use of 2/3" HD lenses on the RED EPIC camera. The optical coverage it provides is approximately equivalent to 16mm hence the maximum recording resolution with a B4 lens is 2K RAW (2048 x 1152 pixel) progressive scan.

MYSTERIUM X® SENSOR

The MYSTERIUM X sensor has been specifically designed for use with RED EPIC cameras, and provides variable frame rate imaging over 1 to 240 fps at up to 2K resolution, 1 to 160 fps at up to 3K resolution, and 1 to 120 fps at up to 4K or 5K resolution.

Native color balance for the MYSTERIUM X sensor is 5,000 degrees Kelvin, but it may be electronically compensated for any color temperature in the range 1,700 to 10,000 degrees Kelvin. White balance preset values include Tungsten (3200K) and Daylight (5600K) light sources; the camera may also calculate a color neutralizing White Balance value on demand by imaging on a standard white or 18% grey card.

The MYSTERIUM X sensor includes high precision analog to digital conversion, capable of delivering up to 13.5 stops of dynamic range with daylight light sources over a camera sensitivity range of 320-800 ISO.

IMAGE PROCESSING

The digital image received from the sensor is formatted as a pixel defect corrected (but in all other aspects unprocessed) 12-bit, 14-bit or 16-bit per pixel RAW data frame. When operating in STILL mode, each image received from the sensor is treated as a unique FRAME; however when operating in MOVIE mode, successive images received from the sensor are collected together into a CLIP. In all other regards, a frame of information gathered in STILL mode or MOVIE mode is identical.

Each RAW frame or sequence of RAW frames in a clip is compressed using proprietary wavelet based REDCODE® RAW compression, then stored to digital media such as a REDMAG™ 1.8" SSD.

The RAW data recorded is independent of any RGB domain signal processing choices such as ISO, White Balance or other RGB color space adjustments made by the camera operator. These parameters are saved with the RAW data as reference METADATA; they are not burned into the recorded RAW data.

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This recording technique permits RGB color processing choices to be deferred to post production and/or to be adjusted in the field to visualize alternative color treatments, without impacting the recorded image.

The camera's monitoring path converts RAW sensor data to a white balanced 12-bit depth 2048 x 1080 pixel RGB 4:4:4 video signal. This signal may be modified using ISO, White Balance or other RGB color space adjustments as desired by the operator, and is then scaled and gamma corrected to provide VIEWFINDER, HD-SDI and HDMI monitor outputs at 10-bit depth in 4:2:2 Y,Cb,Cr, or at 8-bit depth in 4:4:4 RGB.

Frame guides and other camera data may be added as desired by the user to one or more of the outputs.

NOTE: If a specific set of RGB image processing values are desired to be repeatable on-set, a .RMD "look" file may be created by supplied REDCINE-X® PRO application software. The camera can generate preset files (.preset) which are more flexible as they can be image settings or other settings. Go to SECONDARY MENUS > PRESETS for details.

HDRX™

HDRx is an option for extending dynamic range from +1 to +6 stops over the baseline Dynamic Range offered by the camera. HDRx mode simultaneously shoots two images of identical resolution and frame rate - a primary track (A-track) that is normally exposed, and a the secondary track (X-track) that has an exposure value that reflects the additional stops of highlight protection desired.

EXAMPLE: If you select an HDR value of +2 and your primary exposure is 1/48th sec, the X-track exposure will be 2 stops faster, 1/192 sec.

The ISO and Aperture remain the same for both exposures.

During acquisition and recording, the two tracks are "motion-conjoined", meaning there is no gap in time between the two separate exposures. This is important to note because if they were two standard alternating exposures, there would be a time gap between the two tracks that would show up as an undesirable motion artifact. Both tracks (A & X) are stored in a single R3D® file. Since there are two exposures, when in HDRx mode, the camera is recording double the amount of frames. For example, if you are shooting 24fps, the camera is recording two 24fps tracks, which is the data rate equivalent of 48fps. However, after combining the two tracks in postproduction you see only one 24fps motion stream.

HDRx provides multiple options for exploitation in postproduction.

- Blend the two tracks in post tools like REDCINE-X, Storm or any other application that supports the SDK to create Magic Motion™. This blending of the two tracks comes with a slider so you can decide just how much of each track you want to use. A preview window shows you the combined result of your selection, or you can view each track individually.
- Combine the two tracks using MNMB (More Normal Motion Blur). MNMB is designed to emulate the motion of a traditional camera with full motion blur. This is a tool created by The Foundry that uses a new motion estimation algorithm designed specifically for HDRx. The shorter exposure (sharper image) is blended to match the motion blur of the normal exposure. Again, a preview window shows the combined result of your selection, or you can view each track individually.
- Use the X-track data for motion tracking, then combine the X-track with the A-track as in #1 or #2 above... or just motion stabilize the A-track using the motion analysis data extracted from the X-track.
- Exporting to EXR file format will give you a multi-view EXR with both exposures (like a stereo EXR).

NOTE: If you ignore the X-track completely, you will have a standard exposure with 13.5 stops of native dynamic range just as if you had not enabled HDRx. For this reason, we encourage the A-track exposure to be "normal" as it provides the most options. If you are tempted to shoot "over-under", you are then fully committed to using HDRx and your postproduction options are reduced.

NOTE: When recording in HDRx mode the camera records twice as many frames, so the maximum frame rate, minimum REDCODE ratio, and maximum record time on your media will be cut in half.

MAGIC MOTION™

Shooting at 24fps and with an 180 degree (1/48th) shutter on a film or digital camera may create an optical illusion we are familiar with, however it is not really the way the eye sees motion. To understand this, ask someone to stand in front of you and swing their arm over their head from one side to the other. What you would observe in the recording is a constant motion blur until the arm stopped. What your eye sees though is both motion blur AND a sharper reference to the arm and hand all along the motion path. "Magic Motion" provides such a combination of motion blur (A-track) and a sharper reference (X-track), with the bonus of extreme dynamic range not available with any other motion capture camera system.

AUDIO RECORDING

The RED EPIC can record up to two discreet channels of microphone level uncompressed 24-bit, 48 KHz audio (four channels of microphone level or line level audio inputs when equipped with a PRO I/O Module), that are synchronized with video and timecode, to REDMAG 1.8" SSD media.

Input signals are routed via a high quality pre-amplifier and optional soft clip limiter in order to achieve the desired audio reference / recording level and to maximize dynamic range.

To assist with audio reference level setup, the camera provides a color-coded Audio meter in the Graphical User Interface. Meter range is -36dBu to +20dBu (-56dBFS to 0dBFS) with audio input type and audio input clipping indication.

Audio monitor output options include a 2-channel headphone output on the camera Brain and 2-channel line level analog outputs from the optional PRO I/O Module, plus 2-channel and 4-channel 24-bit 48KHz uncompressed digital audio embedded in the HD-SDI and HDMI outputs.

MICROPHONE LEVEL ANALOG INPUTS

The recording level of Microphone inputs are affected by the sensitivity of the microphone and the Gain setting of the camera's pre-amplifier. Available pre-amplifier range is +8dB to +62dB, with a default value of +32dB. The camera operator should choose a Gain value that aligns the input signal to the 0dBu reference line drawn through the camera's peak meter (or +4dBu line if referencing to that level).

This setting provides up to 30dB of input signal headroom above reference 0dBu level before clipping (26dB for +4dBu reference level) and maximizes the signal to noise ratio of the 24-bit digital recording.

LINE LEVEL ANALOG INPUTS

The recording level of Line inputs are affected only by the signal provided by the field production sound mixer or other external line level source. The sound mixer operator should choose a mixer output level that aligns a reference tone signal to the 0dBu (0.775 volts RMS / -20dBFS) reference mark drawn through the camera's Peak Meter, or if using +4dB as reference level, a mixer output level that aligns a reference tone signal to the +4dBu (1.23 Volts RMS / -16dBFS) reference mark.

The 0dBu setting provides up to 24dB of input signal headroom above reference level before clipping (20dB for +4dBu reference level) and the maximum signal to noise ratio for the 24-bit digital recording.

VIDEO MONITORING OUTPUTS

In its default configuration, the RED EPIC camera can simultaneously support one VIEWFINDER output (suitable for use by a BOMB EVF®, or RED LCD) plus one HD-SDI based PROGRAM output and one HDMI based PREVIEW output. Each output can support a set of overlay graphics including camera GUI, timecode, clip name and framing guides; the specific overlay graphics for each type of output is user configurable.

The default VIEWFINDER output is the EVF / LCD connector located on the front face of the Side SSD Module. If neither of these is connected, VIEWFINDER output will be automatically transferred to the HDMI output, or it may be selected by the operator to appear on the HD-SDI output of the camera Brain.

BOMB EVF

A 1280 x 784 pixel resolution progressive scan color image equivalent to viewing a 17" reference monitor from a distance of about 3ft (1m), with Surround View™ look around area, frame guides and safe action / title, zebra and false color exposure overlays, operational status and setup menus.

RED LCD

A 800 x 480 resolution RGB 4:4:4 progressive scan touchscreen video display with Surround View™ look around area, frame guides and safe action / title, zebra and false color exposure overlays, operational status and setup menus.

HD-SDI

A 720p or 1080p output suitable for monitoring or recording to an external VTR or DDR device. May be configured for 10-bit Gamma or 10-bit LOG encoded video data. Three different viewing options are available, Preview (menus), Guides (frame guides only) and Program (clean feed). Refer to SECONDARY MENUS > SETTINGS MENU > AUDIO/VIDEO > MONITOR CONTROL for complete details.

When an HD-SDI monitor is connected along with an LCD or EVF, only the main screen menu items will be displayed in Grayed-out text. The menu items will reflect any changes made to Frame Rate, ISO, Shutter Speed, White Balance, Resolution, and REDcode settings, and will not display the same information as the LCD / EVF while making adjustments. Example, when the secondary menus are accessed using the touchscreen LCD, the HD-SDI output will not show the secondary menus, only the main screen menus.

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HDMI

A 720p or 1080p PREVIEW output suitable for monitoring via a PC monitor or most HDTV displays.

When an HD-SDI or HDMI monitor is connected WITHOUT an LCD or EVF, and in PREVIEW mode, the HD-SDI or HDMI monitor will display the menus as if it were the LCD or EVF as shown below, displaying setting changes in real-time.



Figure 2: Example of Video Monitor Output – WITHOUT LCD or EVF Connected

RED LCD / BOMB EVF®

The optional RED LCD and BOMB EVF are specialized video monitors that provide the user with a variety of tools to assist framing, focus and exposure, including:

- Surround View™, which is an additional look around area, visible outside of the recorded image.
- Frame Guides, showing common film presentation and television aspects such as 2.40:1 and 16:9.
- Focus, aided by high display resolution, 1:1 Focus Check function and False Color overlay.
- Exposure, aided by dual Zebras, False Color overlay, RAW “Traffic Lights” and RGB histogram.
- System information including current frame rate, ISO rating, shutter speed, color temperature, record resolution, record quality, clip name, timecode value and the remaining battery and media capacity.

For applications where use of an attached RED EVF or RED LCD is not desired – for example when working on a crane – the VIEWFINDER output can be transferred to the HD-SDI or HDMI outputs, supporting remote camera monitoring up to 200 ft away.

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REDMOTE®

REDmote is a proprietary camera control unit for RED EPIC cameras that attaches to the rear of the camera Brain or the back face of the rearmost expansion module. The REDmote may also be detached from the camera and operate over a proprietary REDlink™ 2.4Ghz wireless connection.

Whether operating attached or via wireless, REDmote supports all basic controls necessary to operate the camera, including Record Start / Stop, Shutter Speed, White Balance, ISO and programmable User Keys. An integrated color LCD displays camera parameters, media and battery capacity and REDmote menus.

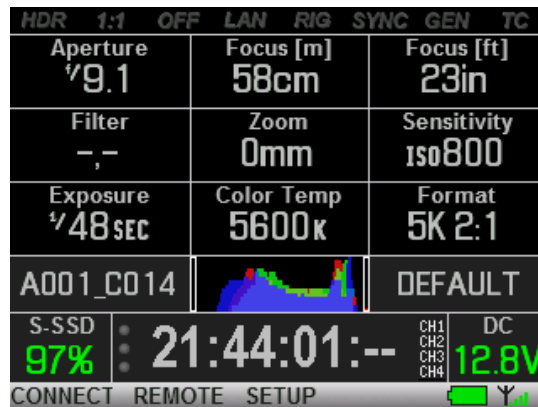


Figure 3: REDmote LCD display

REDmote includes a rechargeable Li-Ion battery, which automatically re-charges when attached to the camera or rearmost module. It may also be re-charged by connecting to a USB 2.0 based power source such as a laptop PC or cell phone charger. Under typical operating conditions, REDmote should operate for up to 8 hours without requiring a re-charge and support a wireless communication range of approximately 50 ft.

DIGITAL MAGAZINE (MEDIA)

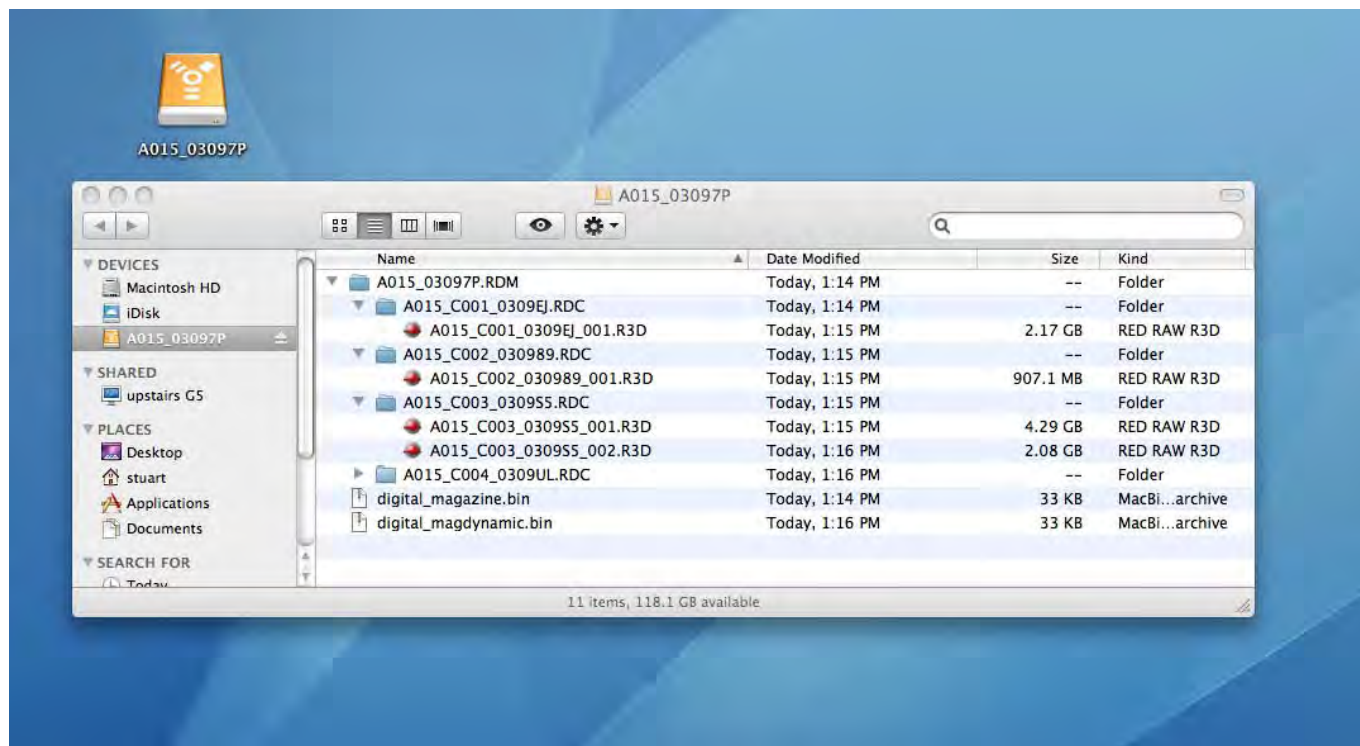
REDCODE RAW compressed MOVIE clips and STILLS images, plus time code, multi-channel audio and metadata may be recorded to **REDMAG 1.8" SSD** solid-state digital media of 64GB, 128GB or 256GB capacity.

Each MOVIE clip is recorded with a unique name and with all the appropriate elements of the clip including one or more REDCODE RAW.R3D files and associated metadata, placed in a clip folder with the file extension .RDC. Refer to CLIP NAMING CONVENTIONS.

All Clips are placed in a master folder (i.e. root directory) for the Magazine with the file extension .RDM. This folder contains all clips recorded on that digital magazine; therefore copying these clips from the digital magazine to backup media may be performed by a single drag and drop operation.

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For additional information about digital magazines, refer to APPENDIX B: MANAGING DIGITAL MEDIA.



METADATA

RED EPIC cameras record extensive Metadata, which is data that describes the precise characteristics of the picture and sound signals in each frame of the recording. This includes camera specific setup information, project and clip management information, Clip Name, Time Code, Date and GMT, lens and shutter speed / angle parameters, audio settings and any video image processing information.

CLIP NAMING CONVENTIONS

When you press RECORD, the camera automatically creates a unique name for the CLIP being recorded to the REDMAG 1.8" SSD media. The format of the clip name is Camera Letter + Reel Number + Month + Day + ** - where ** is a random two digit alphanumeric number used to prevent accidental duplication of file names.

e.g. A001_C002_0502A6.RDC

Where: A = camera A, 001 = reel 001, C002 = clip 002, and 0502 = May 02, and the digits A 6 are the random characters generated by the camera as described above. Other examples are shown below:

A001_C001_0502X3.RDC

A001_C001_0502G6.RDC

A001_C001_0502AB.RDC

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MULTI CAMERA SHOTS

The naming scheme means that three cameras, slated as A, B, C, will generate easily recognizable clips:

A001_C001_0502**.RDC

B001_C001_0502**.RDC

C001_C001_0502**.RDC

3D FOOTAGE

Refer to APPENDIX F: 3D SETUP / OPERATION > CLIP NAMING CONVENTIONS.

SMPTE TIMECODE

Edge Code is a SMPTE timecode track that always starts at 1.00.00.00 on the first frame recorded to the digital media. It is a sequential code that is continuous from frame to frame and also continuous from clip to clip. Edge Code is equivalent to RUN RECORD commonly found on broadcast cameras.

Time Code is a SMPTE timecode track that synchronizes to the camera's clock, or if operated in Jam Sync mode, to an externally supplied SMPTE master timecode signal. It is a sequential code that is continuous from frame to frame, but is discontinuous from clip to clip.

The timecode counter always updates at the same frame rate as the recording, irrespective of whether the camera is operating in normal or Vari-Speed recording mode. This ensures that a valid SMPTE timecode is created without count jumps that would affect clip playback during editing. If operating in Jam Sync mode referenced to an external timecode source, the clip's master time reference point is the first frame of the recorded clip.

NOTE: When in Loop Record mode, Edge Code will also become discontinuous from clip to clip, because frames copied into the cache memory are discarded. This may lead to editing difficulties with postproduction applications that assume continuous timecode.

POWER CONSUMPTION

The camera draws approximately 60 watts when recording in 5K resolution, 24fps MOVIE mode. The camera is cooled by convection from the camera body assisted by a fan contained in a sealed air duct.

Under typical operating conditions, a REDVOLT® XL 90Wh battery will run the camera and accessories for about 90 minutes. A REDVOLT 30Wh battery will run the camera and accessories for about 30 minutes.

CAMERA OPERATIONAL CONTROLS

This section describes the available operational controls on the EPIC-M and EPIC -X camera Brain, Side SSD Module, Side Handle and REDmote accessories.

BRAIN



| | |
|----------|-----------------------|
| A | Power Status LED |
| B | Power / Record Button |
| C | Record Status LED |

Figure 4: Power / Record Button / Status LEDs

- **Power / Record Button:** Powers camera Up / Down and initiates Record Stop / Start
- **Power Status LED:** Indicates Status of Power:
 - LED Red = Power Present
 - LED Yellow = Low Level Code Booting
 - LED Green = Running on AC
 - LED Green Blinking = Running on Battery

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- LED Yellow Blinking = Running on Battery below 10%
- LED Red Blinking = Running on Battery Below 5%
- **Record Status LED:** Indicates status of camera for recording:
 - LED Off = No Media
 - LED Green = Ready to Record
 - LED Red Constant = Recording
 - LED Red Slow Blink = Recording, 25% Media Left
 - LED Red Fast Blink = Recording, 5% Media Left
 - LED Yellow = Finalizing
- **Both LEDs:** Indicates status of camera for recording:
 - Both LEDs Green Blink = FW Update in Progress

SIDE SSD MODULE



| | |
|---|-----------------------|
| A | SSD Slot |
| B | User Key 1 |
| C | User Key 2 |
| D | Focus / Record Button |
| E | Media Indicator |

RED EPIC® OPERATION GUIDE

Figure 5: Side CF / SSD Controls

- **SSD Slot:** Slot for REDMAG 1.8" SSD Media.
- **User Key 1:** Initiates user defined camera function. Undefined by Default.
- **User Key 2:** Initiates user defined camera function. Undefined by Default.
- **User Key 1 + User Key 2 :** Press both keys to Eject (unmount) REDMAG 1.8" SSD Media
- **Focus / Record Button:** Touch for Auto Focus, fully depress to Start or Stop Record.
- **Media Indicator LED:** Indicates status of media:
 - LED Off = No Media
 - LED Green = Ready to Record
 - LED Red Constant = Recording
 - LED Red Slow Blink = Recording, 25% Media Left
 - LED Red Fast Blink = Recording, 5% Media Left
 - LED Yellow = Finalizing
 - LED Yellow Blinking = Media Access (Format etc...)

RED EPIC® OPERATION GUIDE

SIDE HANDLE

TOP



| | | | |
|----------|-----------------------|----------|----------------------|
| A | Battery Release | D | LCD Menu Keys |
| B | Focus / Record Button | E | LCD Display |
| C | Adjustment Ring | F | LCD Backlight Button |

Figure 6: RED Side Handle Controls - Top

- **Battery Door Release Button:** Releases Side Handle battery door to permit battery exchange.
- **Focus / Record Button:** Touch for Auto Focus, fully depress to Start or Stop Record.
- **Adjustment Ring:** Selects and adjusts camera parameter values. Similar to the scroll wheel on the navigation group.
- **LCD Menu Keys:** Specific functions are defined by LCD screen.
1 – ISO 2 – F-Stop 3 – Shutter Speed 4 – White Balance
- **LCD Display:** Displays key camera parameter values.
- **LCD Backlight Button:** Enables LCD backlight.

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FRONT



| | |
|---|-----------------------|
| A | Stills / Movie Slider |
|---|-----------------------|

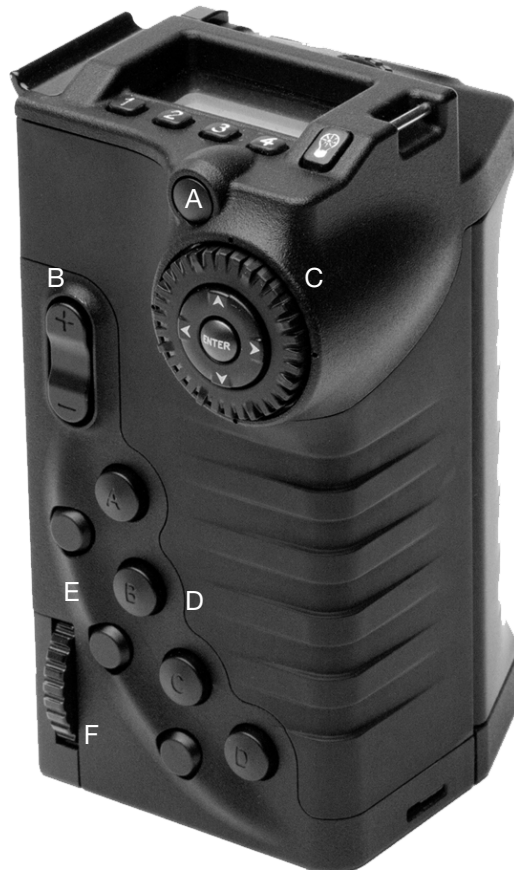
Figure 7: Side Handle Controls - Front

- **Stills / Movie Slider:** Selects between STILLs and MOVIE modes of operation.

NOTE: This switch is not active at this time. Default camera operation is MOVIE

RED EPIC® OPERATION GUIDE

REAR



| | | | |
|---|------------------|---|------------------|
| A | MENU Button | D | User Keys A-D |
| B | Rocker Switch | E | System Keys 1- 3 |
| C | Navigation Group | F | Thumbwheel Lock |

Figure 8: RED Side Handle Controls - Rear

- **Menu Button:** Press to access / camera setup menus.
- **Rocker Switch:** Increases or decreases selected value based on parameter selected in USER KEYS.

RED EPIC® OPERATION GUIDE

- **Navigation Group:** Allows navigation through camera menus, selection of camera parameter for adjustment, and adjustment of selected camera parameter.

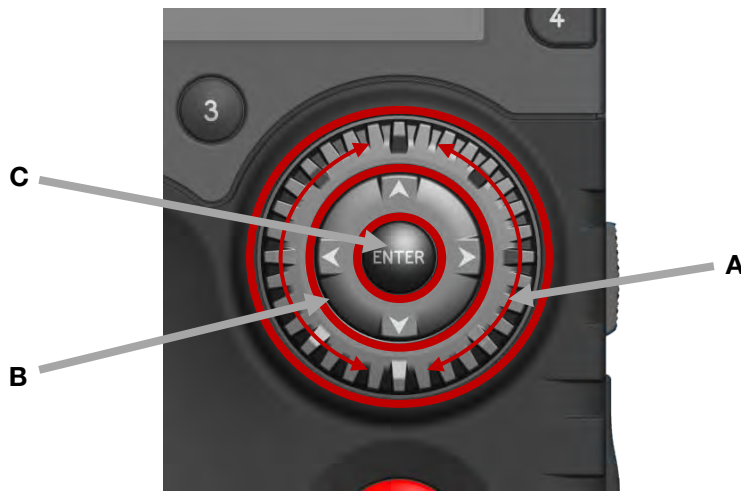


Figure 9: Side Handle Navigation Group

| | | | | | |
|----------|--------------|----------|----------------|----------|--------------|
| A | Scroll Wheel | B | Direction Keys | C | Enter Button |
|----------|--------------|----------|----------------|----------|--------------|

- **Scroll Wheel:** Selects and adjusts camera parameter value.
 - **Direction Keys:** Navigates camera menus and may select parameter for adjustment.
 - **Enter Button:** Confirms selected parameter value adjustment.
- **User Keys:** User Function Keys A-D (F). The specific function of these keys may be programmed by the user. Default settings for User Function Keys A-D are as follow:
 - User Key A – Press to execute user defined function. Default: Toggles Focus Assist Indicator
 - User Key B – Press to execute user defined function. Default: Performs WB Calc
 - User Key C – Press to execute user defined function. Default: Toggles False Color > 1:1 Magnify
 - User Key D – Press to execute user defined function. Default: Toggles False Color > Exposure Check
 - **System Keys:** Function is defined by System Firmware. The specific function of these keys may be programmed by the user.
 - Upper: Toggles false color Exposure Check
 - Center: Not currently defined
 - Lower: Ejects (unmounts) the currently selected Media

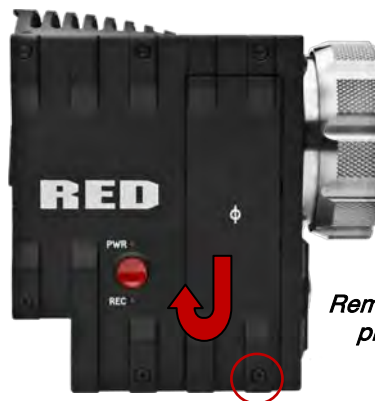
RED EPIC® OPERATION GUIDE

INSTALLATION / REMOVAL

WARNING: THE SIDE HANDLE IS NOT HOT SWAPPABLE - MEANING YOU CANNOT REMOVE OR INSTALL WHILE THE CAMERA IS POWERED ON. BEFORE INSTALLING OR REMOVING THE SIDE HANDLE, YOU MUST POWER DOWN THE CAMERA. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE SIDE HANDLE AND / OR CAMERA BRAIN THAT IS NOT COVERED BY WARRANTY.

To install the side handle:

1. Power down the camera if necessary.
2. Remove the brain side plate (if installed) by removing the single screw located at the bottom.
3. Rotate upwards to disengage lip at top of side plate from camera brain.



Remove screw and rotate side plate upwards to remove.

4. Insert the lip at the top of the side handle into the area where the lip from the side plate was installed.

Insert lip into top of camera brain.



Rotate thumbscrew upwards until tight.

Press side handle flush against camera brain.

5. Rotate side handle down flush along side of camera brain.
6. Rotate thumbscrew upwards until tight. Ensure side handle is secure to camera brain.

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To remove the side handle:

1. Power down the camera if necessary.
2. Rotate the thumbscrew downwards until detached from camera body.

Disengage lip from top of camera brain.

Rotate thumbscrew downwards until loose.

Rotate side handle upwards to remove.



3. Rotate upwards to disengage lip at top of side handle from camera brain.
4. Remove side handle from camera.

RED EPIC® OPERATION GUIDE

REDMOTE

This section describes the physical controls on the REDmote. For complete details on REDmote control, refer to APPENDIX E: REDMOTE OPERATION.

IMPORTANT: For your REDmote to operate with this camera build version, ensure your REDmote has been upgraded to the latest firmware. Refer to APPENDIX E: REDMOTE OPERATION > MAINTENANCE > UPGRADING REDMOTE FIRMWARE.



Figure 10: REDmote Controls

| | | | | | |
|----------|---------------------|----------|-----------------------|----------|--------------------|
| A | Still/Motion Slider | F | User Keys A-D | K | Soft Menu Keys 4-8 |
| B | Release Button (L) | G | MENU Button | L | Power/Lock Slider |
| C | Record LED | H | Soft Menu Keys 1-3 | M | Release Button (L) |
| D | Power LED | I | Navigation Group | N | USB Connector |
| E | Rocker Switch | J | Focus / Record Button | | |

- **Stills / Motion Slider:** Allows selection of STILLs or MOVIE operational modes.
- **Rocker Switch:** Provides continuous adjustment of parameter specified in USER KEYS menu.
- **User Keys:** Press to initiate camera functions as defined in USER KEY menu.

Default settings for User Function Keys A-D are as follow:

- User Key A – Press to execute user defined function. Default: Toggles Focus Assist Indicator
- User Key B – Press to execute user defined function. Default: Toggles False Color > RAW Check

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- User Key C – Press to execute user defined function. Default: Toggles False Color > 1:1 Magnify.
- User Key D – Press to execute user defined function. Default: Toggles False Color > Exposure Check
- **Menu Button:** Press to access / camera setup menus.
- **Soft Menu Keys 1-3:** Below the LCD are three (3) Soft Menu buttons 1-3 (H) whose functions are defined on the LCD screen. For complete information refer to APPENDIX E: REDMOTE OPERATION > OPERATION > REDMOTE MENUS > SOFT MENU BUTTONS 1-3.
- **Navigation Group:** Allows navigation through camera menus, selection of camera parameter and adjustment of selected camera parameter.

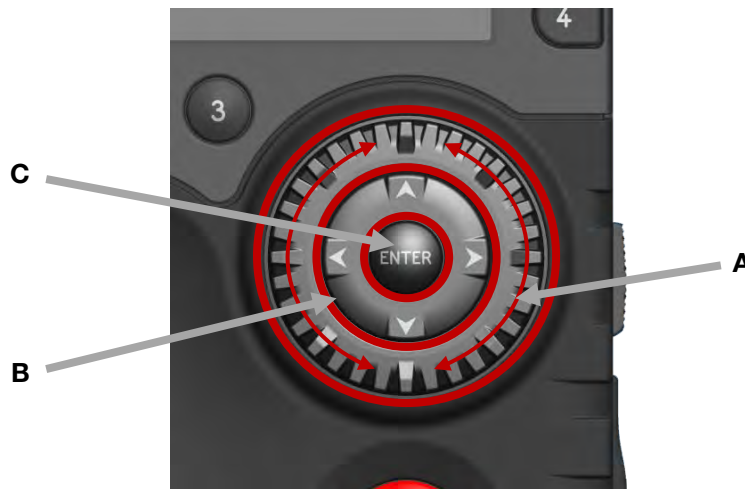


Figure 11: Side Handle Navigation Group

| | | | | | |
|---|--------------|---|----------------|---|--------------|
| A | Scroll Wheel | B | Direction Keys | C | Enter Button |
|---|--------------|---|----------------|---|--------------|

- **Scroll Wheel:** Selects and adjusts selected camera parameter value.
- **Direction Keys:** Navigates camera menus and may select parameter for adjustment.
- **Enter Button:** Confirms selected parameter value adjustment.
- **Focus / Record Button:** Touch for Auto Focus, fully depress to Start or Stop Record.
- **Soft Menu Keys 4-8:** To the right of the LCD are five (5) Soft Menu buttons 4-8 (H). These are pages displaying camera settings. For complete information refer to APPENDIX E: REDMOTE OPERATION > OPERATION > REDMOTE MENUS > SOFT MENU BUTTONS 4-8.
- **Power / Lock Slider:** Slide and hold down to power up / down REDmote and or camera. Slide up to lock keys.

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BOMB EVF



Figure 12: BOMB EVF

| | | | | | |
|---|------------|-----|--------------------|---|-----------------|
| A | Focus Ring | B/C | Brightness Control | D | EVF Tally Light |
|---|------------|-----|--------------------|---|-----------------|

- **Focus Ring:** Adjusts optimal subject focus for your eye. Available diopter range is +2.0 to -5.0.
- **EVF User Key (B):** Increases EVF display brightness.
- **EVF User Key (C):** Decreases EVF display brightness.

NOTE: The specific function of keys A and B may be programmed by the user.

TOUCHSCREEN LCD



Figure 14: RED Touchscreen LCD

| | | | | | |
|----------|------------------|----------|----------------|----------|----------------|
| A | Backlight Adjust | B | LCD User Key C | C | LCD User Key D |
|----------|------------------|----------|----------------|----------|----------------|

- **Backlight Adjust:** Adjusts LCD backlight intensity. Upper button +, Lower button -
- **LCD User Key C (B):** Press to execute user defined function. Default: Toggles False Color > 1:1 Magnify.
- **LCD User Key D (C):** Press to execute user defined function. Default: Toggles False Color > Exposure.

NOTE: The specific function of keys C and D may be programmed by the user.

NOTE: The touchscreen LCD also allows navigation of camera menus and selection and adjustment of camera parameters by directly touching icons on the screen. Gestures supported include:

- **Tap:** Tap on an icon to bring up a quick adjustment display.
- **Hold:** Touch and hold on an icon to bring up an advanced interface display.
- **Slide:** Touch and slide on an icon to increment a value.
- **Pinch:** Touch with two fingers, then open or close to magnify or normalize the video image.

RED EPIC® OPERATION GUIDE

BASIC OPERATION

This section describes basic operation, starting from power up, Viewfinder layout and Menu navigation.

WARNING: THE SIDE HANDLE, SIDE SSD MODULE, REAR MODULES AND LENS MOUNT ARE NOT HOT SWAPPABLE – MEANING YOU CANNOT REMOVE OR INSTALL THEM WHILE THE CAMERA IS POWERED ON. BEFORE INSTALLING OR REMOVING ANY OF THESE ACCESSORIES, YOU MUST POWER DOWN THE CAMERA. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE ACCESSORY AND / OR CAMERA BRAIN THAT WILL NOT BE COVERED UNDER WARRANTY.

POWER SOURCES

SIDE HANDLE

The optional Side Handle accepts one 30Wh REDVOLT® battery, which can power the camera and typical accessories for approximately 30 minutes when recording in 24 fps RAW 5K MOVIE mode.



Figure 15: Side Handle Battery Compartment

EXTERNAL DC POWER

EPIC accepts input voltages between 11.5V - 17V D.C and can draw a maximum current of 12 Amps.

- An appropriate 150W supply with DC output rated at 15V 10A such as AC Power Adapter P/N 740-0019 available from RED DIGITAL CINEMA.
- RED Charger. For RED Charger you must use 2B-to-1B Power Adapter Cable P/N 790-0138.

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- RED BRICK® 140Wh batteries may be used with Backpack Quickplate, RED Quickplate, Battery Belt Clip, or RED Cradle via 2B-to-1B Power Adapter Cable P/N 790-0138.
- 4-pin XLR DC power sources may be used with the camera via adaptor cable P/N 790-0164.

POWER UP

Locate the camera's Power / Record button on the right face of the Brain.

NOTE: This button also serves as a Record Start / Stop button once the camera is powered up.



| | |
|---|-----------------------|
| A | Power Status LED |
| B | Power / Record Button |
| C | Media Status LED |

Figure 16: Power / Record Button / Status LEDs

When an appropriate power source is connected to the Brain, the Power Status LED will illuminate Red. If it is illuminated, depress and then release the Power / Record button. The Power Status LED will initially go out and within 5 seconds illuminate Orange to confirm the camera is powering up, then it will illuminate Green, confirming the camera is powered up and ready to use.

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If a formatted REDMAG 1.8" SSD is attached to the Brain, once powered up the Media Status LED will illuminate Green. If this LED is not illuminated, verify a formatted REDMAG 1.8" SSD is inserted into the Side SSD Module and / or format the SSD if it has not previously been formatted on the camera.

NOTE: Once powered up, if the Power Status LED illuminates Red, it indicates low remaining battery capacity and a battery exchange or switch over to external DC power is recommended.

IMPORTANT: If after upgrading your EPIC to v1.6.20 or higher series firmware, you receive a "New fan available, please contact RED" notification on the camera, please contact RED technical support for assistance.

Press OK to use your camera as normal - the message will appear each time the camera is powered up. Pressing OK, HIDE will hide the message when the camera is powered up, however, be mindful that until the fan is changed, the camera temperature should be monitored. If the fan is not replaced as RED recommends and the camera is damaged by overheating, the camera warranty will be voided.

Once the updated fan has been installed and the camera is powered up, the message will continue to appear. Press OK, then go to **SECONDARY MENUS > SETTINGS > MAINTENANCE > REDISCOVER** and perform the rediscover procedure to clear the message.



POWER DOWN

The camera can be powered down in two ways:

1. Using REDmote or Side Handle Menu controls, or via Touch Screen LCD icons. Refer to SECONDARY MENUS > POWER.
2. Depress and continue to hold the Power / Record button in its fully depressed position for a minimum of 5 seconds. When the button is released, INITIATING CAMERA SHUTDOWN will display and camera will power down.

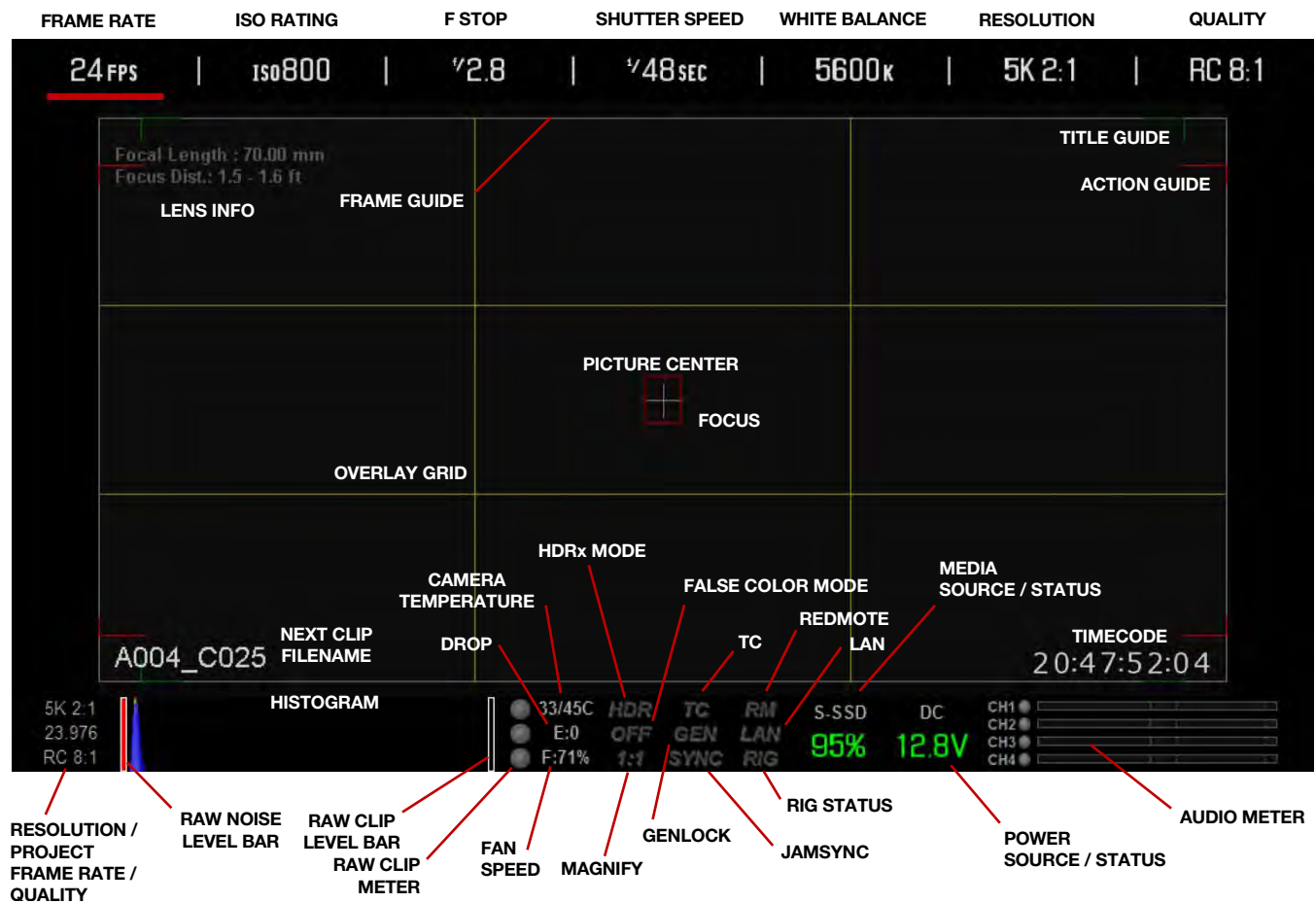
After Power Down, the Power Status LED will illuminate Red, if an appropriate power source is available.

RED EPIC® OPERATION GUIDE

GRAPHICAL USER INTERFACE AND NAVIGATION

RED LCD/TOUCHSCREEN LCD, BOMB EVF, EXTERNAL MONITORS


The following is a general description of the structure of the camera's Graphical User Interface (GUI) which overlays the video monitor signal on the Viewfinder output(s) of the camera.



The display elements include:

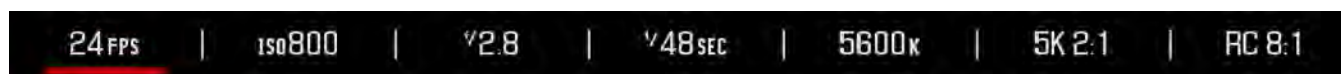
- **Frame Rate:** Current frame capture rate
- **ISO Rating:** Camera sensitivity
- **F Stop:** Functional when optional mount and lens are installed
- **Shutter Speed:** Exposure Time (or Degrees)
- **White Balance:** Color Temp
- **Resolution Record Resolution**
- **Quality:** REDCODE setting
- **Lens Info:** Lens information when using specific Canon or Cooke lenses.
- **Cursors:** Reference cursors – Safe Action / Safe Title, Picture Center, Grid Overlay

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- **Frame Guide:** Record or Projection area
- **Next Clip Filename:** Filename of the clip that will be shot next
- **Project Frame Rate:** Current project TIME BASE
- **Noise Level Bar:** Relative number of RAW pixels in noise
- **Histogram:** RGB Histogram.
- **Clip Level Bar:** Relative number of RAW pixels near clip
- **Clip Meter:** RGB sensor RAW clipping status
- **Temperature:** Camera core temperature
- **Drop:** Indicates if any frames were dropped during recording of the clip
- **Fan Speed:** Displays fan speed in %
- **HDR Mode:** Displays HDRx mode status
- **False Color Mode:** Displays false color overlay mode
- **Magnify:** Tallies 1:1 if magnify is selected
- **TC:** Indicates presence of valid SMPTE timecode signal
- **Genlock:** Indicates presence of valid Genlock signal / sensor sync to genlock
- **Jam Sync:** Timecode Jam Sync status / time code jam
- **RM:** Indicates communication to REDmote
- **LAN:** Indicates communication via Ethernet connection
- **RIG:** Indicates 3D rig metadata is present
- **Media Status:** Media location and remaining media capacity in %
- **Power:** Indicates D.C supply voltage or % of remaining battery capacity Including current supply voltage
- **Audio Meter:** Audio input selection and levels
- **Timecode:** Current **timecode** value
- **Menu ICON** : In the upper right corner on the touchscreen LCD - Opens the Secondary Menu

The GUI is broken down into the following three main sections: the Upper Status Row, the Live Action Area, and the Lower Status Row. On VIEWFINDER output(s), all three sections are visible, on PREVIEW outputs only the Live Action Area and associated graphic overlays are visible. On PROGRAM outputs, none of the graphic overlays are visible, i.e. a PROGRAM output is defined to be a CLEAN FEED output.

UPPER STATUS ROW



Provides immediate feedback on the most critical image composition parameter settings, including:

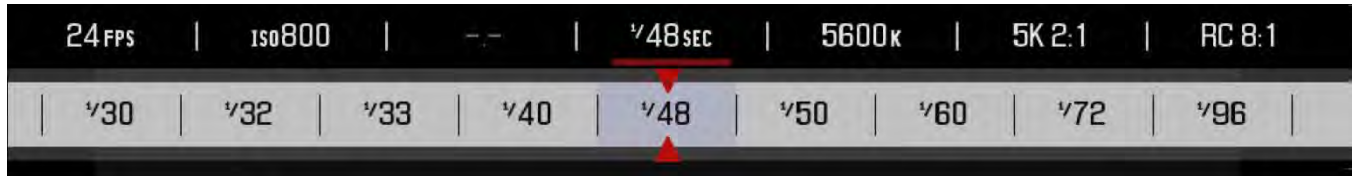
- Current frame capture rate
- ISO Rating
- Shutter Speed (or Shutter Angle)
- White Balance
- Record Resolution
- Record Quality

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Whichever parameter is underlined with a red bar may be immediately adjusted by pressing ENTER in the Navigation Group of the Side Handle or REDmote, then using the Scroll Wheel to change the value of that parameter. To confirm the parameter change press ENTER a second time.

NOTE: Shutter angle is displayed in Relative mode by default, as indicated by Yellow text.

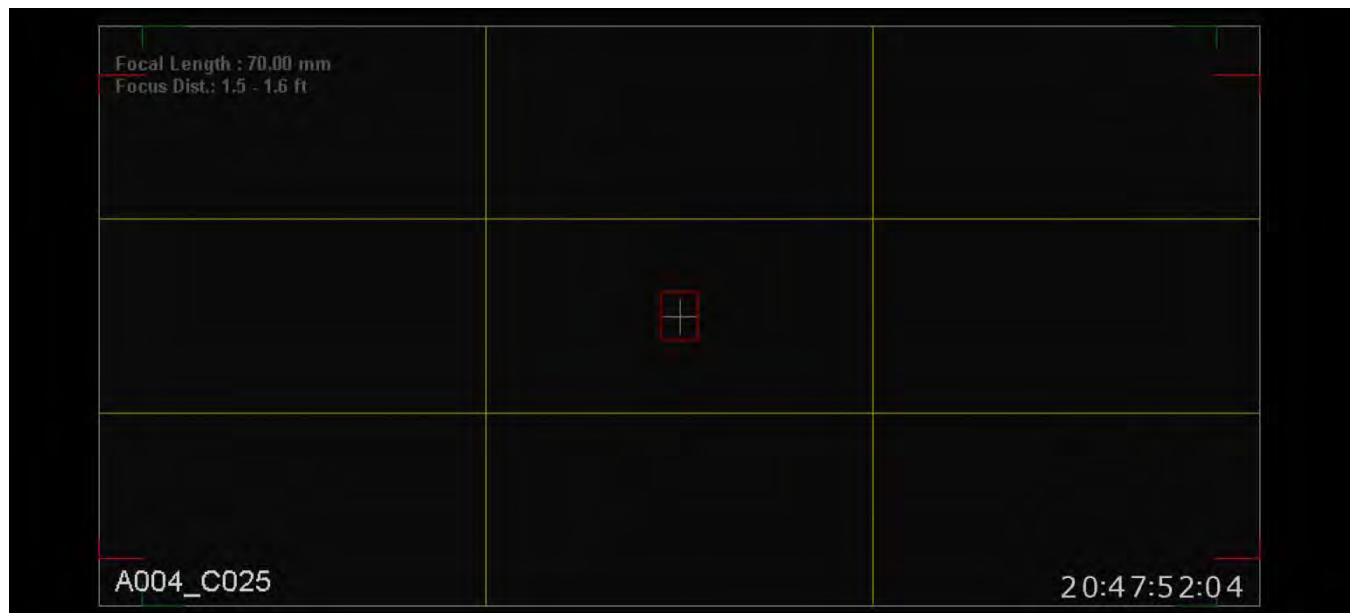
If the red bar is not on the parameter you wish to change, first use the Scroll Wheel to position the red bar under that parameter, then press ENTER, adjust with the Scroll Wheel and press ENTER a second time to confirm the value change.



In the above GUI example, the Scroll Wheel has been used to move the red cursor to the Shutter Speed parameter; and the ENTER key has been pressed. This reveals the Parameter Adjust Window. Adjust the value using the Scroll Wheel and then press ENTER to confirm the value change, then close the sub-menu.

LIVE ACTION AREA

Contains the recorded image area plus Surround View™ look around area, plus overlays for Frame Guide, Safe Action / Safe Title and the current Clip Name and Timecode values. Each overlay may be color coded in one of 5 colors to maximize the contrast between the guide(s) and scene being captured.



RED EPIC® OPERATION GUIDE

LOWER STATUS ROW



The Lower Status Row provides feedback on key systems level camera values, including:

- Clip Settings
- Exposure (Histogram)
- Temperature, Power and Sync
- Media Status
- Power Status
- Audio Levels

ICON BEHAVIOR

TC

- TC Gray - No analog time code is currently detected.
- TC Red - Analog time code is being detected, but the use of it is not enabled.
- TC Green - Analog time code is being used to jam the time of day time code. TC will revert to gray if the signal is no longer detected.

GEN

- GEN Gray - No genlock signal is currently detected.
- GEN Green - A genlock signal compatible with the current project and monitor rates has been locked to.

SYNC

- SYNC Gray - The sensor sync mode is not Genlock.
- SYNC Red - The sensor sync mode is Genlock, but it is not locked to any genlock signal.
- SYNC Green - A genlock signal compatible with the current project and monitor rates has been locked to and the sensor timing is also locked to it.

POWER STATUS

If powering camera through DC power, the current voltage will be displayed.



If using a REDBRICK or similar external battery to power the camera through DC IN, power status displays the current supply voltage available from the battery. Supply voltage decreases as battery is discharged, the displayed text is color coded as follows:

- Green = 12.0 V and up
- Yellow = 11.9 – 11.8 V
- Red = 11.7 – 11.6 V

RED EPIC® OPERATION GUIDE

NOTE: The camera will automatically power down if supply voltage drops to 11.5 Volts.

If using a REDVOLT battery in the Side Handle to power the camera, power status displays the location of the power source (example: SH: Side Handle) and reports the % of remaining battery capacity and the displayed text is color coded as follows:

- Green = 99% - 11%
- Yellow = 10% - 6 %
- Red = 5% - 0%



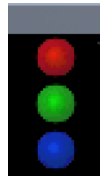
If using a RED BRICK battery connected to DC IN, power status displays BRICK and reports the % of remaining battery capacity and the displayed text is color coded as follows:

- Green = 99% - 11%
- Yellow = 10% - 6 %
- Red = 5% - 0%



RAW CLIP METER

The RAW Clip meter looks a traffic light style meter and indicates if either of the Red, Blue or Green channels of the RAW sensor data are clipping. This meter is unaffected by White Balance, ISO, VIEW or LOOK settings and therefore represents a true measurement of the exposure levels of the sensor at all times.



RAW NOISE LEVEL BAR

The RAW noise level bar displays the amount of pixels in the image that are in noise. For example, if the bar is about 1/8 of the total height, this would indicate approximately 1/8 of the total pixels in the image are at an exposure level at risk of displaying noise when pushed at higher ISO or FLUT values in postproduction.



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RAW CLIP LEVEL BAR

The RAW clip level bar displays the amount of pixels in the image that are clipping. For example, if the bar is about 1/4 of the total height, this would indicate approximately 1/8 of the total pixels in the image are at an exposure level at risk of clipping and may not be recoverable by lowering ISO or FLUT values in postproduction.



SIDE HANDLE



As you navigate and adjust settings on the camera (main menu settings only), they will be reflected on the Side Handle LCD display.

The display elements include:

- **Power:** Camera power status (DC Shown)
- **ISO Rating:** Camera sensitivity
- **Frame Rate:** Image capture rate
- **Shutter Speed:** Exposure Time (or Degrees)
- **Resolution:** Recording Resolution
- **White Balance:** Color Temp
- **Quality:** REDCODE setting

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REDMOTE



The display elements include:

- **Camera ID:** Displays camera ID (NA shown)
- **Wireless Status:** Displays signal strength when connected wirelessly
- **Battery Indicator:** Displays battery life or charge status (shown) of REDmote
- **Resolution** Recording Resolution
- **Quality:** REDCODE setting
- **Frame Rate:** Image capture rate
- **ISO Rating:** Camera sensitivity
- **Frame Rate:** Current frame capture rate
- **Shutter Speed:** Exposure Time (or Degrees)
- **White Balance:** Color Temp
- **Resolution** Record Resolution
- **Quality:** REDCODE setting
- **Clip Filename:** Filename of the clip that will be shot
- **Project Frame Rate:** Current project TIME BASE
- **Clip Meter:** RGB sensor RAW clipping status
- **HDR Mode:** Displays HDRx mode status
- **False Color Mode:** Displays false color overlay mode
- **Magnify:** Tallies 1:1 if magnify is selected
- **TC:** Indicates presence of valid SMPTE timecode signal
- **Gen:** Indicates presence of valid Genlock signal
- **Sync:** Timecode Jam Sync status
- **RIG:** Indicates 3D rig metadata is present
- **LAN:** Indicates communication via Ethernet connection
- **Media Status:** Media location and remaining media capacity in %

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- **Power:** Indicates D.C supply voltage or % of remaining battery capacity Including current supply voltage
- **Audio Meter:** Audio input selection and levels
- **Timecode:** Current timecode value
- **Histogram:** Displays histogram

NAVIGATING MENUS

The primary method to navigate Menus is via the Scroll Wheel on the REDmote or Side Handle. Rotate clockwise to move right, counter clockwise to move left. However, the Left and Right direction Navigation Keys (REDmote or Side Handle) or Adjustment Ring (Side Handle) may also be used for this purpose.

The Up and Down direction Navigation Keys provide additional navigation functions when pressed:

UP Selects Advanced Settings menu.

DOWN Selects standard Settings menu.




As an example, position the Cursor under the Shutter Speed (24FPS) icon and press the UP Direction Key to access advanced adjustment values for Shutter Speed.

USING TOUCHSCREEN LCD

If operating a Touchscreen LCD, camera menu navigation may be made through finger gestures.



- To adjust a parameter value, simply touch it, and then swipe the finger left / right to adjust its value.
- To access an advanced parameter settings display, press and hold down on the parameter icon.
- Touch anywhere outside the overlay windows to enter the value changes and to hide the sub-menus.
- To enter the Secondary Menu, touch the MENU icon. 
- To return to the Main Menu, touch the MENU icon again.



SHORTCUTS

Along the lower status row, menu items can be accessed by simply touching that section of the screen.




NOTE: The upper menu options do not change when you select the below items. You are taken directly inside of that menu item.

- Touching Clip Settings at the lower Left corner of the LCD will display the System Status screen. Refer to SECONDARY MENUS > SETTINGS > MAINTENANCE > SYSTEM STATUS for complete information.
- Touching the RGB Histogram will bring up the False Color overlay menu. Refer to SECONDARY MENUS > SETTINGS > DISPLAY > FALSE COLOR for complete information.
- Touching System Status in the lower Center of the screen will bring up the Settings menu. Refer to SECONDARY MENUS > SETTINGS for complete information.
- Touching Media Status indicator will bring up the Media menu. Refer to SECONDARY MENUS > MEDIA for complete information.
- Touching Power Status indicator will bring up the Power menu. Refer to SECONDARY MENUS > POWER for complete information.
- Touching the Audio Meter will display the Audio Input menu. Refer to SECONDARY MENUS > SETTINGS > AUDIO/VIDEO for complete information.

POWER DOWN

NOTE: Camera will automatically power down if supply voltage drops to 11.5 Volts.

THROUGH POWER MENU

1. Select the MENU icon  in the right corner of the Upper Status Bar to reveal the Secondary Menus.
2. Select POWER.
3. Select SHUTDOWN.

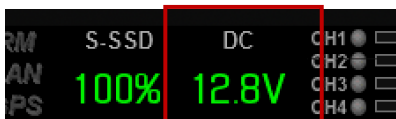
RED EPIC® OPERATION GUIDE

- The camera will immediately power down.



USING POWER STATUS DISPLAY



- Select the POWER status located between the audio channels and media remaining indicator, to reveal the same menu illustrated above.



- Select SHUTDOWN.
- The camera will immediately power down.



LOCK / UNLOCK TOUCHSCREEN OPERATION

LOCK

To lock out the touchscreen operation, touch and hold the MENU icon  until the LOCK icon  displays; indicating the touchscreen has been locked out. When locked, the main menu will be displayed.



UNLOCK

To unlock out the touchscreen and allow normal operation, touch and hold the LOCK icon  until the MENU icon  displays; indicating the touchscreen has been unlocked.



FIRST TIME USE – SETTING UP YOUR RED EPIC

1. ATTACH POWER SOURCE

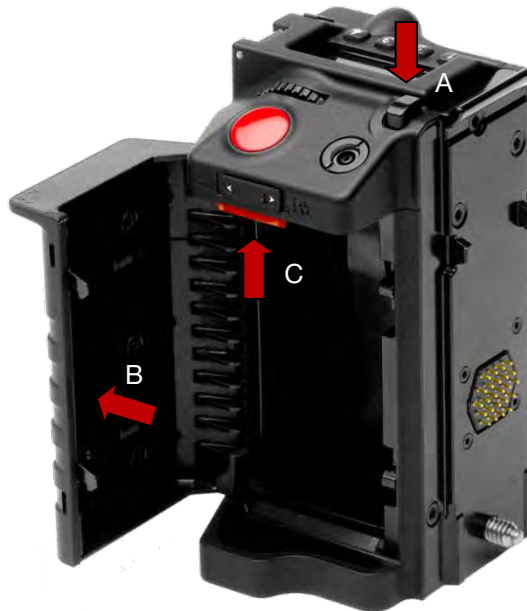
If a REDVOLT battery is installed in the Side Handle and DC power is connect through the DC IN connector, the DC IN power supply has priority and will power the camera instead of the battery.

BATTERY

Connect a RED battery to the camera in one of the following ways:

SIDE HANDLE

Attach a Side Handle and insert a REDVOLT battery.



INSTALL

1. Press the battery door release button (A).
2. Open battery door (B).
3. Press upwards on retainer (C).
4. Insert a REDVOLT battery until it is fully seated and retainer (C) clicks into place.
5. Close battery door.

REMOVE

1. Press the battery door release button (A).
2. Open battery door (B).
3. Press upwards on retainer (C) to release battery.
4. Remove battery from side handle.

REAR BATTERY MODULE

Attach a Rear Battery Module and insert one or more REDVOLT® or REDVOLT® XL batteries.

RED BRICK

Attach to the camera using a V-Plate and 2B-to-1B Power Adapter Cable P/N 790-0138 to the DC IN connector.

DC POWER

Connect a DC power source to the camera in one of the following ways:

- Plug the RED AC Power Adapter into AC power, and the LEMO connector to the DC IN connector.
- Plug the RED CHARGER into AC power, and the LEMO connector to the DC IN connector via 2B-to-1B Power Adapter Cable P/N 790-0138.
- Plug a 12V XLR based power source into the DC IN connector via adaptor cable P/N 790-0164.

NOTE: The maximum sustainable power load of the EPIC AC Power Adapter is 150W (15V@10A). The output of the adapter is over current protected, and will shut down if an excess load condition occurs. If the output trips for any reason, remove any external loads from the camera, such as lights, motors etc, turn off the Adapter and repeat the above procedure.

2. POWER UP

Locate the camera's Power ON / OFF button on the right face of the Brain. If the Power Status LED is illuminated Red, depress and then release the Power / Record button. If not illuminated, check your battery charge status or external power source cable connection. Once powered up the Power Status LED will illuminate Green, confirming the camera is ready to use.

3. PREPARING TO RECORD

Before each days recording, the camera should be prepared as follows:

- Physically set-up camera as desired.
- Verify camera is using the latest firmware version at www.RED.com/support and if appropriate, upgrade the camera firmware. Refer to APPENDIX A: UPGRADING CAMERA FIRMWARE.

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- Insert a blank (or previously used but erasable) REDMAG 1.8” SSD and format it.
- Perform a BLACK CALIBRATION of the Sensor.
- Check your PROJECT SETTINGS (Time Base, Record Resolution, Record Quality, etc.).
- Frame, focus and record.

CONNECT AND FORMAT MEDIA

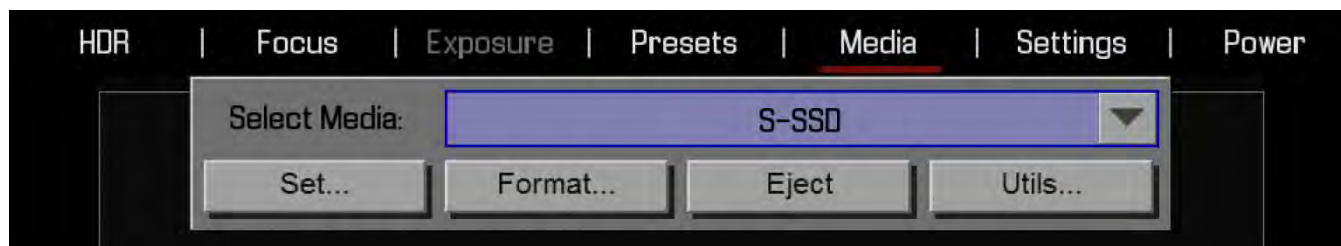
Identify a REDMAG 1.8” 64GB, 128GB or 256GB SSD that has not previously been recorded to, or is not a camera master and may therefore be erased and re-used. Aligned the RED logo of the SSD to the outside, and then push the SSD firmly, but without excessive force, into the slot in the Side SSD Module.

NOTE: When fully inserted, the SSD media protrudes slightly from the SSD slot as indicated above.

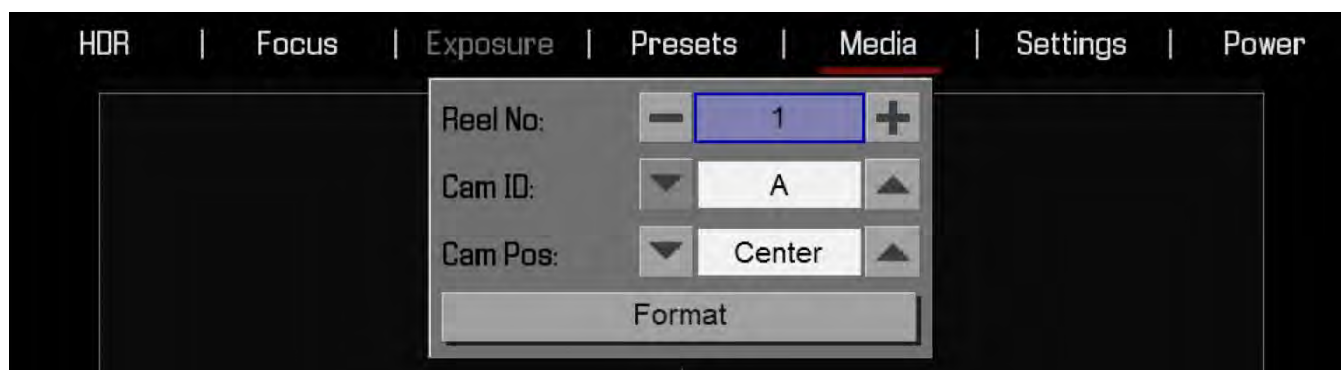
When SSD media is inserted into the camera, the camera will recognize if the media is unformatted:

- On LCD, EVF and external monitors, in the media section of the GUI, NONE will be displayed twice (as opposed to when no media is inserted, the GUI displays NONE with three dashes below “---“).
- On REDmote, NONE will be displayed twice (as opposed to when no media is inserted, the GUI displays NONE with three dashes below “---“).
- On the Side Handle, NA will be displayed (same as if no media is present).

To format the media select SECONDARY MENUS > MEDIA > FORMAT MEDIA.



When FORMAT is selected, a SLATE dialog box will appear allowing you to add Camera Identity and 3D Position properties when formatting. When desired options are set, select FORMAT.



PERFORM A BLACK SHADING CALIBRATION

Refer to SECONDARY MENUS > SETTINGS > MAINTENANCE > CALIBRATION for complete details for performing a Black Shading Calibration.

ADJUST PROJECT SETTINGS

TIME BASE

To adjust the project TIME BASE, press the MENU button on the Side Handle or REDmote. Then use the Scroll Wheel or Direction Keys to navigate to SETTINGS > PROJECT > TIME BASE and press ENTER. Adjust to the desired value using the Scroll Wheel and press ENTER once more to confirm.



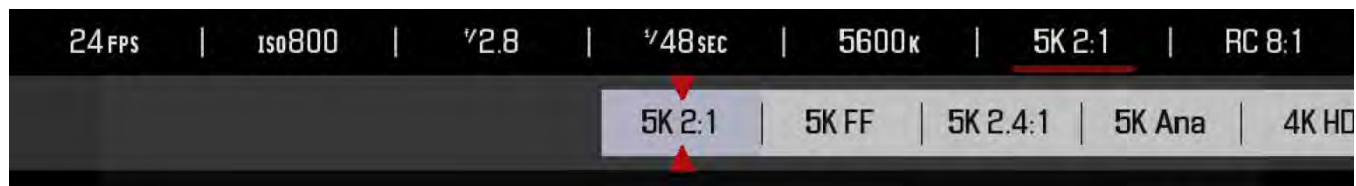
If using a Touch Screen, select SECONDARY MENU > SETTINGS > PROJECT > TIME BASE. Adjust by sliding your finger up / down or tapping on the desired value, and then press anywhere else on the touch screen to confirm.

The following TIME BASES are currently available:

- 23.98 fps
- 24.00 fps
- 25.00 fps
- 29.97 fps
- 47.96 fps
- 48.00 fps
- 50.00 fps
- 59.94 fps

NOTE: A project can only support one Time Base as this defines the frame count to be used for time code and as the clip playback and editing frame rate. It is also the primary frame rate for acquisition, but variable speed (over-crank and under-crank) recordings can be made above and below this base frame rate using the VARISPEED menu.

RECORD RESOLUTION



To adjust Record Resolution, navigate the Cursor to the RESOLUTION icon in the Upper Status Row and press the Navigation Group ENTER key. Adjust to the desired value using the Scroll Wheel and press ENTER a second time to confirm.

If using a Touch Screen, press the RESOLUTION ICON, adjust RESOLUTION by sliding your finger left / right, or tap on the desired resolution, and then press anywhere else on the touch screen to confirm.

The following Recording Resolutions are currently available:

- 5K 2:1
- 5K FF
- 5K 2.4:1
- 5K ANA
- 4K HD
- 2K 2.4:1

RECORD QUALITY (REDCODE)



To adjust Record Quality, navigate the Cursor to the QUALITY (RC) icon using the Navigation Group Scroll Wheel, then press the ENTER key. Adjust to the desired value using the Scroll Wheel and then press ENTER to confirm. Available REDCODE compression options are RC 3:1 through RC 18:1.

If using a Touch Screen, press the QUALITY icon, adjust the REDCODE value by sliding your finger left / right or tap on the desired value, and then press anywhere else on the touch screen to confirm.

Default value for REDCODE is 8:1.

CAMERA ID (SLATE)

If operating on a multi-camera production, enter a different Camera ID for each camera; otherwise skip this step; the camera is ready to shoot.

The Camera ID is set when the media is formatted. Refer to ADVANCED MENU > MEDIA for details.

4. RECORDING

Ensure a formatted REDMAG 1.8" SSD is inserted in the camera's Side SSD Module, then fully depress any one of the RECORD buttons located on the Brain, Side SSD Module, Side Handle or REDmote.

Fully depress again to stop recording. The camera will automatically create a unique and sequential file name for each clip recorded on the SSD based on the Camera's I.D set in the MEDIA menu.

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REDCODE RAW data recordings store the Color Temperature and Exposure (ISO) and any RGB color processing values you use in the monitor path as metadata. This metadata is used in REDCINE-X or other postproduction software as initial white balance, exposure and color correction points however, you are free to change these values at any time when you process the RAW footage.

Time Code and Edge Code values used by the camera are Non Drop Frame (NDF); Drop Frame (DF) is not supported. Audio is captured uncompressed at 24-bit resolution, 48KHz sample rate per channel.

Digital media such as REDMAG 1.8" SSDs are very robust, but should be treated with equal care as exposed film or a videotape master. We recommend storing digital media that contains your footage in a secure location and backing up the data to a digital archival media, such as data tape or hard disk drive.

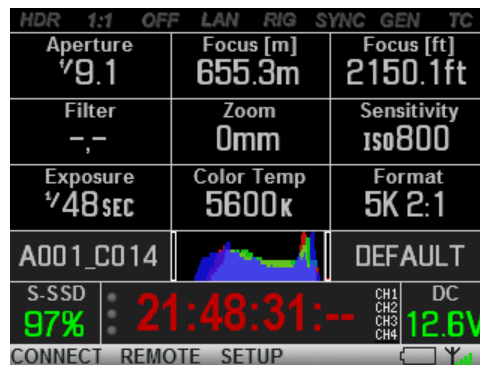
RECORD INDICATOR

When recording, the RED EPIC camera provides a variety of record indications (tallies):

- Timecode, normally displayed in white colored text, will be displayed in red colored text.
- A small Red dot will appear in the top right corner of the VIEWFINDER output(s).



- The REC LED on the right side of the camera Brain will illuminate Red.
- REDmote upper LED will illuminate Red, and the Timecode will turn Red.




- If using a BOMB-EVF, the LED on the front will illuminate Red if Tally is enabled
- SMPTE-RP188 timecode VITC-2 HANC metadata record flag will be enabled on HD-SDI outputs.

- If enabled in the USER KEYS menu, the GPO trigger output in the CNTL connector will pulse.

5. PLAYBACK

Playback of recorded clips is not currently enabled in camera firmware and must be performed off the camera. Off-load the Clips from your REDMAG 1.8" SSD to a personal computer using a RED STATION® REDMAG 1.8" module.

MENU CONTROLS

Displayed in the Upper Display Group of the VIEWFINDER output(s), are FRAMERATE (FPS), EXPOSURE (ISO), $\frac{1}{x}$ (F/Stop), WHITE BALANCE, RESOLUTION, and QUALITY (REDcode). These parameters are adjustable directly through this screen. When using the touchscreen, directly to the right of these parameters is the MENU icon  which when pressed will take you to the secondary camera set up menus.



ADJUSTMENTS

BASIC SETTING ADJUSTMENTS

SIDE HANDLE / REDMOTE

- The MENU button can be used to ENTER the secondary menus, as well as CANCEL inside lists and for navigating back up menus.
- Navigate to the desired setting using the NAVIGATION GROUP direction keys and press ENTER.
- Use the Scroll Wheel or Adjustment Ring to increase or decrease the parameter value.
- When the desired value has been selected, press ENTER to set.

BASIC ADJUSTMENTS USING SIDE HANDLE ONLY

Although not recommended, the Side Handle can be used stand alone to make basic adjustments to FPS, ISO, Shutter Speed, Resolution and REDcode located on the Main Menu screen. Use the Navigation Group to make these adjustments while watching the cursor placement under the desired setting on the side handle LCD. When desired setting is selected, press the Enter button to access, then use the Scroll Wheel, Directional Pad or Adjustment Ring to make changes. When done, press the Enter button again to set the changed parameter. The MENU button can be used to ENTER the secondary menus, as well as CANCEL inside lists and for navigating back up menus.

TOUCHSCREEN

- The MENU ICON can be used to ENTER the secondary menus, as well as CANCEL inside lists and for navigating back up menus.
- Touch the desired parameter for adjustment.
- Slide your finger across the screen to scroll through the available parameter values.
- When desired the parameter value has been selected, touch anywhere in the screen area to set.

- To close an alpha numeric keypad when entering information directly, tap anywhere on the screen outside the keypad.

ADVANCED SETTING MENUS

At this time, only FRAMERATE, SHUTTER SPEED and WHITE BALANCE on the MAIN MENU have advanced settings.

SIDE HANDLE / REDMOTE

1. Navigate to the desired setting using the NAVIGATION GROUP direction keys and then press the UP directional key.
2. Use the direction keys to navigate to the desired parameter adjustment field and press ENTER to confirm.
3. Use the Scroll Wheel to adjust the selected parameter value.
4. When desired selection is made, press the MENU button to set.

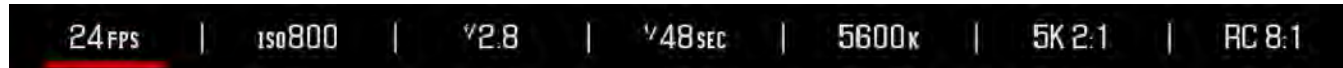
TOUCHSCREEN

1. Press and hold the desired parameter to gain access to advanced setting adjustments.
2. Press the field - a keypad type menu may appear to allow adjustments.
3. Press the desired parameter settings to adjust.
4. When desired selection is made, press anywhere in the screen area to set and exit the advanced settings submenu.

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MAIN MENU

Available options under the MAIN MENU are FRAMERATE (FPS), ISO (SENSATIVITY), F STOP, 1/SEC (EXPOSURE), WHITE BALANCE, RESOLUTION, and QUALITY (REDcode).



FPS

Used to select an image capture frame rate that differs from the Project's TIME BASE frame rate.

Ranges are as follows:

- 1 sec – 300 fps (2K 2.4:1)
- 1 sec – 120 fps (4K HD)
- 1 sec – 96 fps (5K ANA)
- 1 sec – 120 fps (5K 2.4:1)
- 1 sec – 96 fps (5K FF)
- 1 sec – 96 fps (5K 2:1)

Default is 24 fps (or the selected Project TIME BASE frame rate if not 23.98 or 24.00 fps). 1 sec translates to 1 second per frame.

Available frame rate is dependent on Resolution and REDcode settings. Refer to RECODE > REDCODE OPTIONS FOR VARIOUS FRAME RATES table.

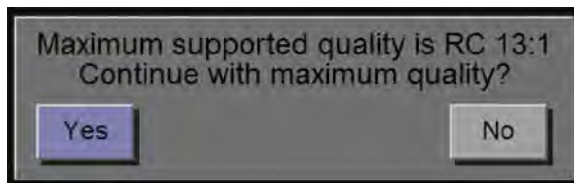
VARISPEED

When a frame rate other than the current TIME BASE has been selected, the FPS text will turn Yellow and VARISPEED will be shown where the Audio Meter is normally displayed at the lower right of the display.



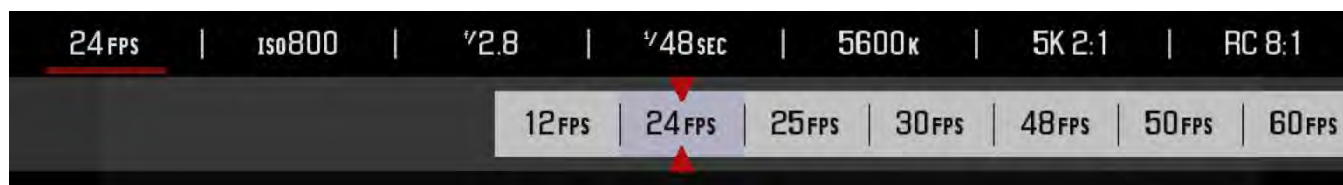
RED EPIC® OPERATION GUIDE

If you press record with a frame rate set too high for the selected record quality, you will be prompted to allow the camera to change the REDCODE setting to the maximum quality that enables that frame rate.

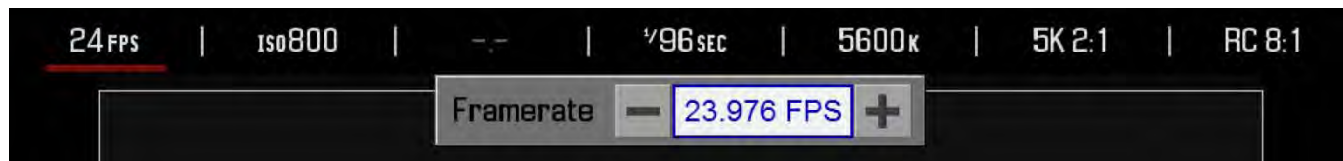


BASIC SETTINGS

Provides quick selection of the most common Varispeed frame rates.



ADVANCED SETTINGS



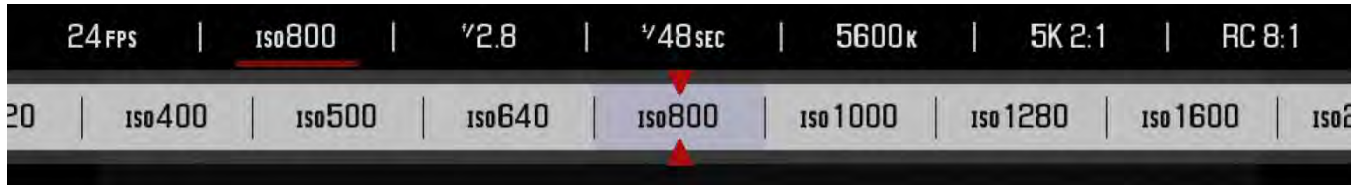
When selected a numerical keypad will appear allowing the desired Varispeed Framerate to be entered in 1 fps increments. Maximum frame rate is a function of RECORD RESOLUTION and REDCODE settings. Granularity is 0.001 FPS.



On Touchscreen systems, a Keypad is available for direct numeric entry of the Varispeed FPS value. Touch the value bounded by the + and - labels to bring up, press outside the keypad to confirm the value.

ISO (SENSITIVITY)

Adjusts the camera's ISO rating. The sensitivity value is adjustable in 1/3rd stop increments. When the ISO rating is adjusted, the camera logs the change as metadata and the monitor path reacts accordingly. Higher ISO values lead to brighter images in the monitor path, and vice versa.



Range is ISO 250 – 12800

Default is ISO 800

-. (F STOP)

Aperture controls the depth of field of the subject imaged by the camera, and in combination with the shutter speed / angle setting controls the amount of light falling on the sensor. i.e. exposure. Increasing the F stop to a higher number reduces exposure as well as increases the depth of field, decreasing the F stop to a lower number increases the exposure and decreases the depth of field. You can choose either 1/3 or 1/4 stops.



RED EPIC DSMC TI PL MOUNT INSTALLED

When a lens equipped with Cooke's S4/i system is attached to the DSMC Ti PL Mount, the camera will display the current aperture (F stop) of the attached lens. This is for information only and on-camera adjustment is NOT available, manual adjustment only.

RED EPIC CANON EOS MOUNT INSTALLED

This menu will appear when a RED EPIC Canon EOS Mount is installed and a Canon EF or EF-S Lens or equivalent is attached (a Non-Canon EF or EF-S Lens may not function as smoothly or accurately). Adjusts the aperture (F stop) of the attached lens.

The attached lens for the example shown is a Canon EF 24-70mm.

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BASIC SETTINGS

Allows adjustment of the aperture (F stop) of the attached lens. The range will vary depending on the attached lens.



ADVANCED SETTINGS

When selected, the advanced settings menu allows fine control over the f-stop value under APERTURE and focal distance under FOCUS.



APERTURE (F STOP)

Provides the ability to enter the F stop value directly.

Range depends on attached lens.

Default depends on attached lens.



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FOCUS

Provides the ability to enter the focal distance directly.

Range depends on attached lens.

Default depends on attached lens.



1/SEC (EXPOSURE)

BASIC SETTINGS

Adjusts the exposure of each frame captured by the MYSTERIUM X sensor. Shutter speed presets are provided for all common speeds (and shutter angles) for 24 / 25 fps and 50 / 60 fps project frame rates.



Decreasing Shutter Speed shortens the amount of time over which light falls on the sensor, increasing exposure and motion blur on any objects moving within the frame. Increasing Shutter Speed increases the amount of time over which light falls on the sensor, decreasing exposure and motion blur on objects moving within the frame.

Range is 2 sec – 1/8000th sec - Slowest available speed is 1 second per frame / frame rate, so for 24 fps it is 1/24th sec.

Default is 1/48th Sec.

ADVANCED SETTINGS

When selected, the advanced settings menu allows fine control over the Exposure value, and permits entry in any of the three following common units – EXPOSURE (Shutter Speed), INTEGRATION TIME or ABSOLUTE ANGLE (Shutter Angle).



EXPOSURE (SPEED)

Provides the ability to enter the Exposure value as a Shutter Speed (1/xx sec).

Range is 2 – 1/8000th Sec - Slowest available speed is 1/frame rate, so for 24 fps it is 1/24th Sec.

Default is 1/48th Sec.

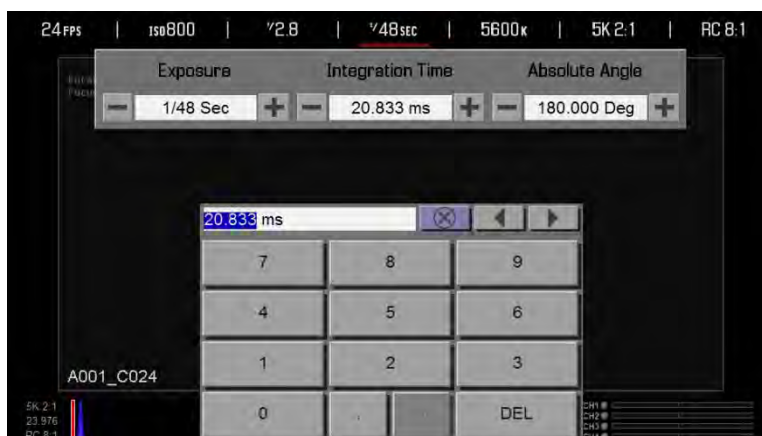


INTEGRATION TIME

Provides the ability to enter the Exposure value as a Shutter Integration Time (xx milliseconds).

Range is 0.125 to 1,000 mS (milliseconds)

Default is 20.833 MS

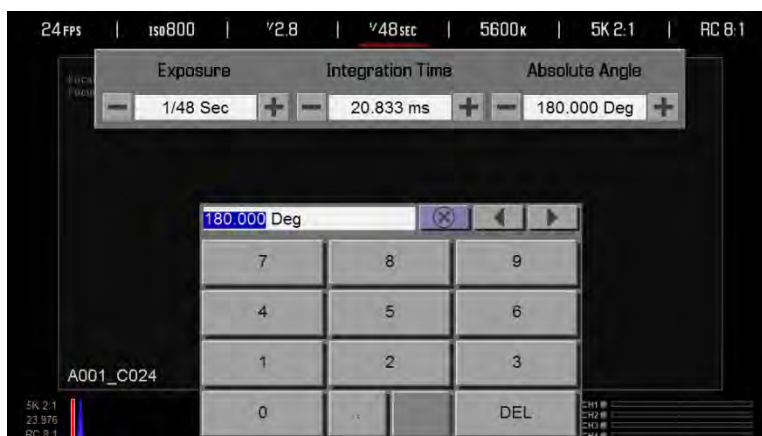


ABSOLUTE ANGLE

Provides the ability to enter the Exposure value as a Shutter Angle (xx Degrees).

Range is 4.0 to 360.0 Degrees

Default is 180.0 Degrees



As you adjust any of these three parameters, the camera will automatically calculate the equivalent value in the other units, but as a quick reference here are some common Speeds and Angles.

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To Convert Shutter Speed to Angle Equivalent:

Equivalent Degrees = (Shutter Speed x Frame Rate x 360)

E.g. = $(1/48 \times 24 \times 360) = (8640/48) = 180$

| SHUTTER | DEGREES | SHUTTER | DEGREES |
|---------|---------|---------|---------|
| 1/32 | 270 | 1/120 | 72 |
| 1/48 | 180 | 1/192 | 45 |
| 1/50 | 172.8 | 1/348 | 22.5 |
| 1/60 | 144 | 1/696 | 11 |
| 1/96 | 90 | 1/1000 | 8.6 |

Equivalent Shutter = $1 / (\text{Frame Rate} \times 360 / \text{Angle})$

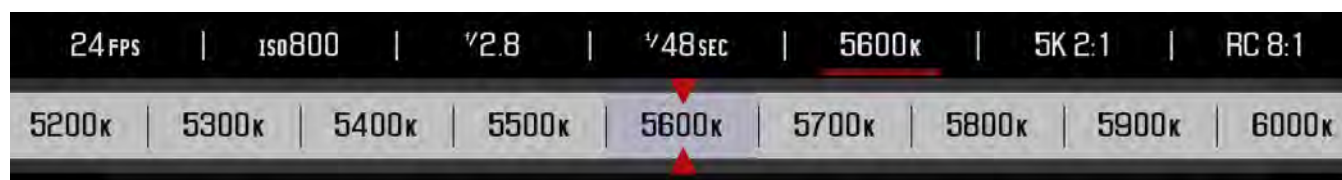
E.g. = $1 / (24 \times 360/180) = 1 / (8640/180) = 1/48$

| DEGREES | SHUTTER | DEGREES | SHUTTER |
|---------|---------|---------|---------|
| 270 | 1/32 | 72 | 1/120 |
| 180 | 1/48 | 45 | 1/192 |
| 172.8 | 1/50 | 22.5 | 1/348 |
| 144 | 1/60 | 11 | 1/696 |
| 90 | 1/96 | 8.6 | 1/1000 |

WHITE BALANCE

BASIC SETTINGS

Allows you to manually set Color Temperature in the range from 1,700 to 100,000 degrees Kelvin.



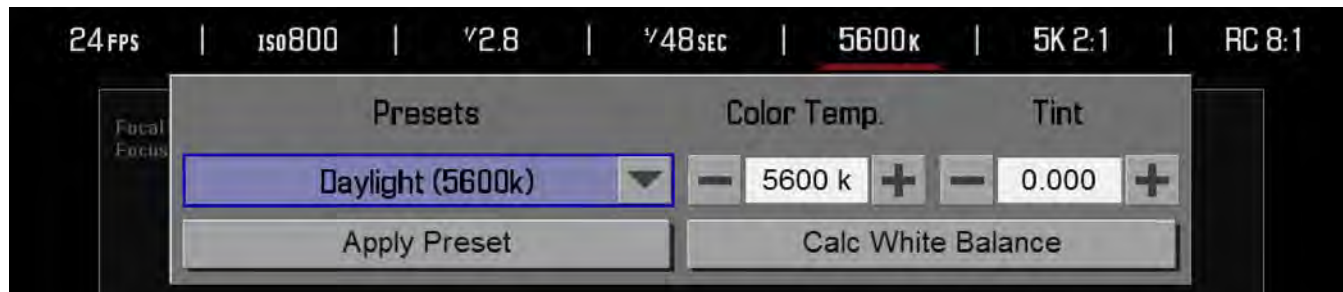
Range is 1,700 K to 10,000 K.

Default is 5600K.

RED EPIC® OPERATION GUIDE

ADVANCED SETTINGS

When selected, allows additional adjustment of the White Balance. Available options are PRESET, COLOR TEMP, TINT, and CALCULATE WHITE BALANCE. Press APPLY PRESET for settings to take effect.



PRESET

Available preset options are:

SHADE

Preset to 9,000K

CLOUDY

Preset to 7,500K

DAYLIGHT

Preset to 5,600K

FLASH

Preset to 5,500K

FLOURESCENT

Preset to 4,500K

TUNGSTEN

Preset to 3,200K

INCANDECENT

Preset to 2,800K

COLOR TEMP

Allows you to manually set Color Temperature in the range from 1,700 to 100,000 degrees Kelvin. Default is 5600K.



TINT

Color Temperature calculations assume a pure light source that may not be true in the specific scene the camera is imaging. To compensate for any residual colorcast, the TINT parameter can adjust the RGB color balance with a compensating Magenta - Green color component. Default is 0.000. When selected, a secondary keypad will appear allowing you to enter the desired Tint value directly.

NOTE: Selecting Calc White Balance calculates a new Tint value. This is maintained if the Color Temp is adjusted via the Color Temp parameter. If you select ANY presets, Tint will be reset to zero, which is the default value.



CALC WHITE BALANCE

The Calc White Balance function analyzes the central 25% of the image visible in the monitor to calculate a Color Temperature that will render a white object as white.



To use Calc White Balance function, place a White or Gray object under the ambient light, select the Calc White Balance function and then press the Calc White Balance function box. Calc White Balance is also assigned to a User Key on the REDmote and Side Handle as a factory default setting.

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RESOLUTION

Allows adjustment of resolution.



Default is 5K 2:1

The following Resolution options are available:

- 5K 2:1
- 5K FF
- 5K 2.4:1
- 5K ANA
- 4K HD
- 2K 2.4:1

Current RED EPIC resolutions listed below with their respective size (in pixels).

| RESOLUTION | X (WIDTH) | Y (HEIGHT) |
|------------|-----------|------------|
| 2K 2.4:1 | 2048 | 854 |
| 4K HD | 3840 | 2160 |
| 5K 2.4:1 | 5120 | 2160 |
| 5K 2:1 | 5120 | 2560 |
| 5K ANA | 3296 | 2700 |
| 5K FF | 5120 | 2700 |

For a visual reference, see APPENDIX L: RESOLUTION CHART.

REDCODE®

Allows adjustment of REDCODE settings.



Range is 3:1 to 18:1

Default is 8:1


RED EPIC® OPERATION GUIDE

REDCODE OPTIONS FOR VARIOUS FRAME RATES

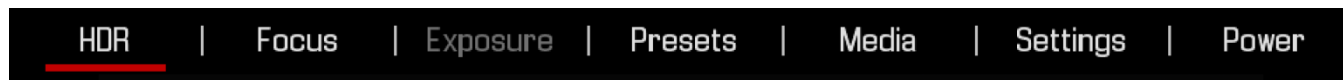
Minimum frame rate is 1 sec per frame; maximum frame rate is a function of REDCODE setting, and record resolution:

| FPS | 24 | 25 | 30 | 48 | 50 | 60 | 72 | 75 | 90 | 96 | 100 | 120 | 150 | 175 | 210 | 250 | 288 | 300 |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 5K FF | RC 3:1 | RC 4:1 | RC 4:1 | RC 6:1 | RC 7:1 | RC 8:1 | RC 9:1 | RC 10:1 | RC 12:1 | RC 12:1 | - | - | - | - | - | - | - | - |
| 5K 2:1 | RC 3:1 | RC 3:1 | RC 4:1 | RC 6:1 | RC 6:1 | RC 8:1 | RC 9:1 | RC 9:1 | RC 11:1 | RC 12:1 | - | - | - | - | - | - | - | - |
| 5k ANA | RC 3:1 | RC 3:1 | RC 3:1 | RC 4:1 | RC 5:1 | RC 5:1 | RC 6:1 | RC 7:1 | RC 8:1 | RC 8:1 | - | - | - | - | - | - | - | - |
| 5K 2.4:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 5:1 | RC 5:1 | RC 6:1 | RC 8:1 | RC 8:1 | RC 9:1 | RC 10:1 | RC 10:1 | RC 12:1 | - | - | - | - | - | - |
| 4K HD | RC 3:1 | RC 3:1 | RC 3:1 | RC 4:1 | RC 4:1 | RC 5:1 | RC 6:1 | RC 6:1 | RC 7:1 | RC 8:1 | RC 8:1 | RC 10:1 | - | - | - | - | - | - |
| 2K 2.4:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 3:1 | RC 4:1 | RC 5:1 | RC 6:1 | RC 7:1 |

SECONDARY MENUS

Press the Menu button on the REDmote / Side Handle or touch the MENU icon  on the LCD to access the Secondary Menu.

Available options in this menu screen are HDR, FOCUS, PRESETS, MEDIA, SETTINGS, and POWER. EXPOSURE is not implemented at this time.



HDR MENU

Available options are HDR OFF, HDRx and STOPS.

NOTE: HDR mode cannot be modified when in Magnify 1:1 mode.



HDR ON / OFF

By default, HDRx is OFF (HDR button is illuminated Blue). In the Lower Status Group of the Viewfinder screen, the HDR text is Gray, indicating HDRx is inactive.

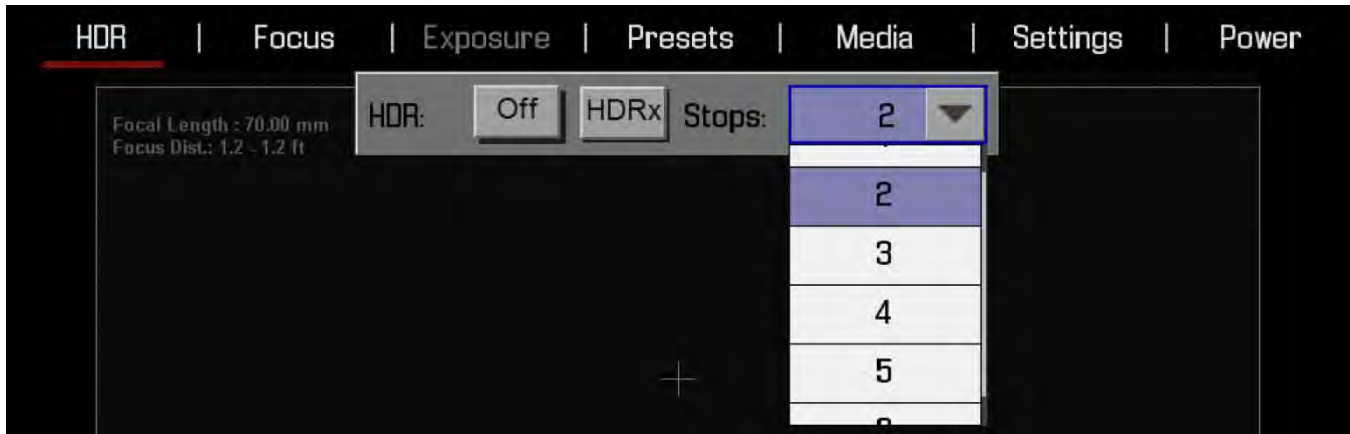


To turn HDRx on, navigate to the HDRx button using the Nav Group and press ENTER, or from the touchscreen directly touch the HDRx button. In the Lower Status Group of the Viewfinder screen, the HDR text will turn White, indicating HDRx is active.



STOPS

To adjust the STOPS parameter, select the Stops box and use the UP / DOWN arrows to adjust.



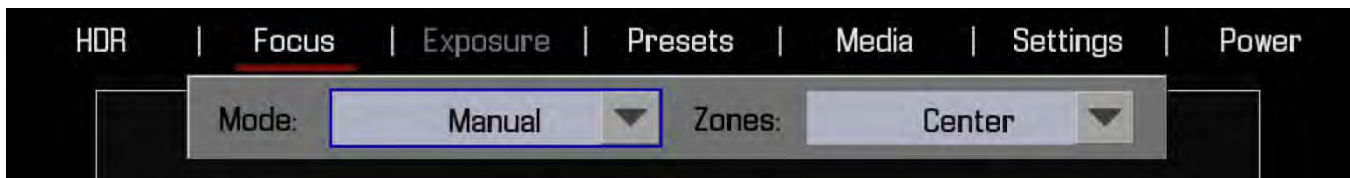
Range is 1 to 6.

Default is 2.

FOCUS MENU

IMPORTANT: Auto Focus IS NOT enabled at this time.

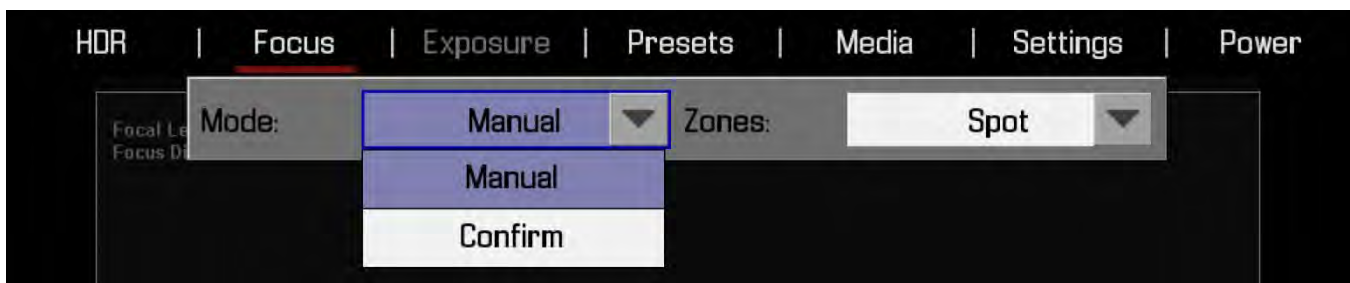
The Focus Menu is used to enable and select Focus parameters including MODE and ZONES.



MODE

To adjust the MODE parameter, select the Menu box and use the UP / DOWN arrows to adjust. Available options are MANUAL and CONFIRM. Default is MANUAL.

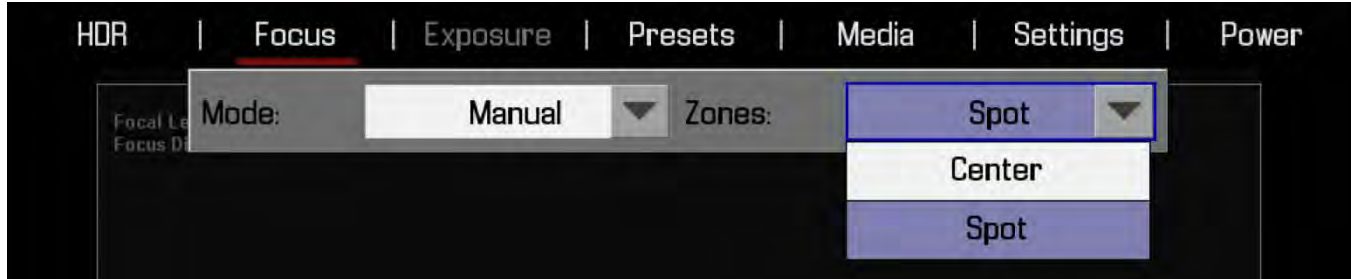
CONFIRM places a single circle or a grid of boxes on the screen (depending on the ZONES selection) that indicate where the image is in focus.



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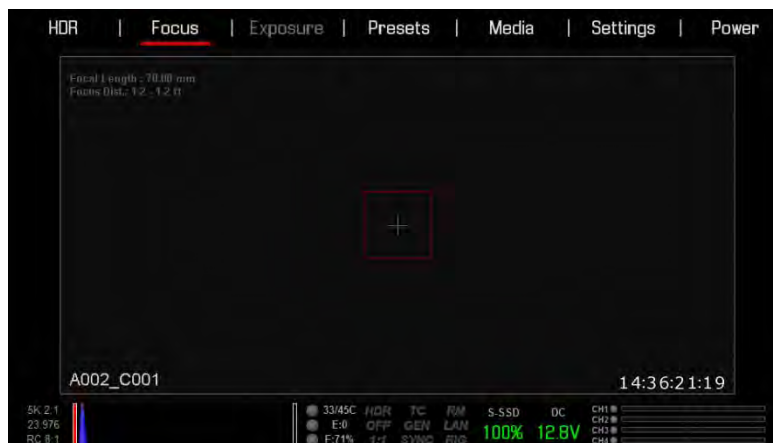
ZONES

Available options are CENTER and SPOT. Default is CENTER. This control allows selection of the boxes used to indicate objects in/out of focus.



CENTER

Provides a large, square target for focus. When objects located in the circle are in focus, the square will be Yellow or Green. When objects located in the square are out of focus, the square will be Red.



SPOT

Provides a small, square target for precise focus (similar to Center focus, only smaller). When objects located in the square are in focus, the square will be Yellow or Green. When objects located in the square are out of focus, the square will be Red.



SPOT FOCUS INDICATOR

Moving

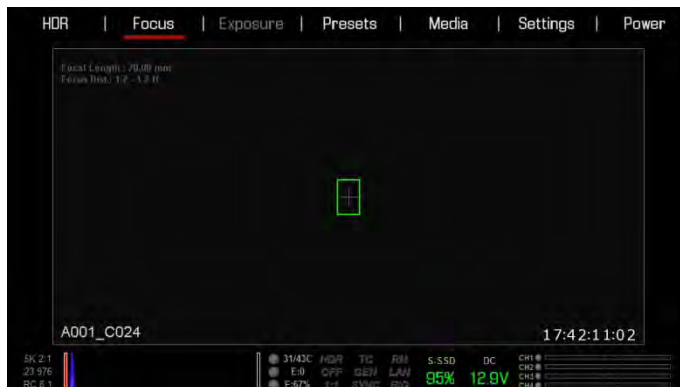
The spot focus square can be moved around the screen.

Touchscreen

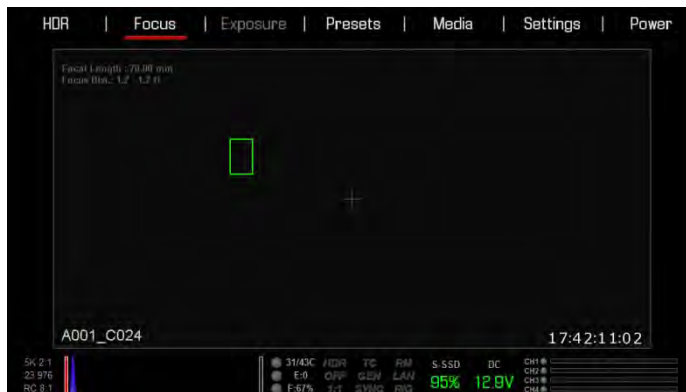
Tap on the spot focus square directly on the touchscreen and drag to the location you wish to relocate the spot focus circle.

Side Handle / REDmote

1. Navigate to the focus menu.
2. Press the down arrow on the Navigation Group.
3. The spot focus square line weight will increase and the Red cursor under FOCUS will dim slightly.



4. Press the ENTER button.
5. Use the directional arrows to move the Spot Focus square to the desired location.



6. To exit:
 - Press the ENTER button, the spot focus square line weight will increase, then press the UP arrow to go back to the FOCUS menu.
 - Press the MENU button.

Resizing

The spot focus square can be resized using the Navigational Wheel or the Touchscreen.

Touchscreen

Tap two times on the square directly on the touchscreen to increase size. You can increase the size 3 times. After that, when you double-tap the spot focus square, it will decrease in size.

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RED EPIC DSMC TI PL MOUNT + LENS

When a RED EPIC DSMC Ti PL Mount is installed and a Lens equipped with Cooke's S4/i system (or equivalent is attached, the Focal Length and Focal Distance is displayed on the LCD, EVF and external monitors.



The focal length and focal distance values and range will vary depending on the attached lens. When the focal length or focal distance of the lens is manipulated, the current values are displayed.

RED EPIC CANON EOS MOUNT + LENS

When a RED EPIC Canon EOS Mount is installed and a Canon EF or EF-S Lens or equivalent is attached, the Focal Length and Focal Distance is displayed on the LCD, EVF and external monitors.



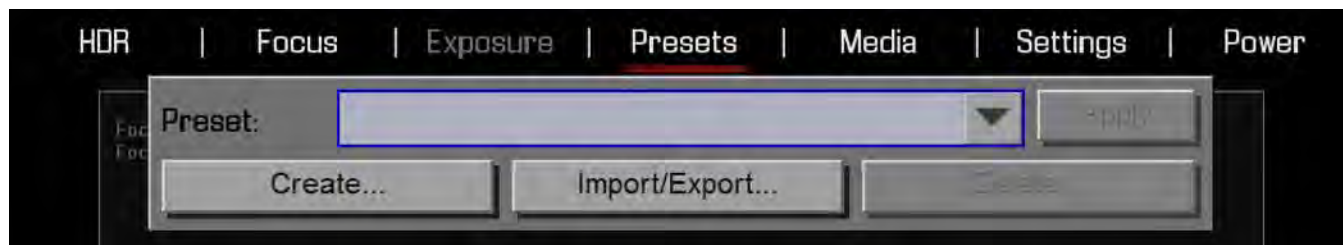
The focal length and focal distance values and range will vary depending on the attached lens. When the focal length of the lens is manipulated, the current value is displayed under Focal Length. The Focal Distance can be changed under MAIN MENU > -.- (F-STOP) > ADVANCED SETTINGS.

EXPOSURE MENU

Not implemented at this time.

PRESETS MENU

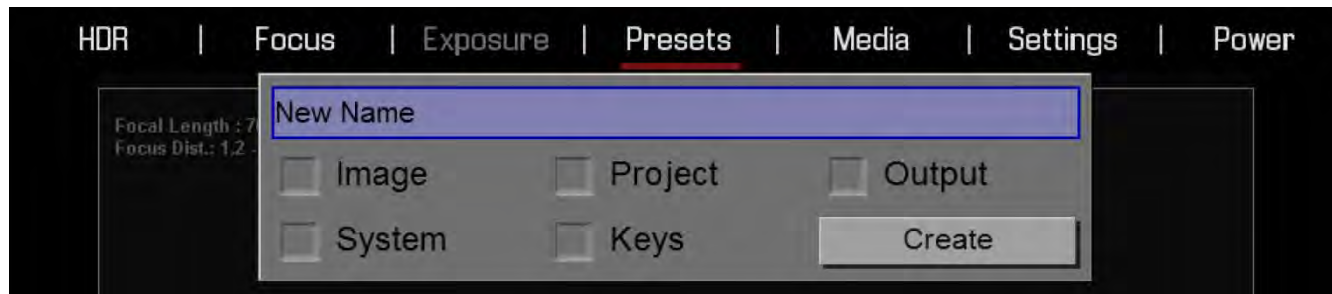
Presets are stored inside the camera. They can be imported / exported to the SSD. The Presets menu is used to create, save and import presets. Available options are APPLY, CREATE, IMPORT/EXPORT and DELETE.



If presets are available, they will be accessible by using the arrow keys in the Preset name field.

CREATE PRESET

When selected allows you to create your own preset and decide which information will be stored with that preset.



After Preset name is entered and Preset information is highlighted, select CREATE to create your preset and will be taken back to the Preset Main Menu – your new preset shown.

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PRESET NAME

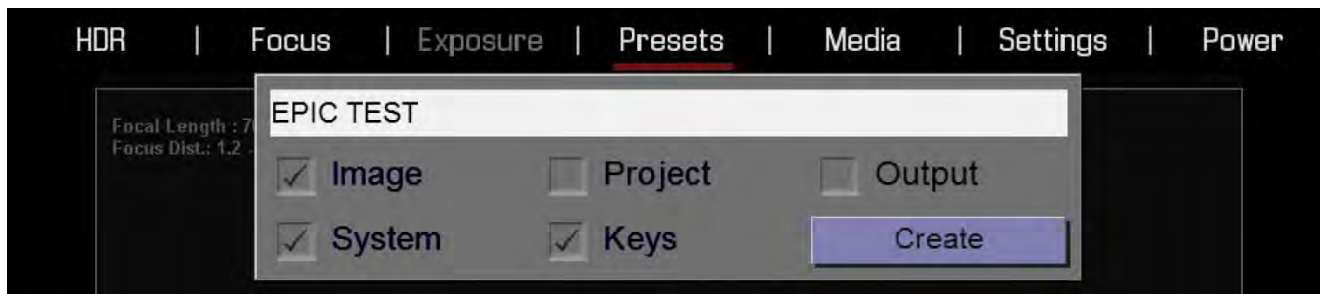
Press the Enter button on the New Name field, a keyboard will appear allowing you to enter the desired preset name.



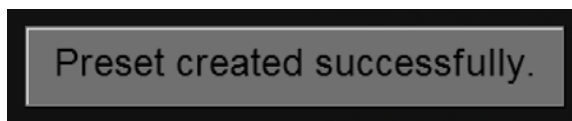
Use the arrow keys and Enter button, enter the desired name. When finished, press the Menu button to close the keyboard.

PRESET INFORMATION

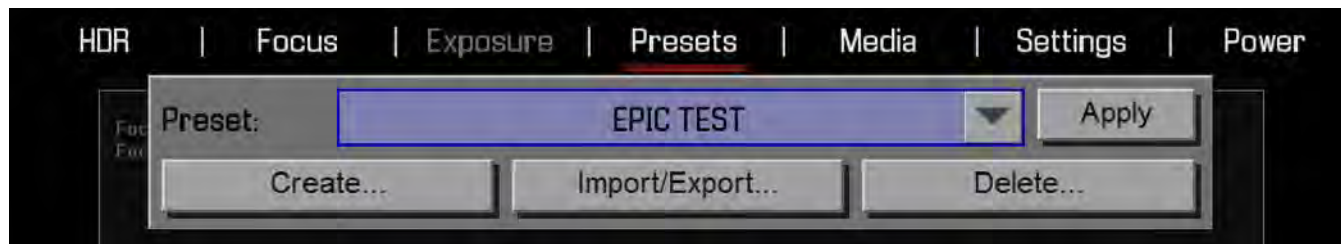
Use the arrow keys and Enter button to select the information you want to be stored for your preset. Available options are IMAGE, SYSTEM, PROJECT, KEYS, and/or OUTPUT.



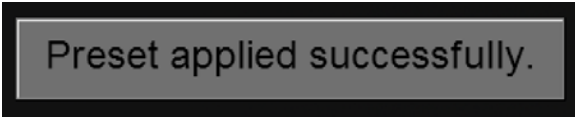
When creating a new preset successfully completed, "Preset Created Successfully" will appear and the preset will be listed.



You can then select APPLY to apply the preset to the camera.



When successfully completed, “Preset Applied Successfully” will appear.



Preset applied successfully.

EXPORT / IMPORT PRESET

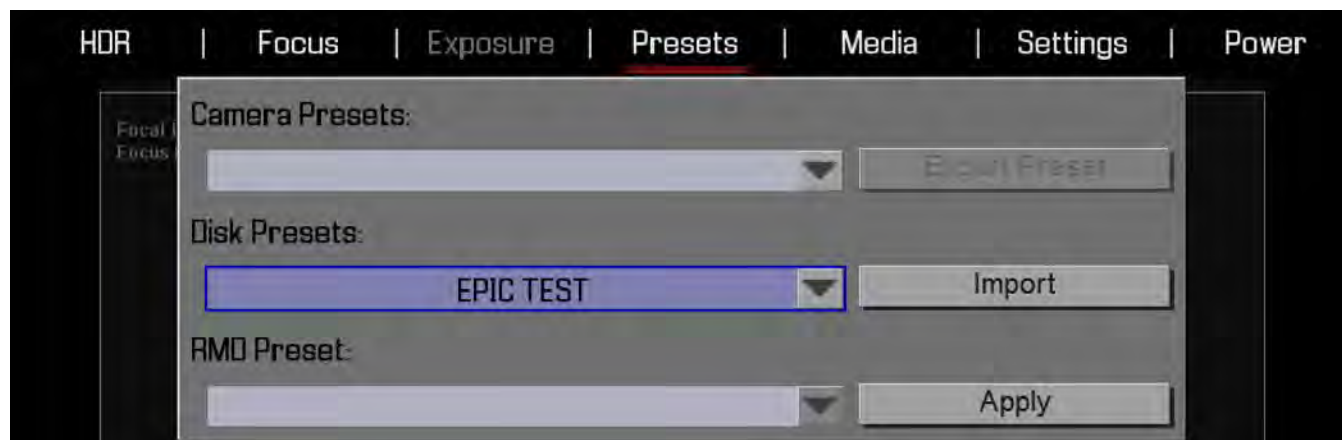
When selected you will be able to export presets from the camera to external memory (1.8” SSD), import presets from the external memory (1.8” SSD) to the camera, or apply available RMD presets.

NOTE: Exported presets will be located in a folder labeled “Presets” on the CF or 1.8” SSD. This is also the location to place any presets for importing.


CAMERA PRESETS

When EXPORT PRESET is selected, this will export the CAMERA PRESETS from the camera to the external memory (1.8” SSD). Once a preset is exported, it will appear as a selection in the DISK PRESETS field.

NOTE: If external memory is not connected, the Export Preset function cannot be performed.



When successfully completed, “Preset Exported Successfully” will appear.



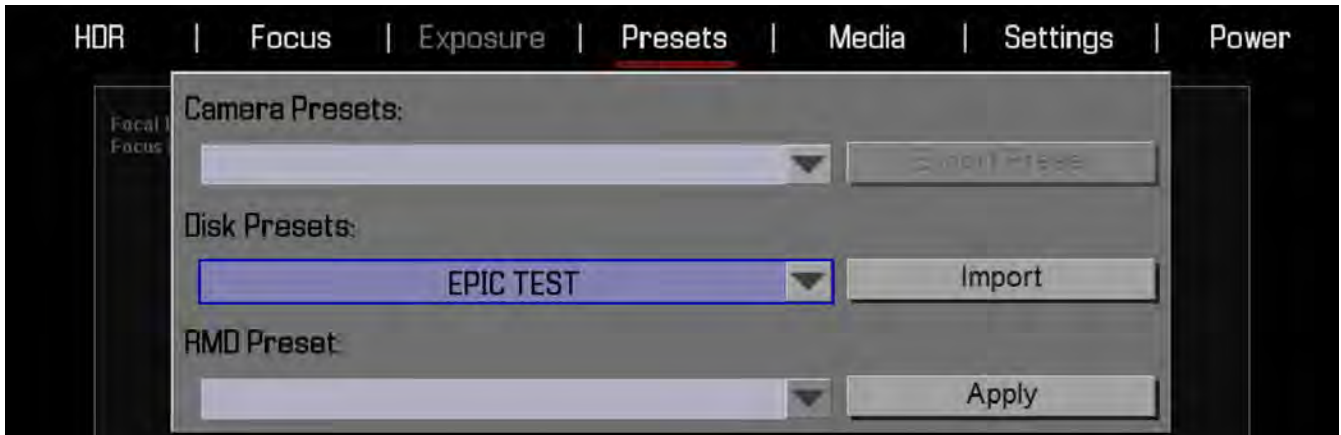
Preset exported successfully.

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DISK PRESETS

When IMPORT is selected, the selected preset will import from external media (1.8" SSD) to the camera. Once imported the preset will be listed under CAMERA PRESETS.

NOTE: If no media is connected or no presets are saved to the media, this selection will remain Grayed out (until a preset is exported of course).



You will then be asked if you want to apply the imported preset.



If **No** is selected, the preset will be imported and listed in the available Camera Presets.

If **Yes** is selected, "Preset Applied Successfully" will appear when successfully completed. The preset will be listed in the available Camera Presets.

Preset applied successfully.

If the preset could not be applied, "Preset Could Not Be Applied" will appear to inform you. Try to set again.

Preset could not be applied.

RMD PRESETS

If an RMD file exported from REDCINE-X or REDCINE-X PRO is on the SSD it can be imported from the SSD to the camera. When APPLY is selected, the RMD file is transferred to active system memory.

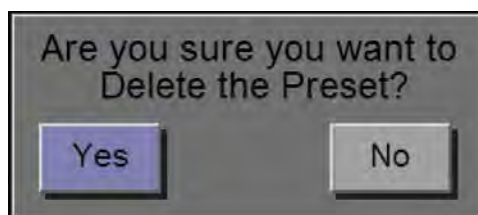
DELETE PRESET

When selected will delete the selected preset from the camera. It will not delete the selected preset from the external media (1.8" SSD).



IMPORTANT: You will not be warned of the deletion nor asked to confirm this deletion. Be sure to save your preset to the external media (1.8" SSD) for later use before deleting the preset from the camera. Once you have deleted the preset, you will either need to create a new one or import and existing one from external media.

You will be asked to confirm if you want to delete the preset.



When successfully completed, "Preset Deleted Successfully" will appear.



MEDIA MENU

The Media Menu is used to format media (SSD) prior to use on the camera as well as to Eject (unmount) the media prior to removal from the camera. Available options when selected are SELECT MEDIA, SET MEDIA, FORMAT MEDIA, EJECT MEDIA, and UTILITIES.

IMPORTANT: Media MUST be ejected from the camera before removal to prevent corruption and/or loss of data on media.



SELECT MEDIA

Allows you to select the Media location to be used by the camera. Default is the Side SSD Module.

SET MEDIA

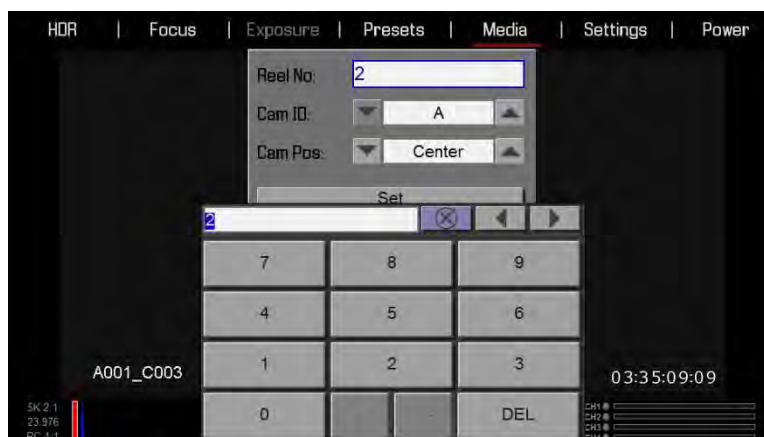
When selected, a new dialog box will appear allowing you to add properties to the media highlighted in the Current Media box when formatting. Available options are REEL NO, CAM ID, CAM POS, and SET to set the values entered.



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REEL NO.

When selected, a keypad will appear allowing you to enter a value between 1 and 999.



CAMERA ID (SLATE)

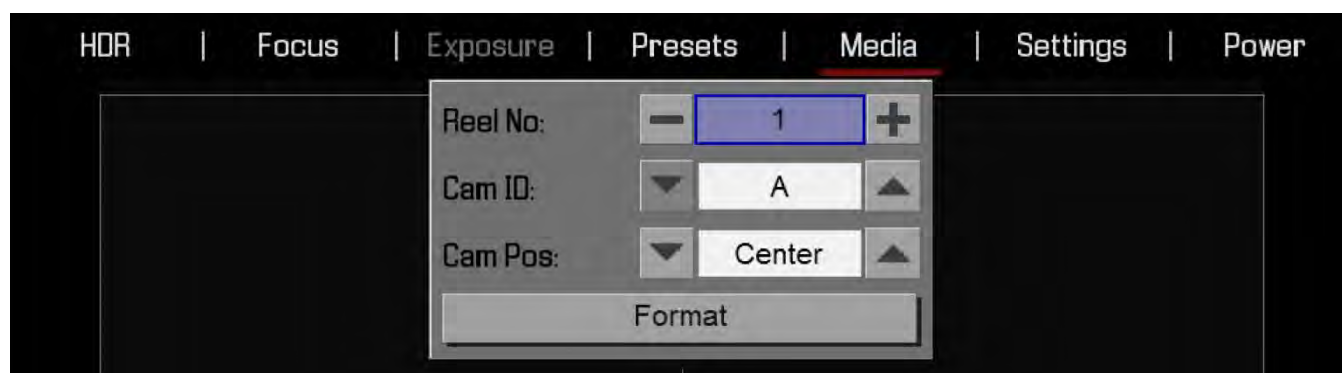
Identifies the camera with a letter A through Z. Default is A.

CAMERA POS (POSITION)

Identifies the camera position as Right, Left or Center. Default is Center.

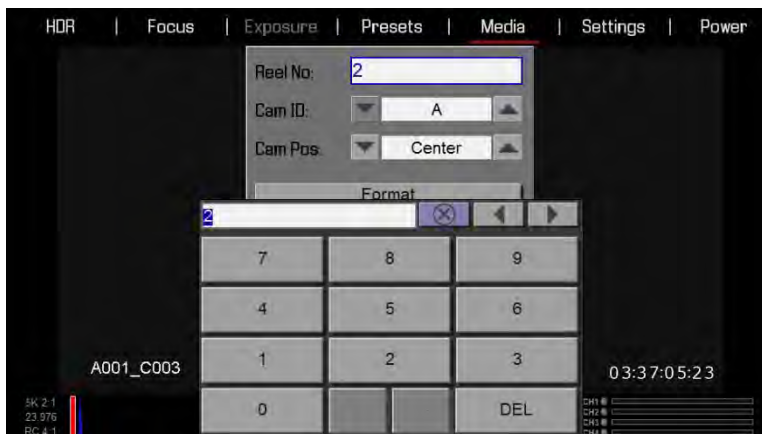
FORMAT MEDIA

When selected, a new dialog box will appear allowing you to add properties to the media highlighted in the Current Media box when formatting. Available options are REEL NO, CAM ID, CAM POS, and FORMAT to format the media with the values entered.



REEL NO.

When selected a keypad will appear allowing you to enter a value between 1 and 999.



CAMERA ID (SLATE)

Identifies the camera with a letter A through Z. Default is A.

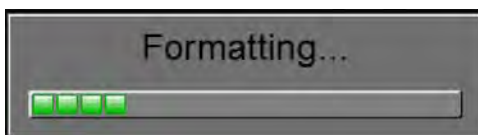
CAMERA POS (POSITION)

Identifies the camera position as Right, Left or Center. Default is Center.

FORMAT

When selected, formats the media and adds the selected properties.

- During formatting, the camera will display “Formatting” with a Green status bar.

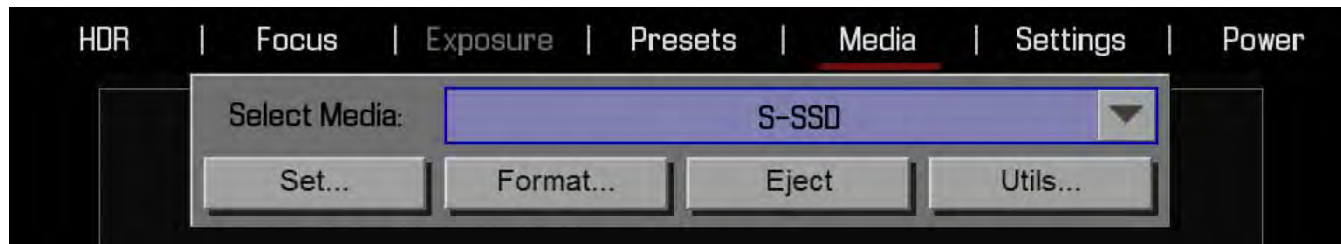


- When formatting is complete, camera will display “The magazine was successfully re-formatted. The digital magazine is ready for immediate use.”

The magazine was successfully re-formatted.
The digital magazine is ready for immediate use.

EJECT MEDIA

When selected will Eject (unmount) the media highlighted in the Select Media box.

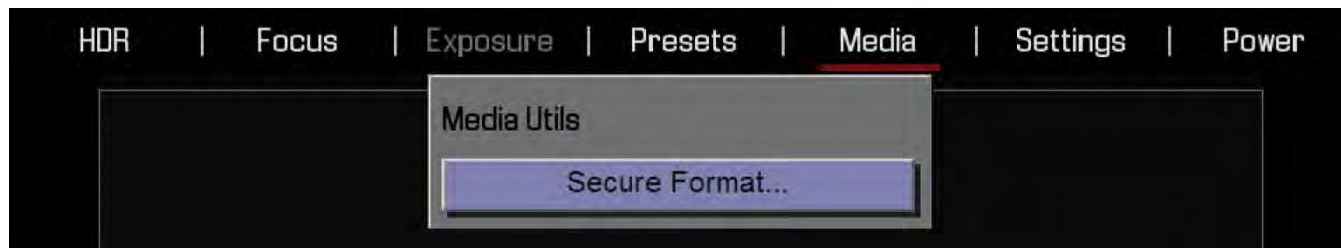


When ejected, camera will display "Media Ejected Successfully".



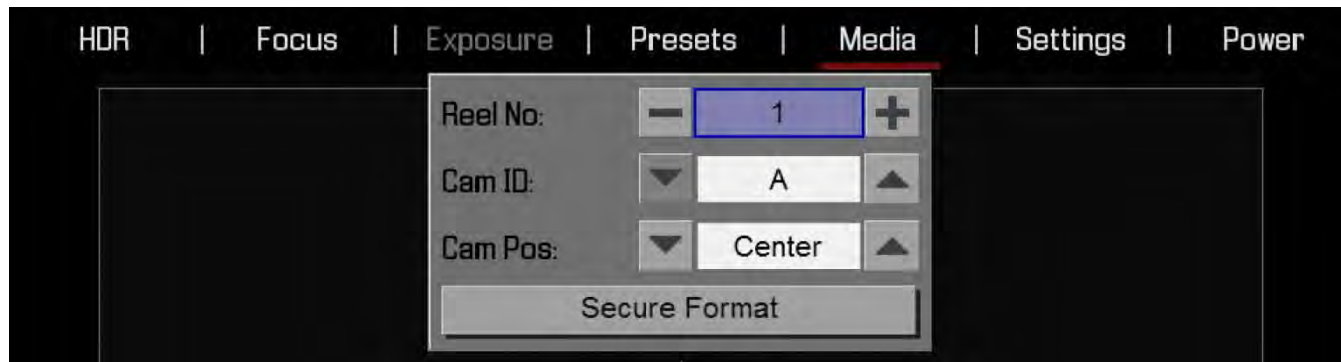
UTILITIES

Options are SECURE FORMAT.



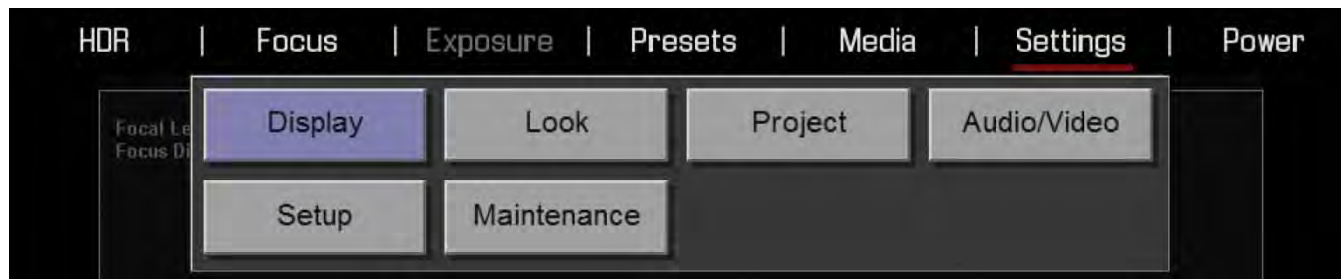
SECURE FORMAT

Secure Format is a low-level format that rebuilds the SSD file system. It should only be used if the performance of the SSD is in question.



SETTINGS MENU

This section describes the various secondary controls available to configure the camera. Menu options are DISPLAY, LOOK, SENSOR, PROJECT, MODES, AUDIO/VIDEO, SETUP and MAINTENANCE.



DISPLAY

Available options are TOOLS, ZEBRA, OVERLAY, MODES, FRAME GUIDE, AREA GUIDES, and MONITOR.



TOOLS

The Tools menu permits the operator to adjust the GUI elements displayed on the Viewfinder output(s). Available options are OFF, EXPOSURE, FOCUS, RAW, VIDEO, EDGE, and MAGNIFY. The Dialog is available by either going to SETTINGS > DISPLAY > TOOLS or simply clicking on the histogram in the lower left.



OFF

Turns off any of the display modes in the first line.

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EXPOSURE

This will show areas of under exposure (Purple) or over exposure (Red) on top of a monochrome image. The color is based on RAW data so over/under exposure refers to data actually close to clipping in the sensor. When selected, the icon “E√” will be displayed in the Lower Status Group.



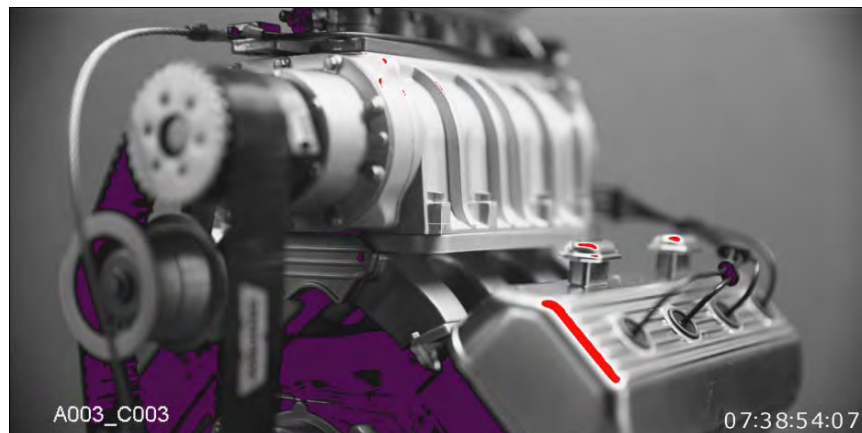
The EXPOSURE meter's color bands provide the following information:

| | |
|--------|------------------|
| PURPLE | Minimum Exposure |
| RED | Maximum Exposure |

Between minimum and maximum exposure values, the image is displayed as a monochrome image.



In the image, Purple areas represent sensor exposure levels that are likely to be noisy if gained up in postproduction. Red areas represent sensor exposure levels that are at clipping.



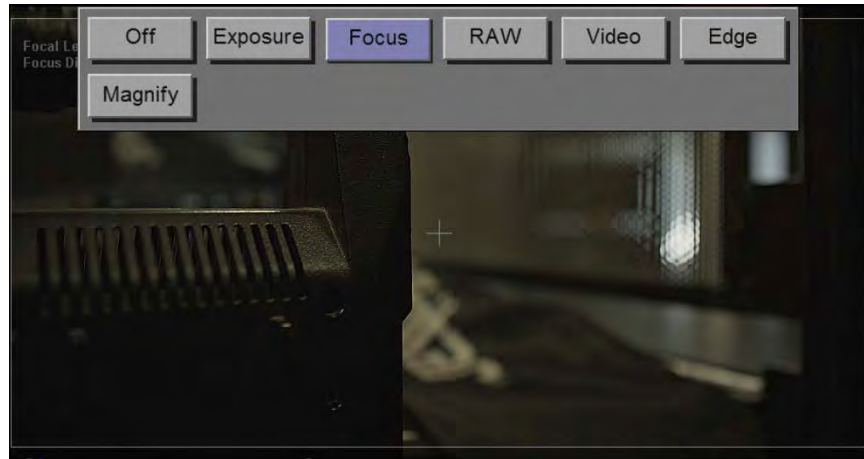
NOTE: As EXPOSURE meters sensor RAW information, it is not affected by any RGB domain adjustments - such as ISO rating, FLUT, White Balance, Video Gain or other LOOK information.

NOTE: Because the RAW data represents a wider color space than RGB, provided that the Red (clip) color is not present in EXPOSURE view, even if Red (clip) color is present in VIDEO view, the apparently clipped RGB highlights can be recovered in post production by adjustment of ISO, FLUT or changing the KNEE and WHITE values of the CURVE box.

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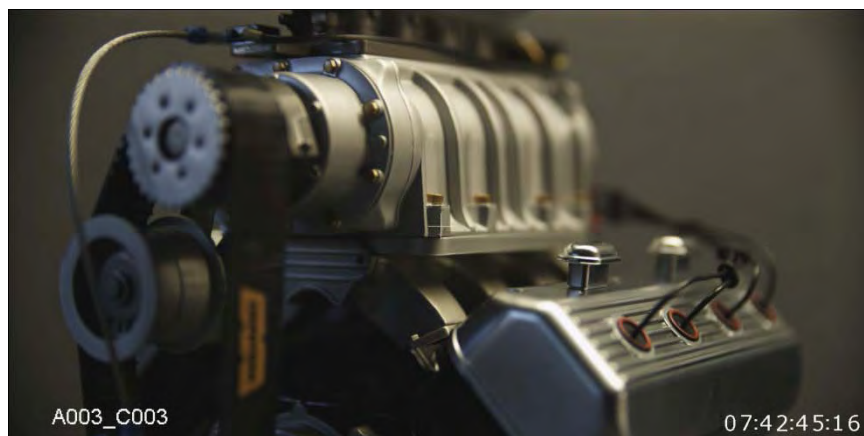
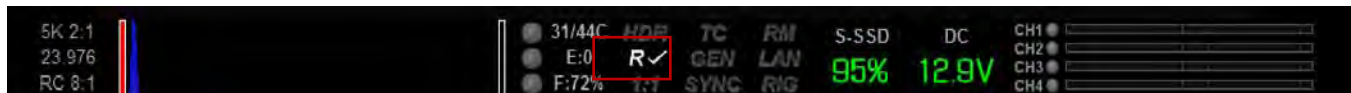
FOCUS

This will emphasize edges in the image without changing brightness/image content so it is easier to judge if the image is in focus. By adjusting your lens zoom and focus you can see which objects are coming into and falling out of focus. When selected, the icon “F✓” will be displayed in the Lower Status Group.



RAW

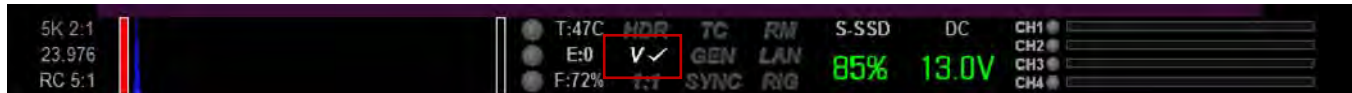
RAW displays the image without any ISO correction. When selected, the icon “R✓” will be displayed in the Lower Status Group.



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VIDEO

VIDEO displays a multi-color color overlay that allows you to check the video level of the RGB monitor path (calibrated to the SMPTE test signal) and any outputs driven from that path - such as HD-SDI and HDMI. When selected, the icon “V ✓” will be displayed in the Lower Status Group.



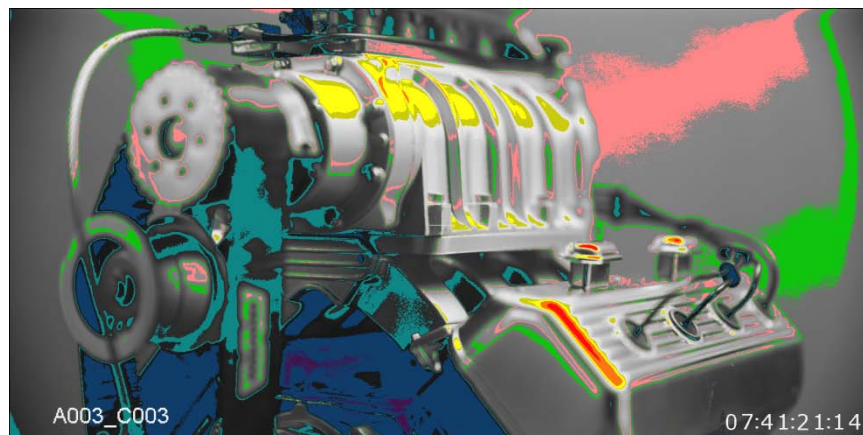
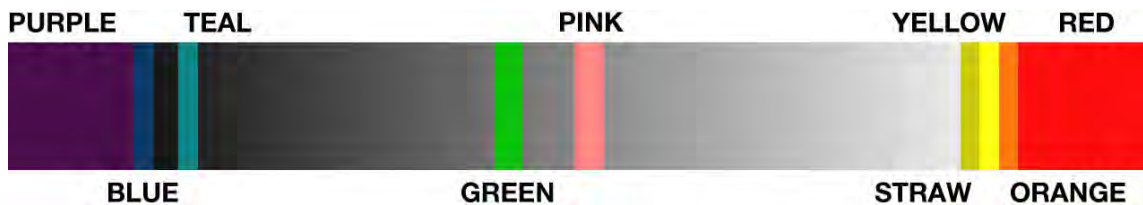
Purple represents Super-Black, Dark Blue represents Black, Teal represents 3-stops under 18% Gray, Green represents 18% Gray, Pink represents Skin Tone, Straw represents White, and Yellow, Orange and RED represent various degrees of signal clipping in RGB space.

By adjusting ISO, FLUT and Shadow while looking at VIDEO check, the operator can ensure that Black, White and 18% Gray values conform to the desired levels on the HD-SDI and /or HDMI outputs.

The VIDEO bands provide the following information:

| | |
|---------------|--|
| PURPLE | Super Black (IRE 1-0) |
| BLUE | Black (IRE 1-3) |
| TEAL | Dark Gray (IRE 9-12) |
| GREEN | Typical Level for 18% Gray Card (IRE 44-47) |
| PINK | Typical level for Caucasian Skin (IRE 54-57) |
| STRAW | White (IRE 96-98) |
| YELLOW | Super White (IRE 101-104) |
| ORANGE | Super White (IRE 105-107) |
| RED | Super White (IRE 108-109) |

At all other values, the monochrome image displayed represents the luminance value of the ISO adjusted image.

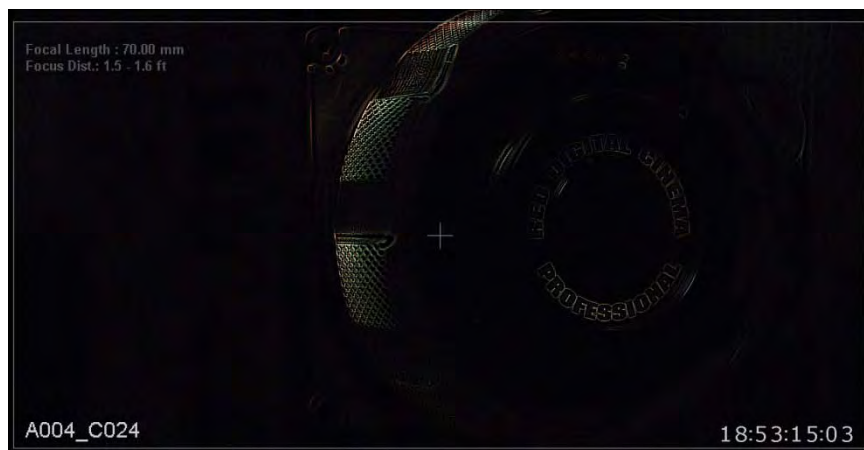


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EDGE

EDGE displays a color overlay that outlines the edges of objects in an outline mode. By adjusting your lens zoom and focus you can pinpoint focus. When selected, the icon “F” will be displayed in the Lower Status Group.

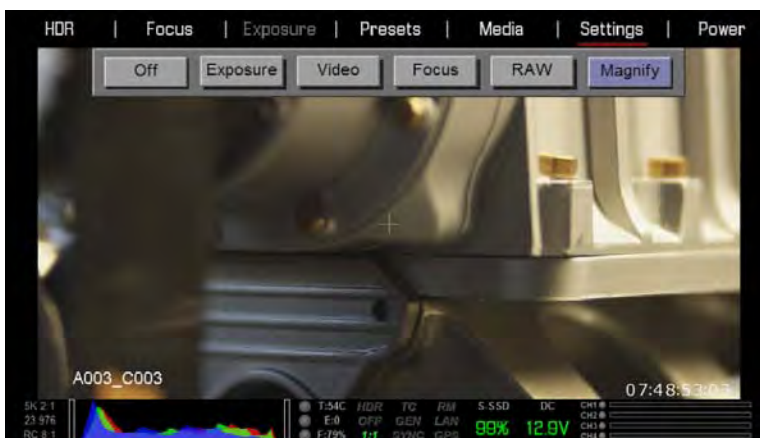
WARNING: This will potentially interfere with recordings done via HDMI/HD-SDI in "Clean" Mode!



MAGNIFY

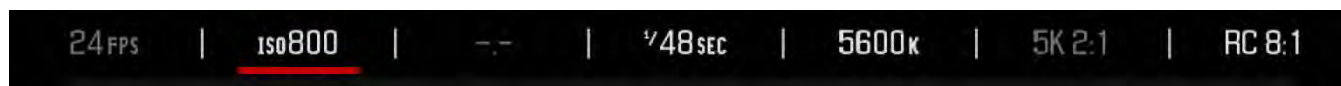
Magnify displays the central region of the sensor in 1:1 pixel resolution. When enabled, the 1:1 text in the Lower Status Group will change to Green. If in Magnify mode, when the Record button is pressed, the system will automatically exit this mode. When using a touchscreen you can also perform this function by pinching your fingers together and apart.

NOTE: HDR mode cannot be modified when in Magnify 1:1 mode.



RED EPIC® OPERATION GUIDE

NOTE: When in magnify mode, you will not be able to adjust frame rate or resolution. These options will be Grayed out.



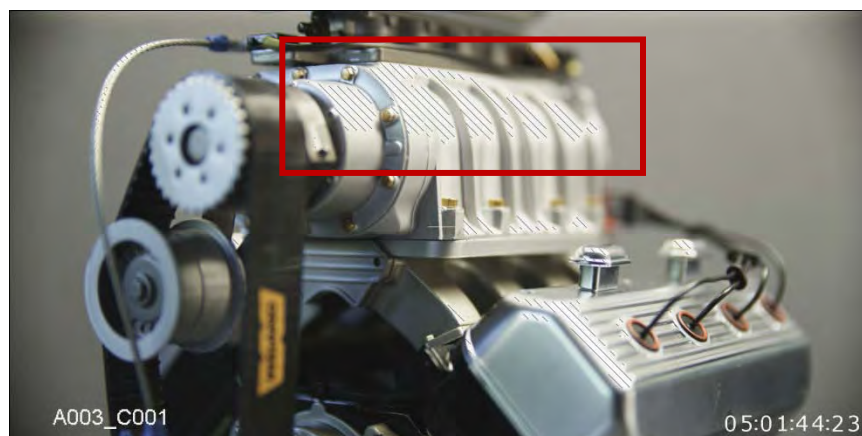
ZEBRA

Zebras enable and adjust the upper and lower values for two independent Zebra indicators. One zebra may be used for highlight exposure, and the other for mid tone or shadows. Zebras will be visible when in 1:1 zoom. **By default, Zebra 1 and 2 are disabled.**



ZEBRA 1

To enable, select ZEBRA 1 check box. Areas of the image exposed within these ranges will be indicated by crosshatched overlays at - 45 degrees relative to vertical. Zebra 1 is shown in the image below.



High IRE

Change the desired setting between 93 and 109 (default is 108).

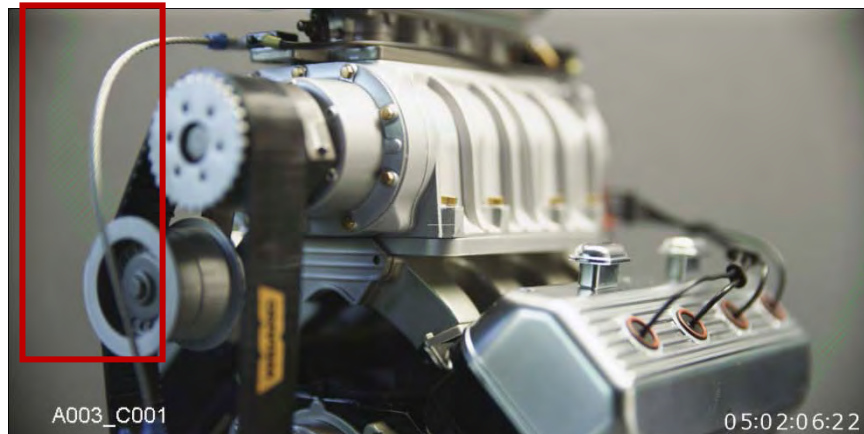
Low IRE

Change the desired setting between 75 and 107 (default is 99).

RED EPIC® OPERATION GUIDE

ZEBRA 2

To enable, select ZEBRA 2 check box. Areas of the image exposed within these ranges will be indicated by crosshatched overlays at + 45 degrees relative to vertical. Zebra 2 is shown in the image below.



High IRE

Change the desired setting between 1 and 99 (default is 1).

Low IRE

Change the desired setting between 0 and 84 (default is 48).

OVERLAY

Allows you to enable and color code graphic overlays visible the on the Viewfinder and Preview outputs.



SHOW

Check the box adjacent to each overlay type to show. Overlays available are AF Zones, Center and Grid. Look Around is always enabled.

RED EPIC® OPERATION GUIDE

Check the boxes below Look Around are File Name, Time Code, and Lens Info. When selected will be displayed on the main screen. By default, all three are shown.

Transparency

The transparency setting for AF Zones, AE Zone, Faces, Center, Grid and Look Around may be adjusted. Options are 0%, 25%, 50%, 75% and 100%.

Color

The color setting for AF Zones, AE Zone, Faces, Center, Grid and Look Around may be adjusted. Options are White, Blue, Yellow, Green, Red, or Black. Select the color that provides maximum contrast with the scene you are shooting.

Grid

The Grid display is shown below. The grid may be used as a “rule of thirds” indicator.



RED EPIC® OPERATION GUIDE

Look Around

Highlights the look around area.



MODES

Available GUI display mode adjustments are Exposure, Shutter Mode, Aperture, and Focal Distance.



EXPOSURE

Selects GUI display of Shutter Exposure on Main screen as Time (1/xx sec) or Angle (Degrees). Default is Time. Angle is shown below.



SHUTTER

Enables one of two shutter timing (duration) modes: Absolute or Relative. Default selection is Absolute.

RED EPIC® OPERATION GUIDE

Absolute

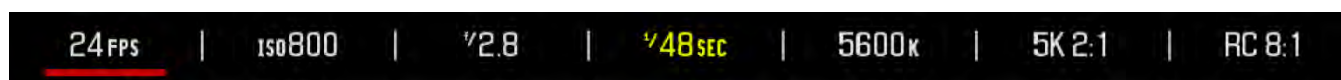
Shutter Speed is defined exclusively by the Shutter Speed setting.

NOTE: When operating in Absolute mode, the shutter speed is reported in White text.

Relative

Shutter Speed is defined by the requested Shutter Speed divided by the ratio of the current capture fps to the Project TIME BASE fps.

NOTE: When operating in Relative mode, the shutter speed is reported in Yellow text.



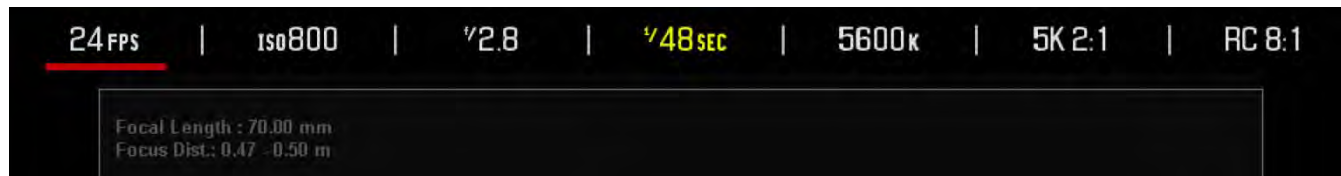
NOTE: If the operator requests a shutter speed that is outside the capability of the camera, the camera will automatically limit them when a limiting parameter changes.

APERTURE

Selects GUI display of f/stop as 1/4 f Stop or 1/3 f Stop. Default is 1/3.

FOCAL DISTANCE

Allows you to set the Lens Info to display in Metric or Imperial measurements. Default is Imperial.



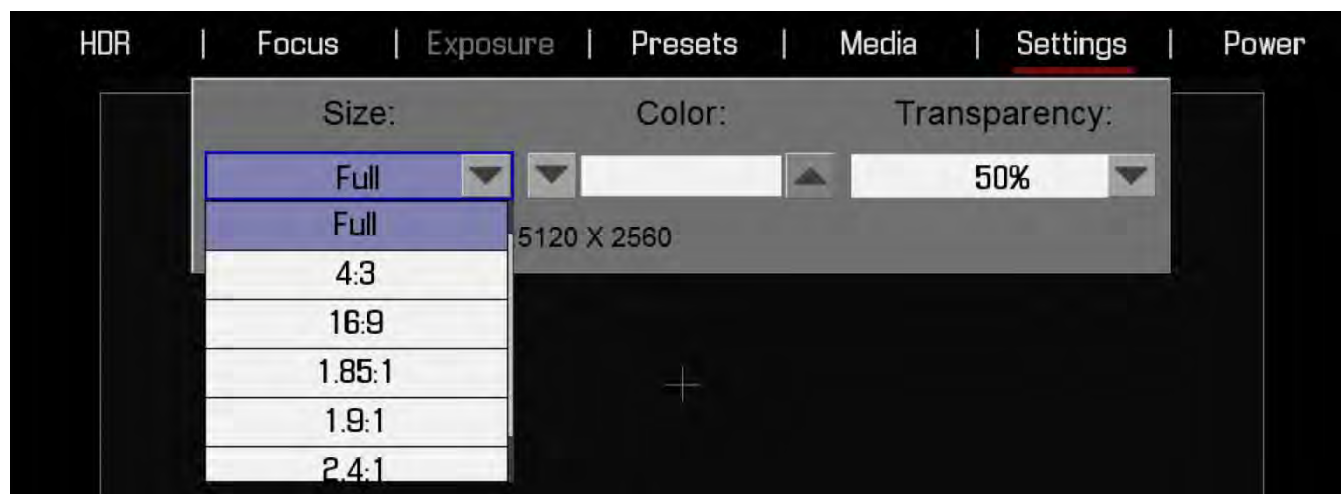
FRAME GUIDE

This sub-menu provides a selection of frame guides and safe action and safe title guides. User definable safe action and safe title guides may be saved as a USER PREFERENCE, thereby permitting the camera guides to be fully customized for any application. Available options are Size, Color and Transparency. Full is enabled by default.



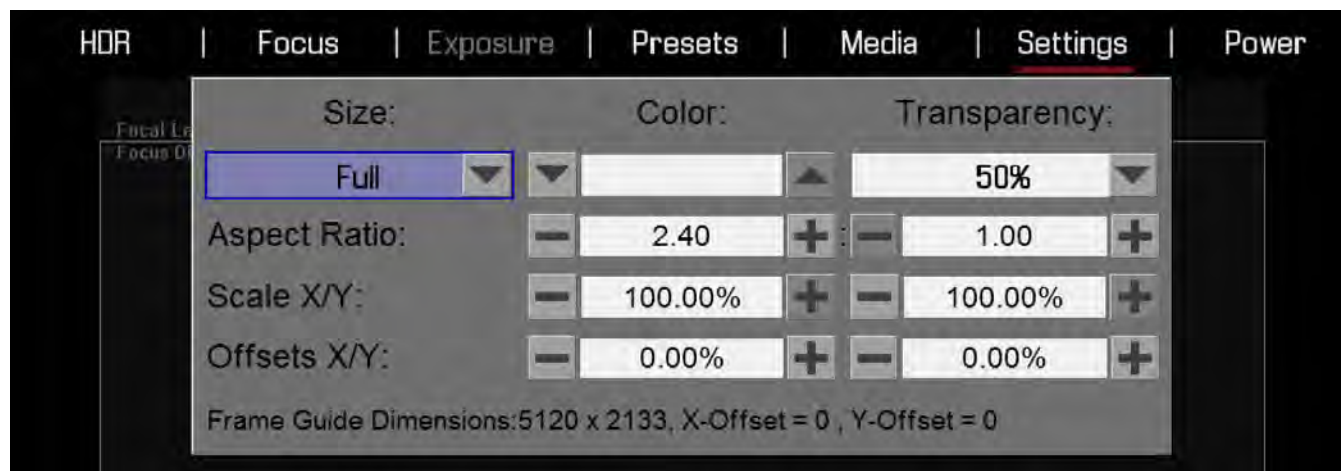
SIZE

Available options are Off, Full, 4:3, 16:9, 1.85:1, 1.9:1, 2.4:1, or User.



User

Frame guides can be set to your own preferences through the User Settings. Available options are Aspect Ratio, Scale X/Y and Offsets X/Y. Note that the selected size will be displayed in the bottom of the Frame Guide box.



RED EPIC® OPERATION GUIDE

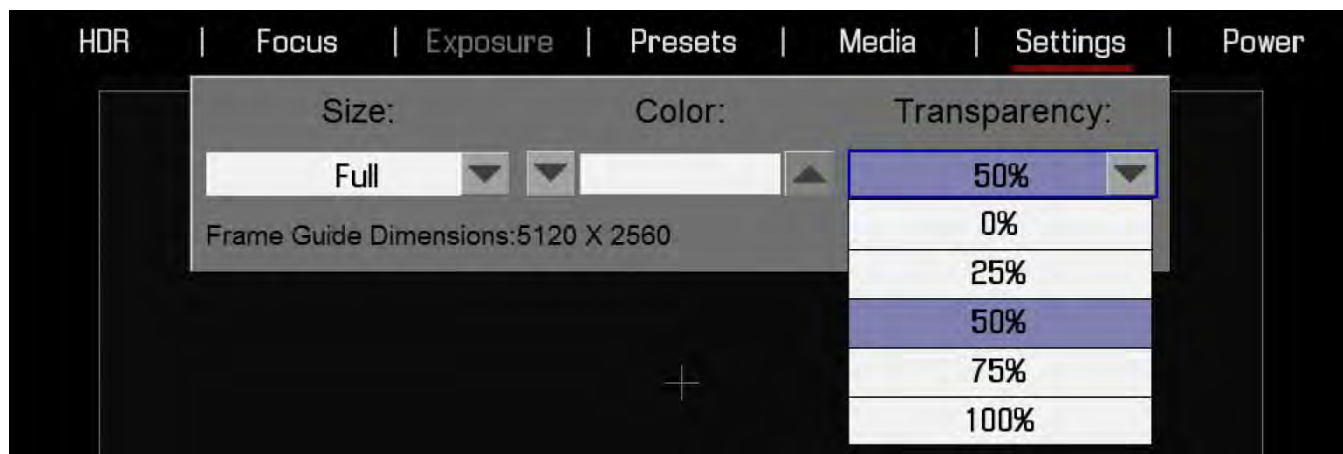
COLOR

Sets the frame guideline color to White, Gray, Teal, Purple, Yellow, Green, Blue, Red, or Black. Select the color that provides maximum color contrast with the scene you are shooting. Default is White.



TRANSPARANCY

Sets the frame guide transparency. Available options are 0%, 25%, 50%, 75% and 100%.



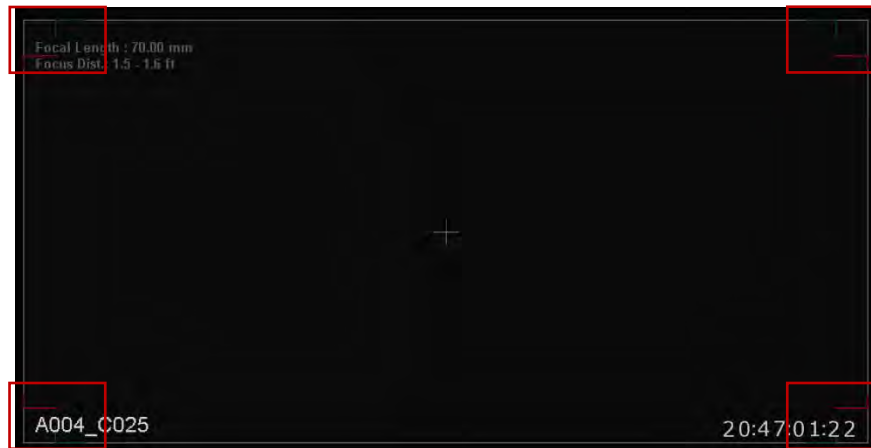
AREA GUIDES

Area Guides displays Title Guides and Action Guides.



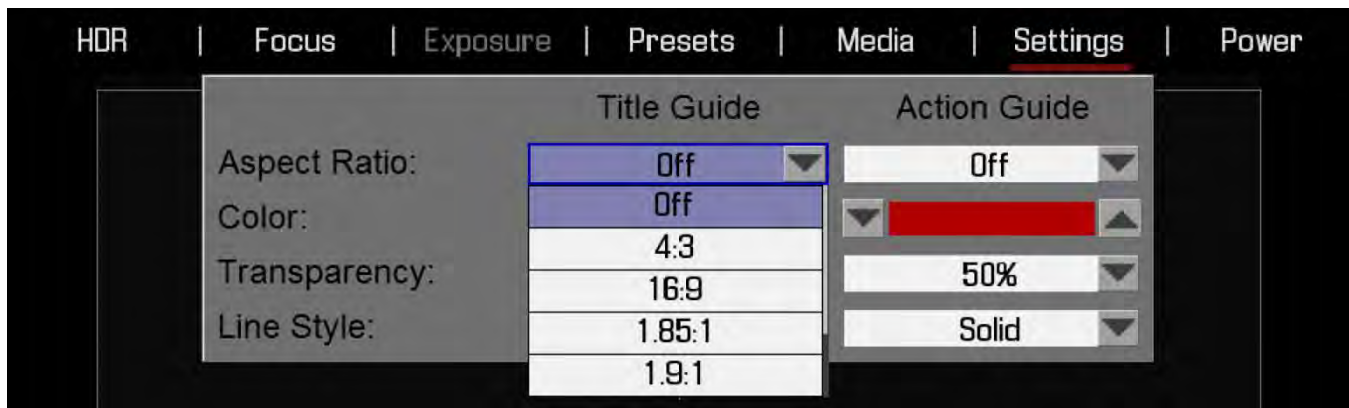
RED EPIC® OPERATION GUIDE

Bracket Line Style shown below.



ASPECT RATIO

For both Title Guide and Action Guide, available options are OFF, 16:9, 14:9, 4:3, 2.4:1, 1.85:1, and User. Default is OFF.



RED EPIC® OPERATION GUIDE

User

Title Guide and Action Guide can be set to your own preferences through User Settings. Available options are Aspect Ratio and Scale. Solid Line Style shown below.



RED EPIC® OPERATION GUIDE

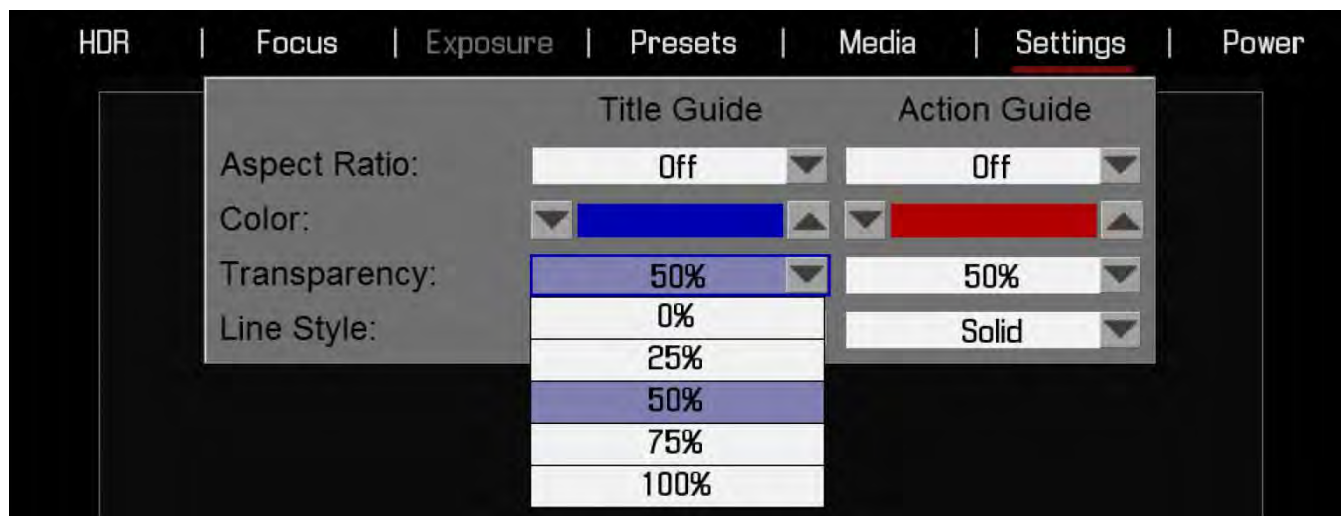
COLOR

Sets Title Guide and Action Guide line color to White, Blue, Yellow, Green, Red, or Black. Select the color that provides maximum color contrast with the scene you are shooting.



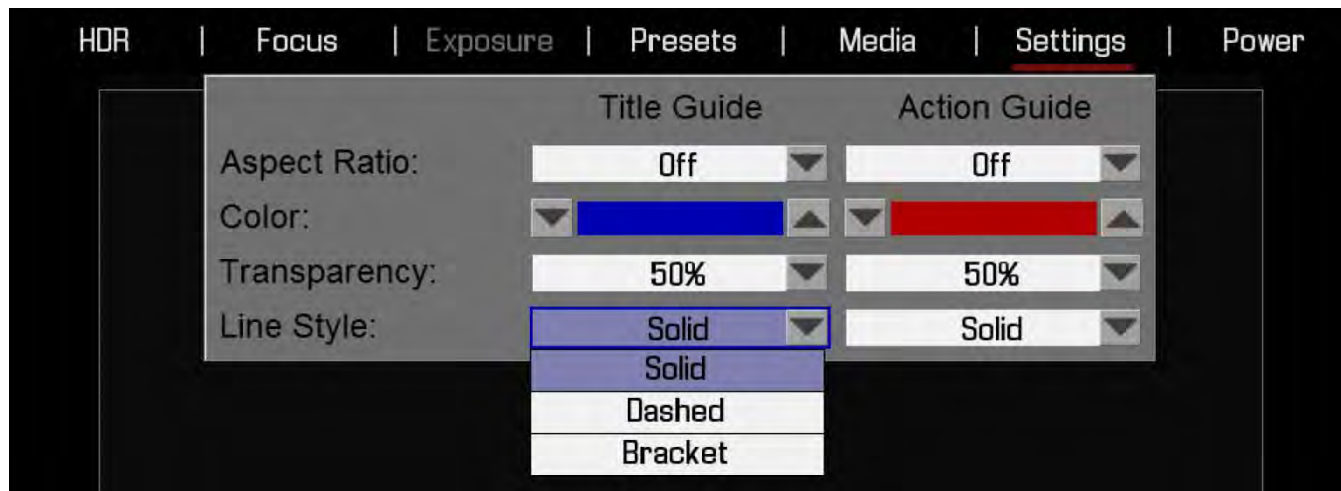
TRANSPARENCY

Sets Title Guide and Action Guide transparency. Options are 0%, 25%, 50%, 75% and 100%.



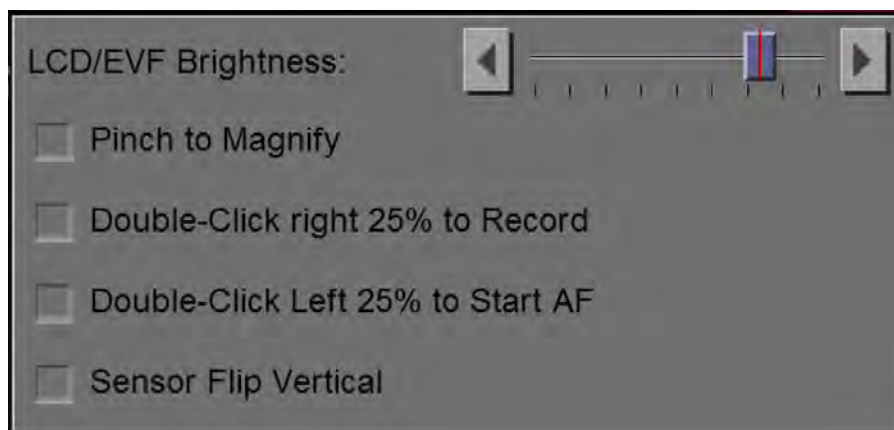
LINE STYLE

Sets Title Guide and Action Guide line style. Options are Solid, Dashed and Bracket.



MONITOR

Allows you to modify brightness of the LCD and EVF parameters through Brightness Control. Also allows options for the LCD touchscreen to be changed through Touch Gestures.



BRIGHTNESS CONTROL

Slide to the right for a brighter display; slide to the left for a dimmer display.

TOUCH GESTURES

These options apply ONLY to the Touchscreen LCD.

RED EPIC® OPERATION GUIDE

Pinch to Magnify

When selected, allows you to use two fingers in a pinching motion on the screen to enable Focus Zoom. To zoom out to normal view, slide fingers apart.

Double-Click Right 25% to Record

When selected, the right 25% of the screen can be double-tapped to start and double-tapped again to stop recording.

Double-Click Left 25% to Start AF

When selected, the left 25% of the screen can be double-tapped to start the Autofocus (when RED EPIC Canon EOS mount and compatible lens are installed).

Sensor Flip Vertical

When selected, will flip the image vertically on the sensor, not just through the monitors, this is the actual image being recorded.

NOTE: Sensor Flip Vertical is NOT available while recording.



LOOK

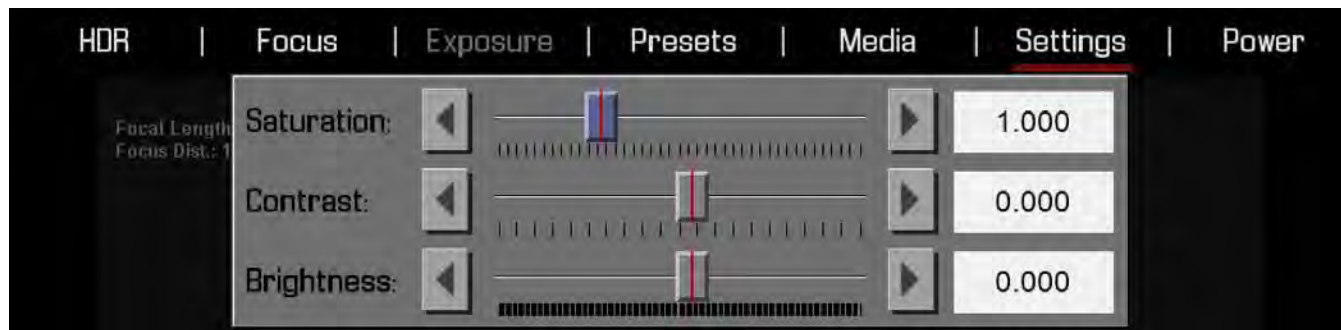
The LOOK menu permits adjustment of COLOR, GAIN, FLUT®, and CURVE metadata values. These parameters will affect the look of the monitor path, but do not affect the actual REDCODE RAW data being recorded.



RED EPIC® OPERATION GUIDE

COLOR

The Color sub-menu permits adjustment of SATURATION, CONTRAST, and BRIGHTNESS.



SATURATION

Adjusts color saturation. Range is 0.0 (monochrome) to + 2.0 (super color). Default is 1.0.

CONTRAST

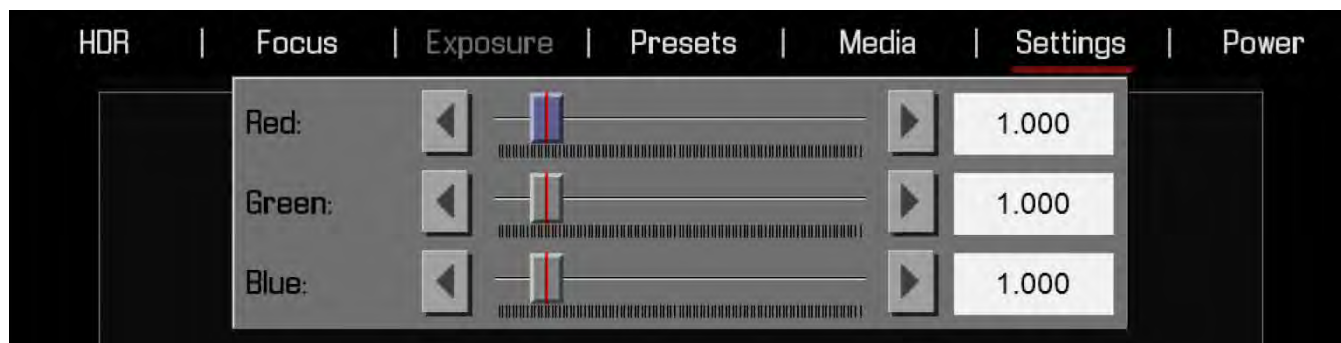
Adjusts the overall contrast of the image. Range is -1.0 (flat) to +1.0 (max contrast). Default is 0.0.

BRIGHTNESS

Adjusts brightness without crushing highlights. Available range is - 10 to +10. Default is 0.0.

GAIN

The GAIN sub-menu permits adjustment of RED GAIN, BLUE GAIN and GREEN GAIN.



RED

Adjusts the gain of the RED channel only. Range is 0.0 (no Red) to 4.0. Default is 1.0.

BLUE

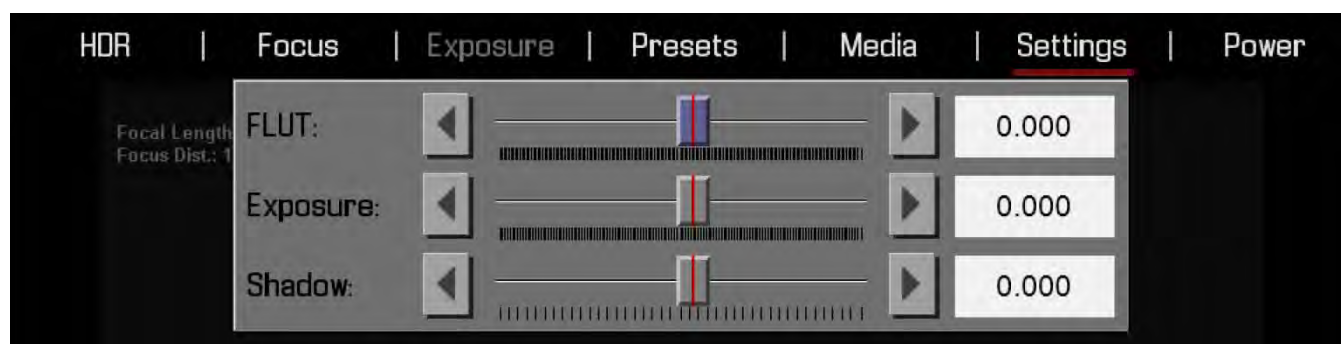
Adjusts the gain of the BLUE channel only. Range is 0.0 (no Blue) to 4.0. Default is 1.0.

GREEN

Adjusts the gain of the GREEN channel only. Range is 0.0 (no Green) to 4.0. Default is 1.0.

FLUT

The FLUT sub-menu permits adjustment of FLUT, EXPOSURE COMPENSATION and SHADOW.



FLUT

FLUT (Floating Point Lookup Table) adjusts mid-range tone values. Range -4.0 to +4.0. Default is 0.0.

EXPOSURE

Adjusts exposure compensation. Available exposure range is -2.0 to +4.0. Default is 0.0.

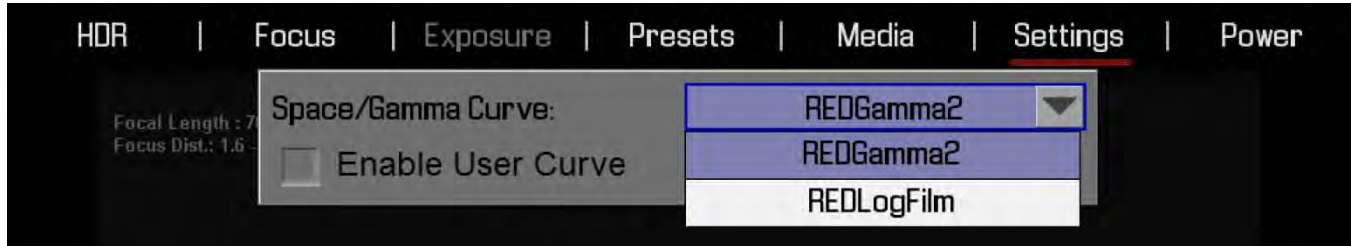
SHADOW

Shadow adjusts the toe value of the FLUT or in other words, the tone near Black. Range is -2.0 to +2.0. Default is 0.0. Increasing the Shadow value raises the video level of near Blacks. Lowering the Shadow value crushes the video level of near Blacks.

RED EPIC® OPERATION GUIDE

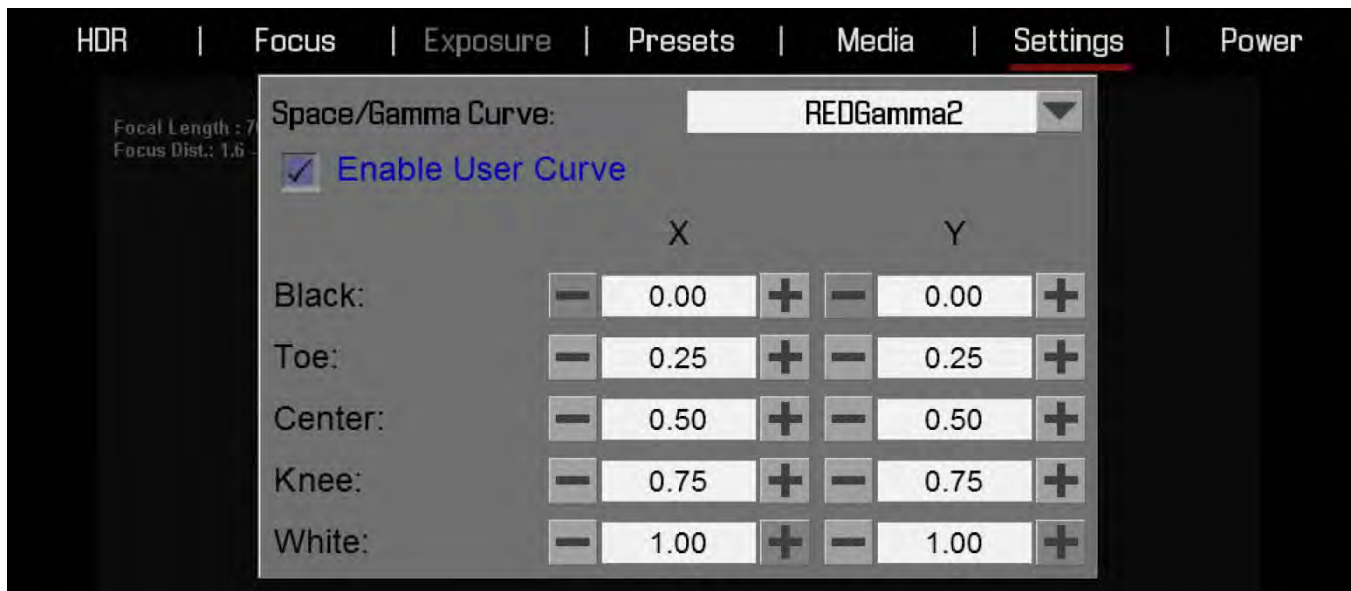
CURVE

The CURVE sub-menu permits adjustment of the monitor output Color Space and Gamma curve. Available options are REDGamma2 and REDLogFilm.



ENABLE USER CURVE

When checked will open more options allowing you to adjust the X and Y values for Black, Toe, Center, Knee, and White of the curve.



PROJECT

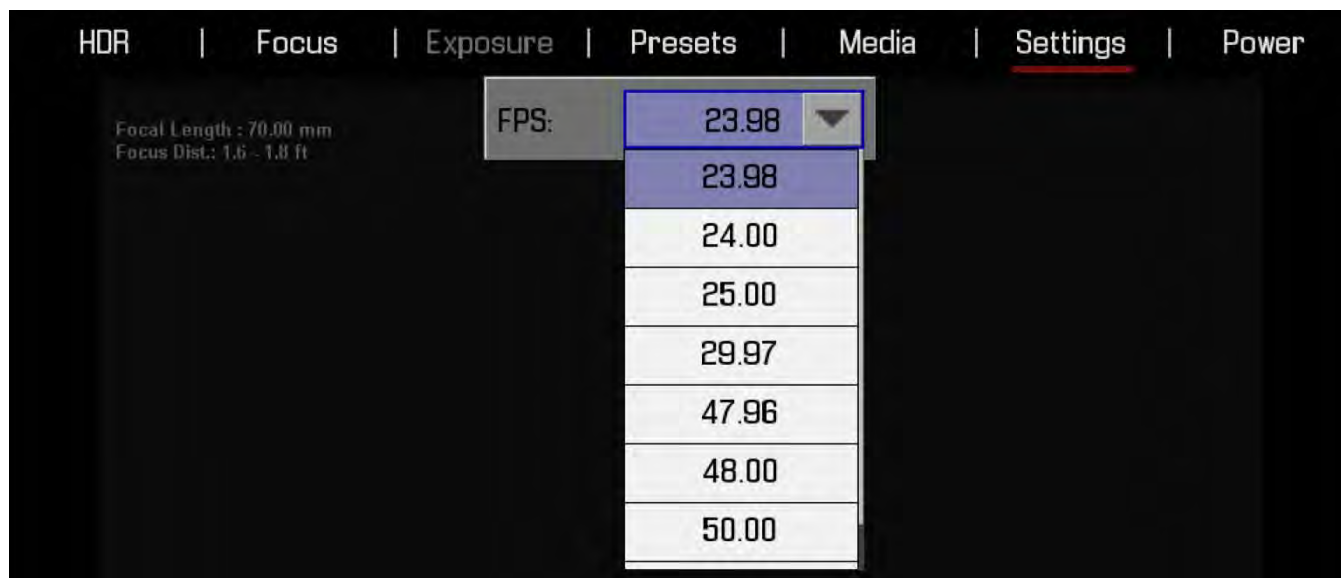
The project menu sets the operating parameters the camera will use for a given project. Options available are TIME BASE and TIME CODE.



TIME BASE

Sets the TIME BASE (fps) to be used for the project - the primary acquisition frame rate, time code count and playback & editing frame rate. Setting is displayed in the lower left corner of VIEWFINDER output(s).

Available options are 23.98, 24.00, 25.00, 29.97, 47.96, 48.00, 50.00, and 59.94. Default is 23.98.



TIME CODE

Selects the TIME CODE source to be used. Options are EXTERNAL TC and INTERNAL USER-PROVIDED TC.

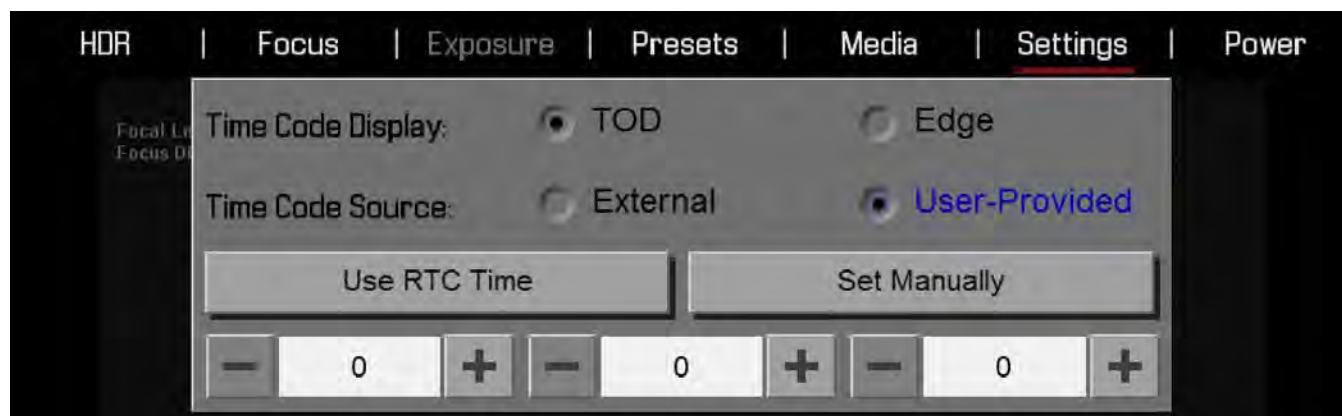


TIME CODE DISPLAY

Allows you to choose between TOD and Edge display.

TIME CODE SOURCE

Available options are EXTERNAL and USER-PROVIDED.



User-Provided

The three numerical boxes below allow you to set hours, minutes and seconds (in that order).

Use RTC Time

When selected the camera uses the camera's Real Time Clock as the timecode counter source (snapshot of the RTC.)

Set Manually

When selected allows the user to define a custom value as the timecode counter seed.

AUDIO/VIDEO

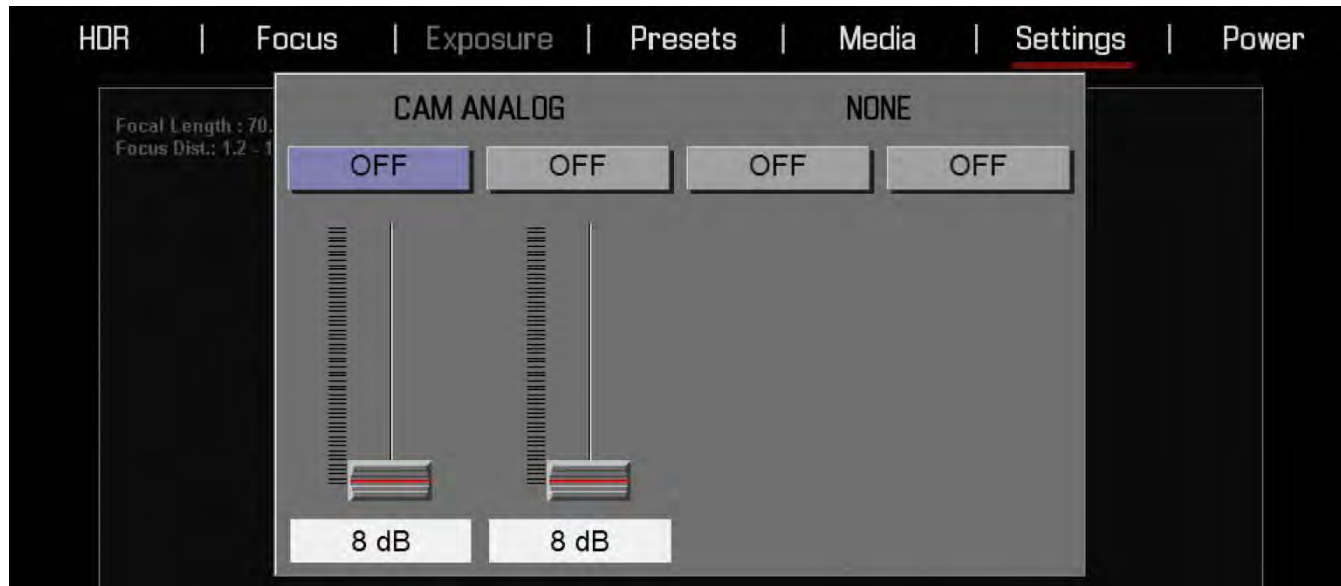
Menu adjusts AUDIO INPUT, AUDIO OUTPUT, AUDIO CHANNELS, MONITOR CONTROL, and TEST SIGNALS.



RED EPIC® OPERATION GUIDE

AUDIO INPUT

Allows you to enable / disable and adjust levels for audio inputs (CAM ANALOG). Available options for each input are ON and OFF. Default is OFF.



Audio channel level inputs are displayed in the lower section of the UI.

When audio is enabled and an audio jack is plugged in (detected by the camera), the circle next to CH1, CH2 etc... will be Green and the box around the signal will be highlighted.

When audio is enabled and an audio jack is not plugged in (not detected by the camera), the circle will be Red.



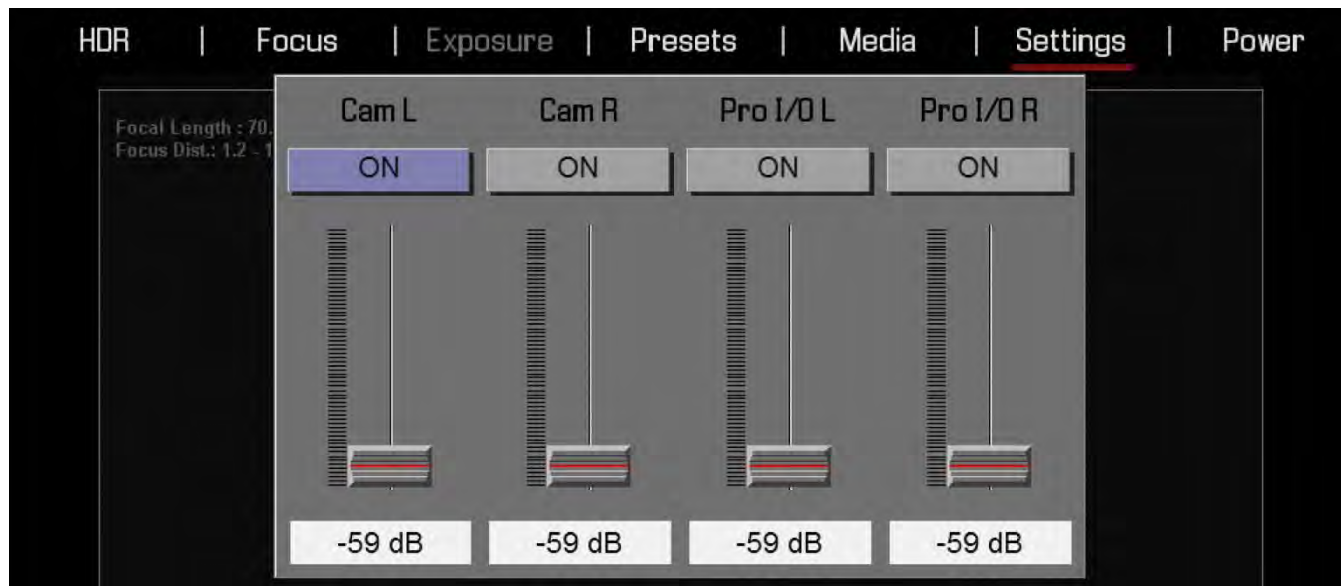
Also, when audio is disabled and an audio jack is plugged in, the circle will remain Gray but the box around the signal will be highlighted (jack is detected by the camera).



RED EPIC® OPERATION GUIDE

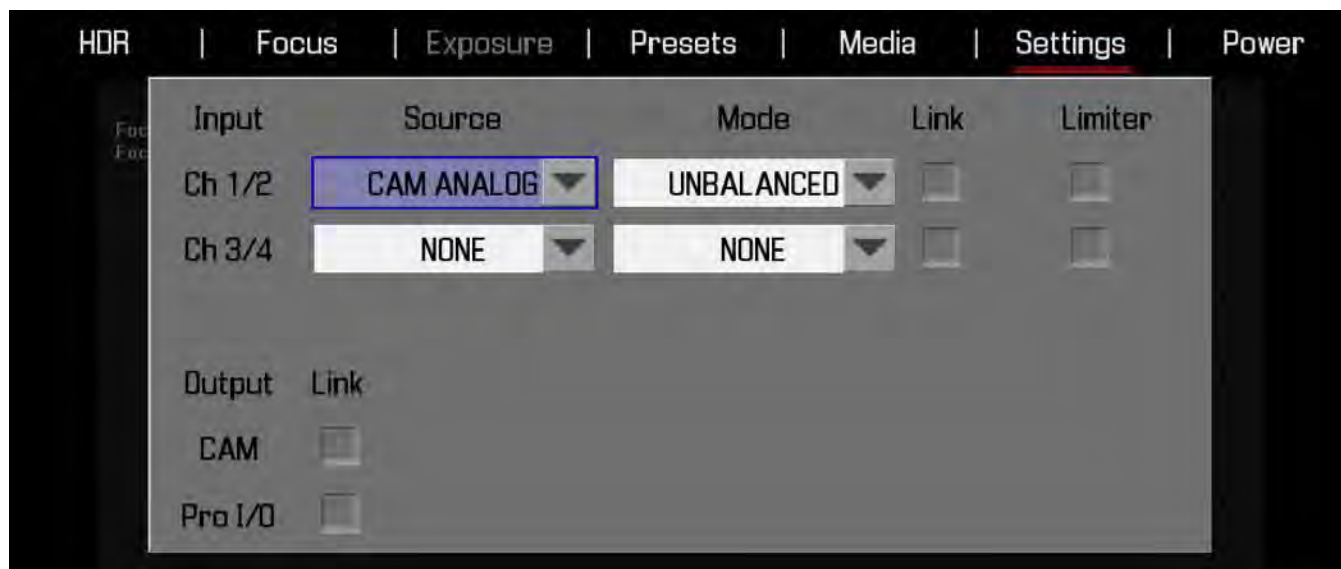
AUDIO OUTPUT

Allows adjustment of audio output levels fed to the outputs. Available options for each channel are ON and MUTE. Default is ON.



AUDIO CHANNELS

Allows selection of audio inputs and operational modes.



RED EPIC® OPERATION GUIDE

INPUT

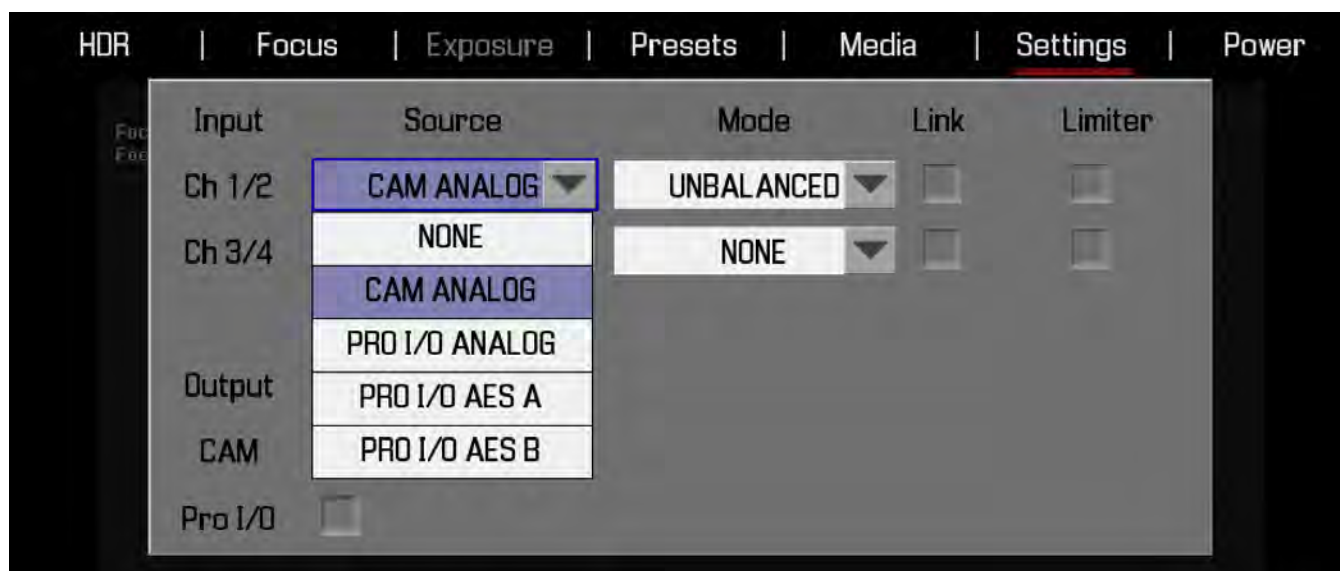
Available inputs are CH 1/2 and CH 3/4.

NOTE: For cameras not equipped with a PRO I/O module, options are CH 1/2.

Source

Available options are NONE, CAM ANALOG, PRO I/O ANALOG, PRO I/O AES A, and PRO I/O AES B.

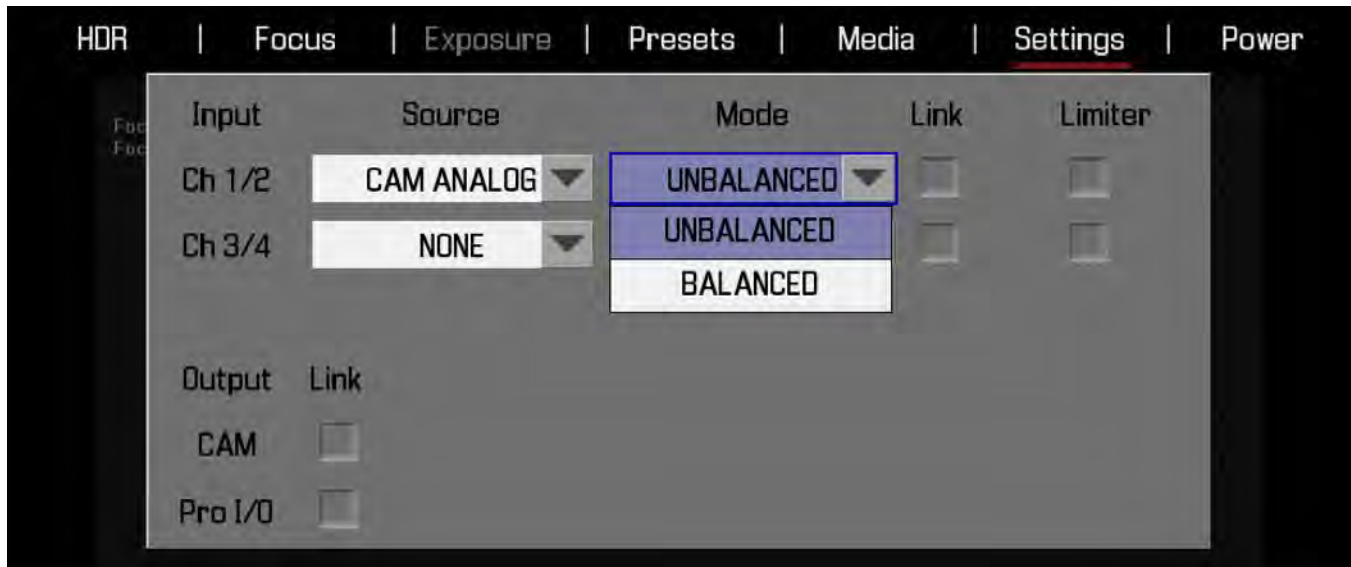
NOTE: For cameras not equipped with a PRO I/O module, options are NONE or CAM ANALOG.



RED EPIC® OPERATION GUIDE

Mode

Available options are UNBALANCED and BALANCED.



Link

Enables linkage between Channel Gain controls.

Limiter

Enables signal limiter circuit. Limiter enabled adds 10dB of headroom for Microphone level inputs, or 4dB for Line Level inputs.

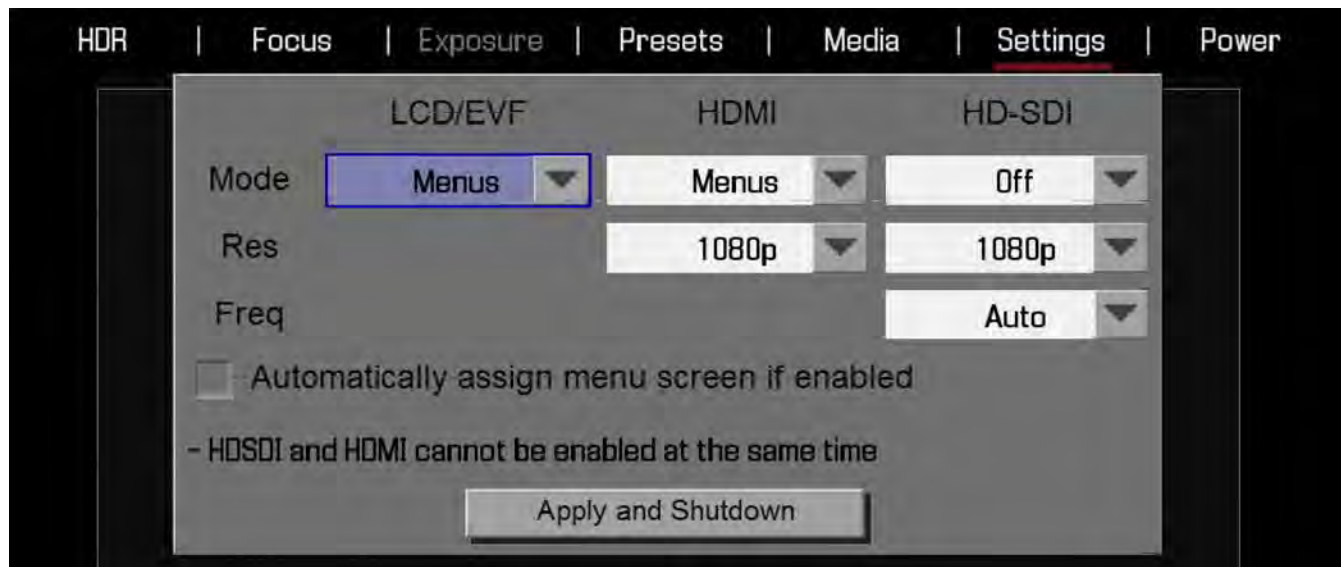
OUTPUT

Link

Enables linkage between Output Channel Attenuation controls.

MONITOR CONTROL

This sub-menu allows the monitor outputs settings to be modified. For changes to take effect, the camera **MUST** be restarted. This can be performed immediately by selecting **APPLY AND SHUTDOWN** or at a later time through the **POWER** menu.



MODE

Allows you to choose the output for the LCD/EVF, HDMI and HD-SDI monitors.

LCD/EVF

Options are MENUS, PREVIEW, CLEAN, OVERLAY, OVERLAY LEFT, and OVERLAY RIGHT.

If anything other than MENUS is selected on the LCD (such as CLEAN), to return to displaying the MENUS, perform a double-tap on the LCD screen.

HDMI & HD-SDI

Options are OFF, MENUS, PREVIEW, CLEAN, OVERLAY, OVERLAY LEFT, and OVERLAY RIGHT.

RES

Allows you to choose the output resolution for HDMI and HD-SDI monitors. Available options are AUTO, 720p and 1080p.

NOTE: Some HDMI monitors may have trouble when "AUTO" is selected. In these cases it is recommended to manually select the maximum monitor resolution provided.

RED EPIC® OPERATION GUIDE

FREQ

Allows you to choose the output frequency in Hertz (Hz) for HD-SDI monitors. Available options are AUTO, 23.976/24, 25, 29.976, 47.952/48, 50, and 59.94.

AUTOMATICALLY ASSIGN MENU SCREEN IF ENABLED

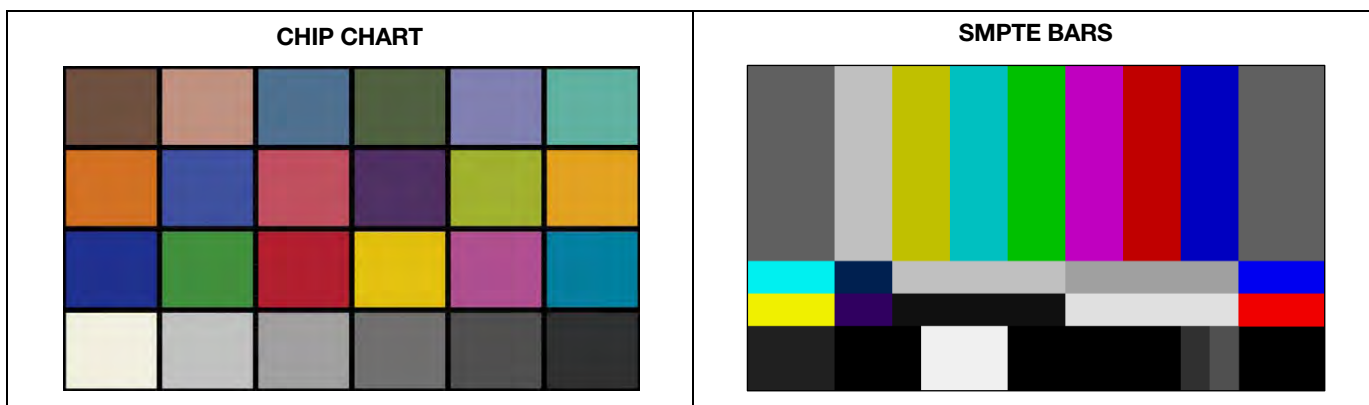
When checked will assign an attached external monitor to display the menus if none are selected.

TEST SIGNALS

Permits the video monitor outputs to be replaced with a video test pattern. Available test patterns are CHIP CHART and SMPTE BARS.



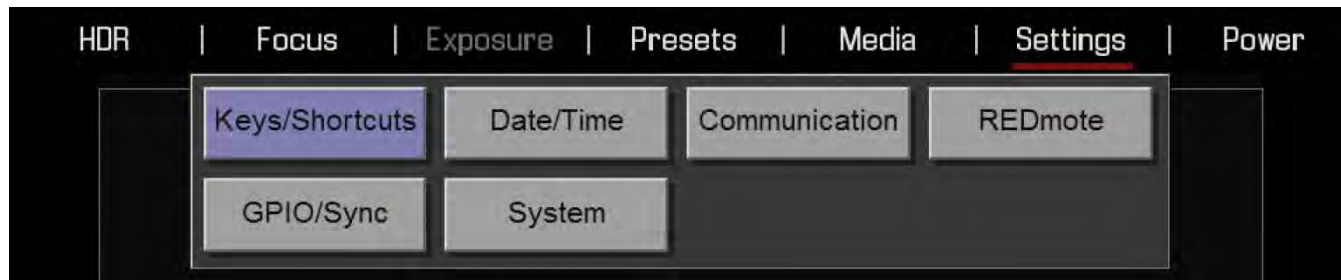
To enable a desired test signal, select the desired test signal box. To exit the test signal, tap the touchscreen one time or press the Enter or Menu button on the Side Handle or REDmote.



NOTE: RED EPIC test signals are not recordable, they are provided to help align external video monitors connected via the HD-SDI or HDMI outputs.

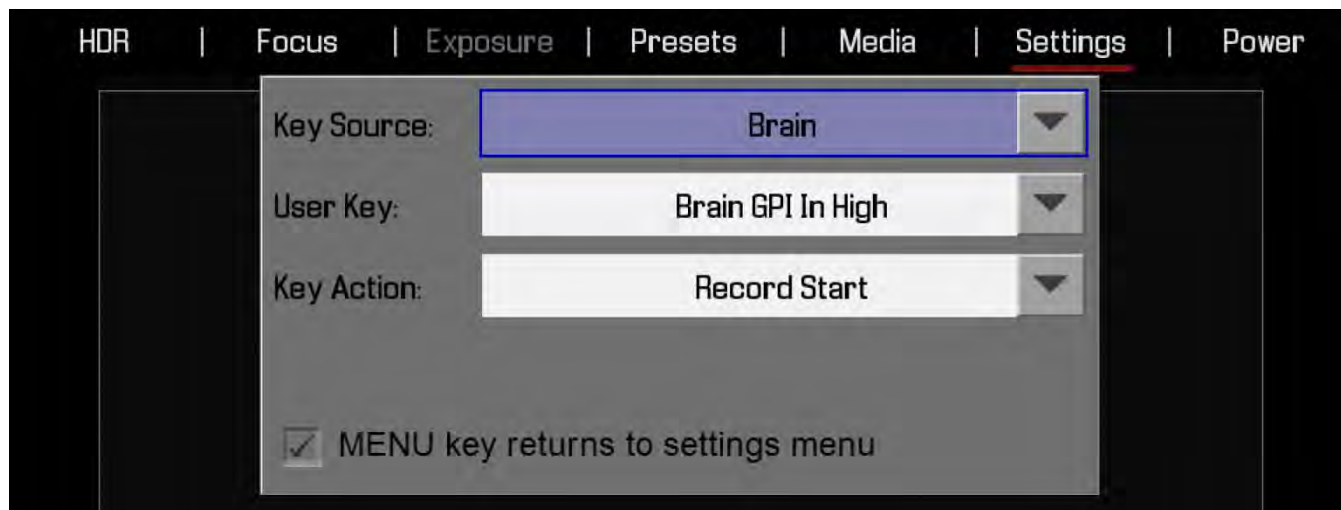
SETUP

This menu permits a variety of system setup tasks to be accomplished. Options available are KEYS / SHORTCUTS, DATE / TIME, NETWORK, SERIAL, REMOTE, GPIO, and SYSTEM.



KEYS / SHORTCUTS

Keys / Shortcuts display the USER KEY and KEY ACTION sub-menus. These options allow selected menus or functions to be mapped to specific User Keys on the camera body and accessories. User keys are also referred at as Soft Keys / Buttons.



KEY SOURCE

Use this menu to select the device to program.

USER KEY

Use this menu to select and program the camera user keys (buttons).

NOTE: To reset keys to default settings, go to RESTORE. A reboot of the camera is necessary to restore defaults.

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NOTE: Multiple keys can be programmed to the same action.

Default settings by device are listed below.

- “Down” indicates pressing of the key.
- “Side CF” refers to the Side SSD Module.
- “Brain LCD” refers to the EVF/LCD being plugged into the brain EVF/LCD connector.
- “Tele Level” refers to the +/- rocker switch.
- “North, South, East, West” refers to the Direction keys (Up, Down, Left, Right) on the Navigation Group.
- “Rotary Jog” refers to Scroll Wheel on the Navigation Group.
- “Rotary Front” refers to Adjustment Ring on Side Handle near LCD.

WARNING: IT IS NOT ADVISABLE TO REMAP THE NAVIGATION KEYS (UP, DOWN, LEFT, RIGHT, SELECT (ENTER), OR MENU) ON THE SIDE HANDLE AS IT IS THEORETICALLY POSSIBLE TO GET INTO A SITUATION WHERE IT IS NOT POSSIBLE TO RESTORE THE FACTORY KEY PRESET ANYMORE IF NO TOUCH SCREEN IS ATTACHED TO THE SYSTEM.

Brain

- Brain GPI In High Record Start
- Brain Record Full Button Down Toggle Record
- Brain GPI In Low Record Stop

Side Handle

- Side Handle User Key A Down Toggle AF Mode
- Side Handle User Key B Down WB Calc
- Side Handle User Key C Down Toggle Magnify
- Side Handle User Key D Down Exposure Check
- Side Handle Function 1 Key Down Activate ISO
- Side Handle Function 2 Key Down Activate Aperture
- Side Handle Function 3 Key Down Activate Shutter
- Side Handle Function 4 Key Down Activate WB
- Side Handle Function 5 Key Down Exposure Check
- Side Handle Function 6 Key Down Toggle REDCode
- Side Handle Function 7 Key Down Eject Media
- Side Handle Still Select Set focus mode for still
- Side Handle Movie Select Set focus mode for movie
- Side Handle Record Half Button Down HALF Press Request
- Side Handle Record Full Button Down Toggle Record
- Side Handle Tele Level +1 Zoom In Speed 1
- Side Handle Tele Level +2 Zoom In Speed 2
- Side Handle Tele Level +3 Zoom In Speed 3
- Side Handle Tele Level +4 Zoom In Speed 4
- Side Handle Tele Level -1 Zoom Out Speed 1
- Side Handle Tele Level -2 Zoom Out Speed 2
- Side Handle Tele Level -3 Zoom Out Speed 3
- Side Handle Tele Level -4 Zoom Out Speed 4
- Side Handle Tele Level 0 Zoom Stop
- Side Handle Backlight Key Down Toggle SH Backlight
- Side Handle Menu Key Down Menu Toggle
- Side Handle North Key Down Menu Up
- Side Handle South Key Down Menu Down

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- Side Handle West Key Down
- Side Handle East Key Down
- Side Handle Center Key Down
- Side Handle Rotary Front CCW
- Side Handle Rotary Jog CW
- Side Handle Rotary Front CW
- Side Handle Rotary Jog CCW

- Menu Right
- Menu Left
- Menu Select
- Rotary Next Value
- Rotary Next Value
- Rotary Previous Value
- Rotary Previous Value

Bottom Handle

- Bottom Handle Record Half Button Down
- Bottom Handle Record Full Button Down
- Bottom Handle Tele Level +1
- Bottom Handle Tele Level +2
- Bottom Handle Tele Level +3
- Bottom Handle Tele Level +4
- Bottom Handle Tele Level -1
- Bottom Handle Tele Level -2
- Bottom Handle Tele Level -3
- Bottom Handle Tele Level -4
- Bottom Handle Rotary CW
- Bottom Handle Rotary CCW

- HALF Press Request
- Toggle Record
- Zoom In Speed 1
- Zoom In Speed 2
- Zoom In Speed 3
- Zoom In Speed 4
- Zoom Out Speed 1
- Zoom Out Speed 2
- Zoom Out Speed 3
- Zoom Out Speed 4
- Rotary Previous Value
- Rotary Next Value

Side CF (SSD)

- Side CF Function 3 Button Down (press 1 and 2 together)
- Side CF Record Full Button Down

- Eject Media
- Toggle Record

REDmote

- REDmote User Key A Down
- REDmote User Key B Down
- REDmote User Key C Down
- REDmote User Key D Down
- REDmote Function 1 Key Down
- REDmote Function 2 Key Down
- REDmote Function 3 Key Down
- REDmote Record Half Button Down
- REDmote Record Full Button Down
- REDmote Tele Level +1
- REDmote Tele Level +2
- REDmote Tele Level +3
- REDmote Tele Level +4
- REDmote Tele Level -1
- REDmote Tele Level -2
- REDmote Tele Level -3
- REDmote Tele Level -4
- REDmote Tele Level 0
- REDmote Menu Key Down
- REDmote North Key Down
- REDmote South Key Down
- REDmote East Key Down
- REDmote West Key Down
- REDmote Center Key Down
- REDmote Rotary CW

- Toggle AF Mode
- RAW Check
- Toggle Magnify
- Exposure Check
- Open ISO List
- Open Shutter Speed List
- Open Color Temp List
- HALF Press Request
- Toggle Record
- Zoom In Speed 1
- Zoom In Speed 2
- Zoom In Speed 3
- Zoom In Speed 4
- Zoom Out Speed 1
- Zoom Out Speed 2
- Zoom Out Speed 3
- Zoom Out Speed 4
- Zoom Stop
- Menu Toggle
- Menu Up
- Menu Down
- Menu Right
- Menu Left
- Menu Select
- Rotary Next Value

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- REDmote Rotary CCW

Rotary Previous Value

LCD

- LCD Function 1 Button Down
- LCD Function 2 Button Down
- LCD Arrow Up Button Down
- LCD Arrow Down Button Down

Toggle Magnify
Exposure Check
Brain LCD Br. Up
Brain LCD Br. Down

EVF

- EVF Function 1 Button Down
- EVF Function 2 Button Down

Brain LCD Br. Up
Brain LCD Br. Down

KEY ACTION

When the desired User Key is selected, this setting allows the desired action for that User Key to be defined by the user. Available actions are as follow:

- | | | | |
|----------------------|----------------------|----------------------------|-------------------------------------|
| • Activate ISO | • Shutdown | • Open ISO List | • Toggle Display Mode |
| • Activate WB | • No Action | • Open Aperture List | • Toggle Color Space |
| • Activate Shutter | • Toggle AF Mode | • Open Shutter Speed List | • Toggle Zebra 1 Mode |
| • Active Aperture | • Exposure Check | • Open Color Temp List | • Toggle Zebra 2 Mode |
| • Toggle Record | • Toggle REDCode | • Open AF AE | • Toggle Zebra 1/2 Mode |
| • Toggle Magnify | • Zoom Stop | • Record Start | • Toggle Shutter Mode |
| • WB Calc | • Zoom In Speed 1 | • Record Stop | • Toggle Shutter Angle Abs/Rel Mode |
| • Menu Select | • Zoom In Speed 2 | • Toggle SH backlight | • Toggle TC Display Mode |
| • Eject Media | • Zoom In Speed 3 | • Menu Up | • Toggle Lens Ring Mode |
| • HALF press request | • Zoom In Speed 4 | • Menu Down | • Toggle Fan Mode |
| • Menu Left | • Zoom Out Speed 1 | • Rotary Next Value | • One Shot AF |
| • Menu Right | • Zoom Out Speed 2 | • Rotary Previous Value | • Key Disabled |
| • Menu Toggle | • Zoom Out Speed 3 | • Set focus mode for still | |
| • No Action | • Zoom Out Speed 4 | • Set focus mode for movie | |
| • Shutter Sync | • Brain LCD Br. Up | • RAW Check | |
| • False Color | • Brain LCD Br. Down | • Toggle HDR Mode | |
| • Next Value | • Toggle ND Filter | | |
| • Previous Value | • Open FPS List | | |

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DATE / TIME

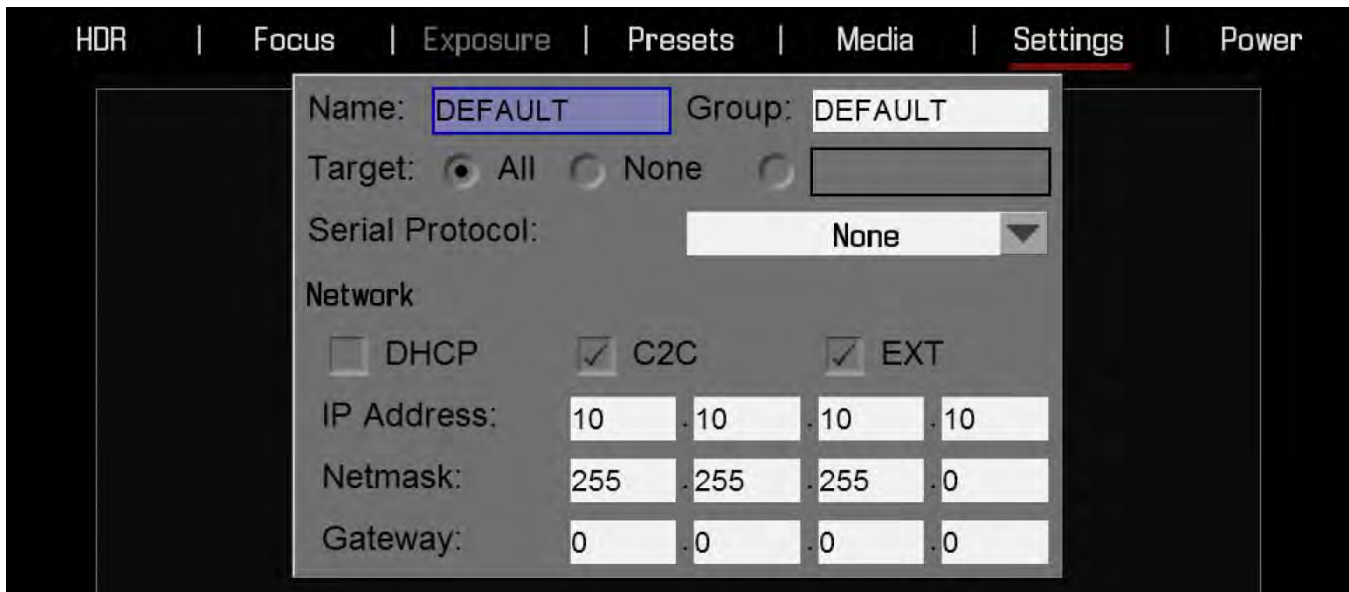
This menu allows the user to reset the battery backed up clock of the RED EPIC camera. These values will be used to timestamp each recording as they are made to the RED MAG 1.8" SSD media.



NOTE: Enter time in 24-hour clock format. i.e. 2:35 pm should be entered as 14:35:00.

COMMUNICATION

Communication Menu allows you to set a NAME, GROUP, TARGET, set a SERIAL PROTOCOL, ENABLE DHCP, C2C or EXT, set an IP ADDRESS, NETMASK, and/or GATEWAY. This function also allows you to identify the camera (NAME). With the serial port or a direct link Ethernet cable (Via UDP) only two cameras or devices can be connected, if the camera is connected to a hub or router multiple cameras or devices can communicate.



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NAME

Allows you to manually designate a unique camera NAME. Each device in the network needs to have a unique NAME (Like "CAM_A_L" or CTRL_PAD"). The name is limited to 8 characters. This is also required if only two devices are connected. The device name can be used to uniquely address a command to a specific device.

When selected a keyboard will appear.



GROUP

A device can also be part of a GROUP of devices. (For example the group "RIG_A" could include the two cameras on a stereo rig "CAM_A_L" and "CAM_A_R"). The default group is named "DEFAULT". Groups (like names) can be used to send commands to a selected group of devices.

When selected a keyboard will appear.

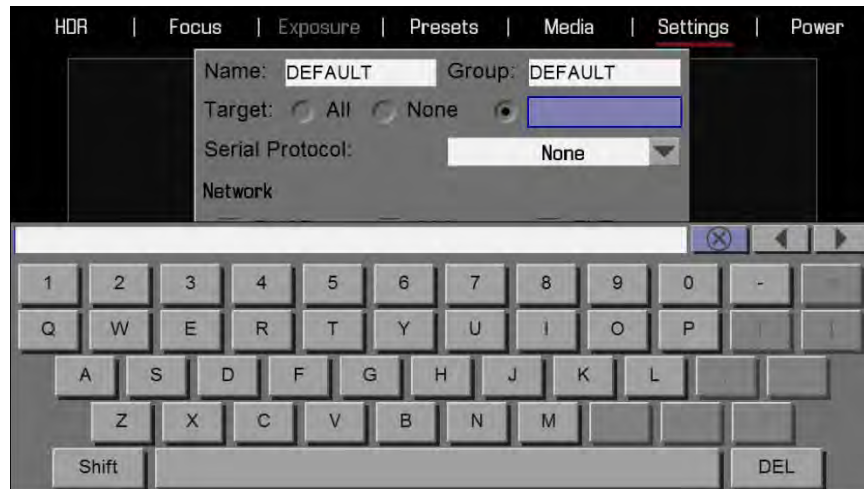


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TARGET

Commands can either be sent to ALL devices, to NONE of the devices (So this device will only listen) or to a specific TARGET (Which can either be the NAME of a specific device or a whole GROUP). This allows for a lot of flexibility in bigger setups. For example on a 3D shoot with multiple rigs one can either send commands to individual cameras (Set CAM_A_L to 1/64th exposure), to a group of cameras (Set "RIG_A" to 48 FPS), or to all cameras (Start Recording on all cameras). It is important to note that with the exception of the NONE setting, all filtering is happening on the receiver side.

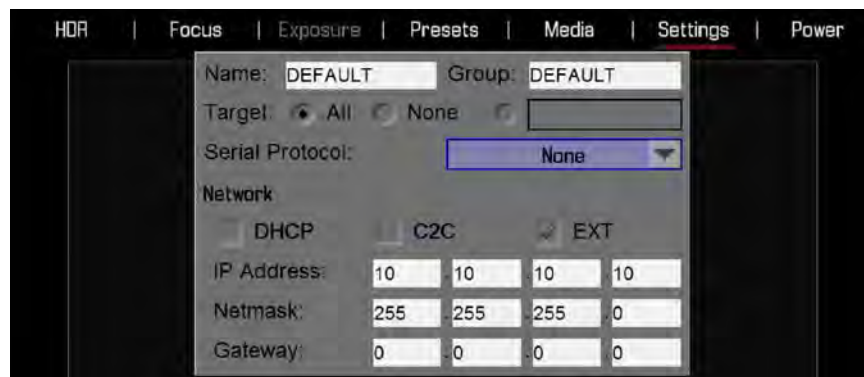
When selected a keyboard will appear.



SERIAL PROTOCOL

EPIC can communicate to the outside world either via the Serial Port (RS-232, if RCP is selected as the SERIAL PROTOCOL) or the Ethernet Port (Gigabit-Ethernet).

This menu allows the user to select the CTRL (RS232) Serial Port PROTOCOL. Available options are NONE, ELEMENT TECHNICA, 3ALITY SPC 7100 and 3ALITY SPC 7000. Default is NONE.



NETWORK

If the Ethernet connection is used additional settings are required. Each Device requires a unique IP ADDRESS. (Technically, with the camera-to-camera cable using UDP this is not required but good

RED EPIC® OPERATION GUIDE

practice). For simple camera-to-camera communication via UDP all devices need to be in the same subnet. (Need the same NETMASK and GATEWAY and the first 3 parts of the IP address need to be the same.

DHCP

If a DHCP-server is available in the network the DHCP option can be checked and the camera will obtain the IP address, Netmask and gateway automatically from the DHCP -server.

C2C

If the camera-to-camera (C2C) check box is checked, changes to the settings on this camera will be sent out via the network as UDP packets as a SET command (Which then sets the property on other cameras). SET commands send to this camera will not be propagated.)

EXT

If the EXT check box is checked this camera can be controlled via TCP/IP from an external device.

IP Address

Permits the user to adjust the camera's static IP address.

Netmask

Permits the user to adjust the Subnet Mask address.

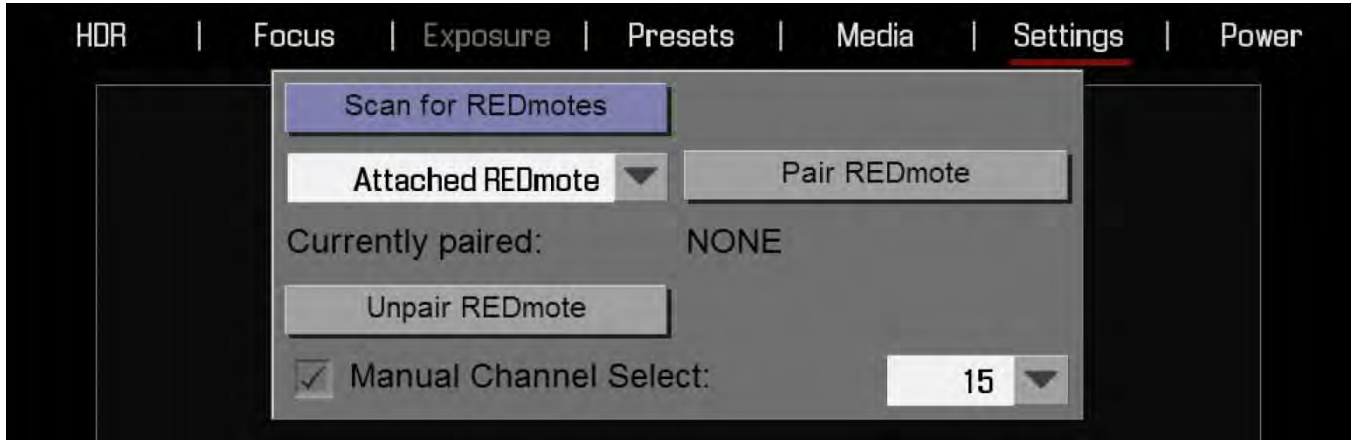
Gateway

Permits the user to adjust the Gateway address.

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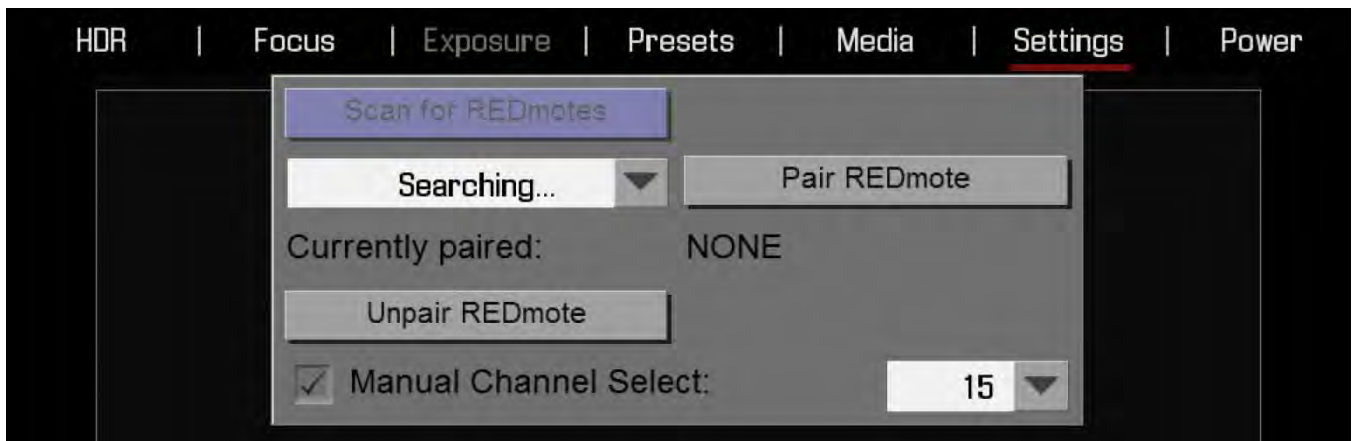
REDMOTE

This function is used to pair the camera to a REDmote for wireless operation. For pairing procedures, go to APPENDIX E: REDMOTE OPERATION > OPERATION > WIRELESS CONNECTION.



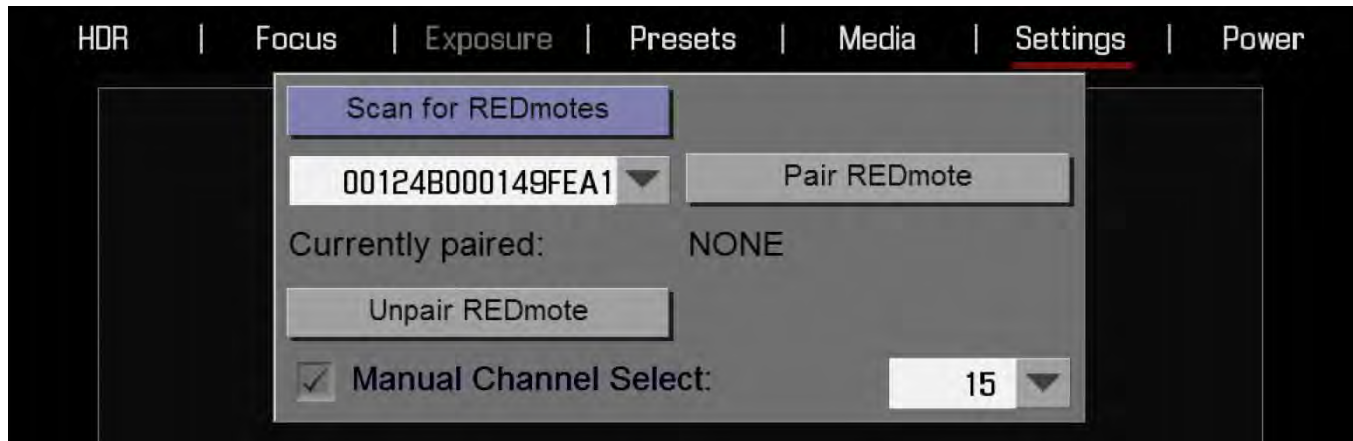
SCAN FOR REDMOTES

When selected, the camera will look for REDmotes that are turned on with wireless enabled. Searching will display.



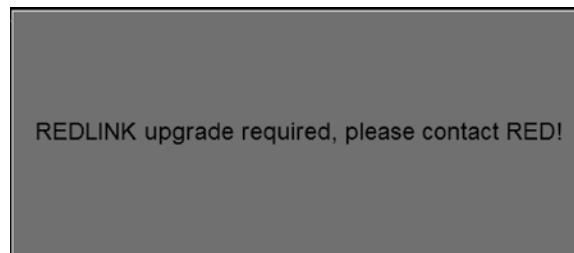
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After scanning, the recognized REDmotes will be listed below.



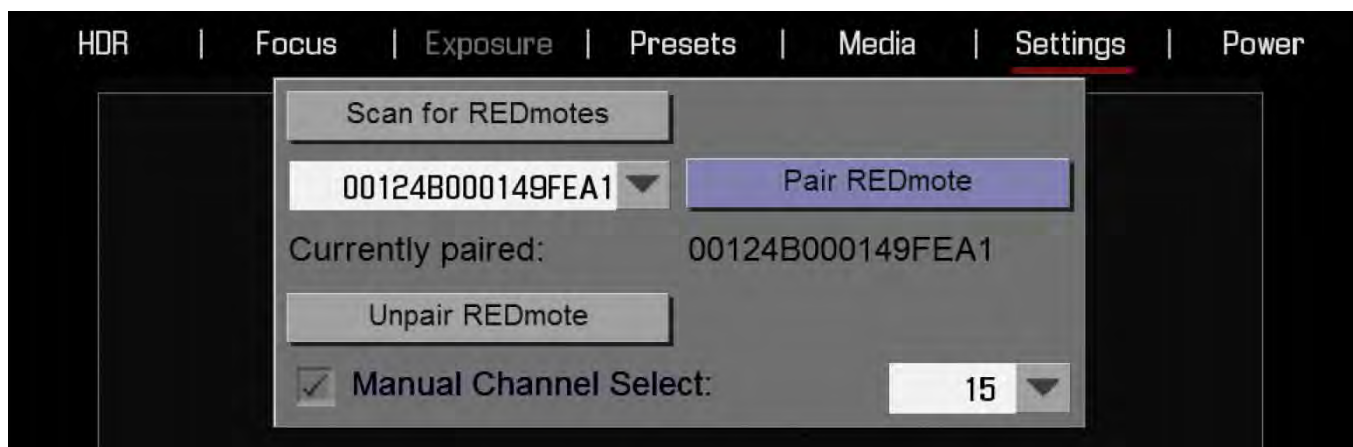
REDLINK Message

If after upgrading your EPIC to v1.7.xx and upgrading your REDmote to v1.0.13, your REDmote will not wirelessly connect to your EPIC and "REDLINK upgrade required, please contact RED!" is displayed on the camera, then your EPIC and REDmote may need to be sent back to RED for evaluation/updating. Please save a .LOG file and send to RED Technical Support to diagnose and confirm next steps.



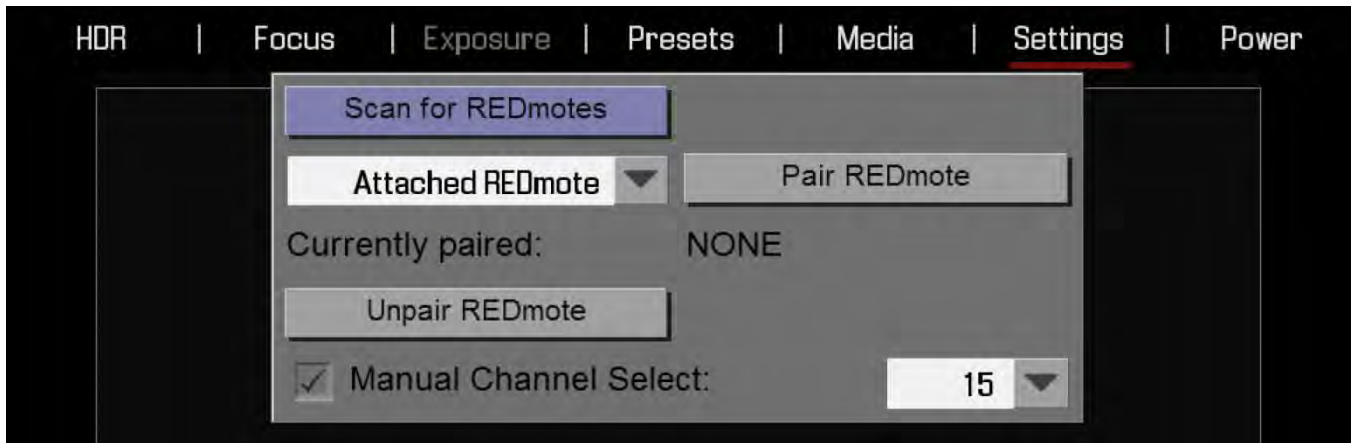
PAIR REDMOTE

Select the REDmote from the drop-down and select PAIR REDMOTE to pair the REDmote to the camera.



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You can also pair the attached REDmote by selecting ATTACHED REDMOTE.



CURRENTLY PAIRED

Displays the ID of the REDmote currently paired with the camera.

UNPAIR REDMOTE

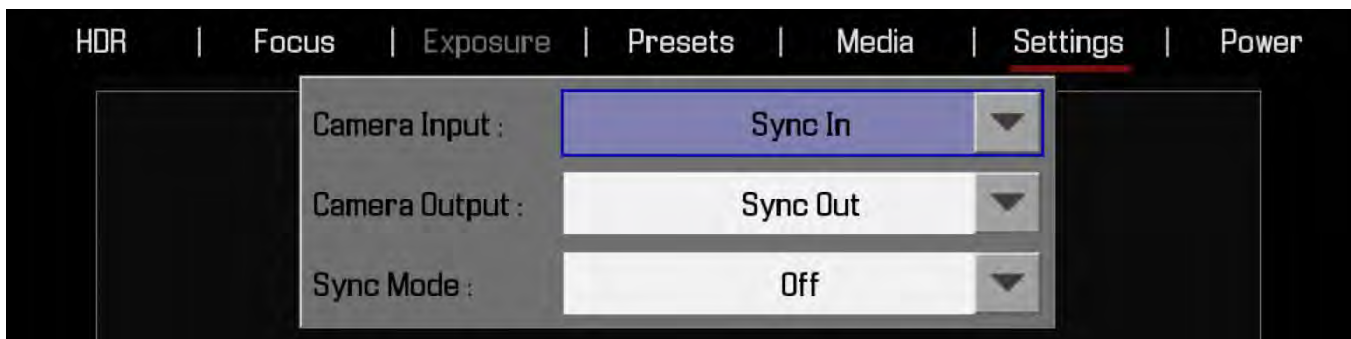
When selected will un-pair the paired REDmote from the camera.

MANUAL CHANNEL SELECT

The Manual Channel Select option is for the wireless connection to the REDmote. You may choose the manually select the desired channel (checked) or leave as automatic (unchecked). Auto (unchecked) will pick the "cleanest" channel automatically on each camera boot. Default is channel 0.

GPIO

GPIO selects the GPIO preferences sub-menu.



CAMERA INPUT

Permits the function of the SYNC IN / GPI pin in the SYNC connector to be defined as:

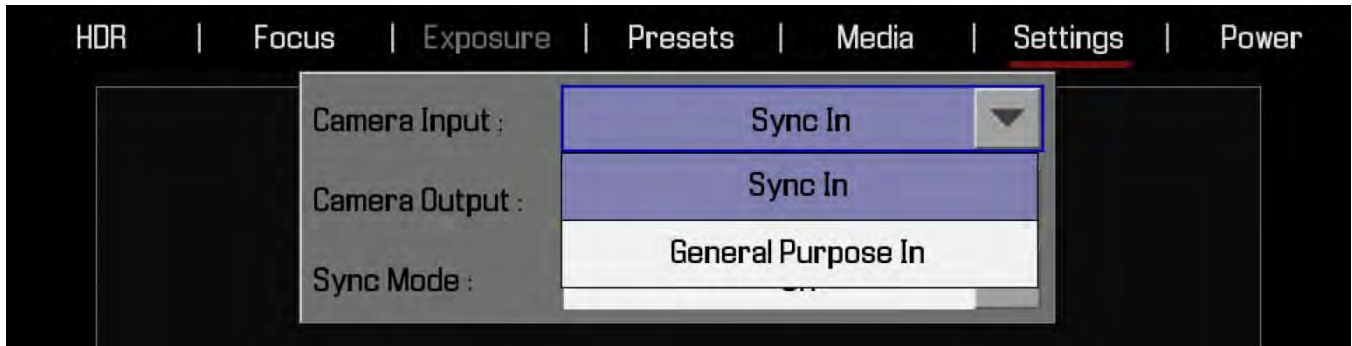
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Sync In

Accepts an Input Sync signal to control Shutter Start timing.

General Purpose In

Accepts an Input Trigger signal to act as a General Purpose Input.



CAMERA OUTPUT

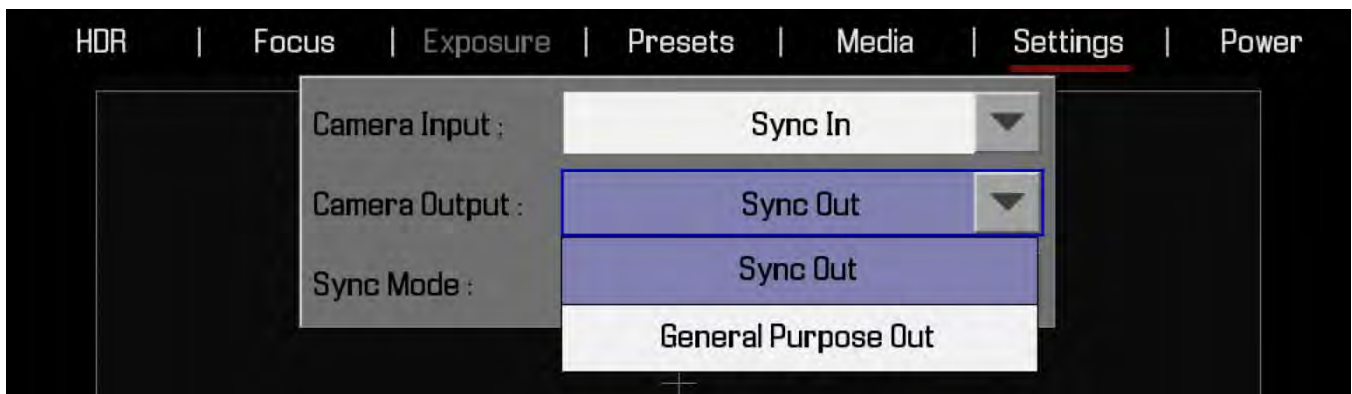
Permits the function of the SYNC OUT / GPO pin in the CNTL connector to be defined as:

Sync Out

Provides an Output Sync signal to act as a Shutter Start tally.

General Purpose Out

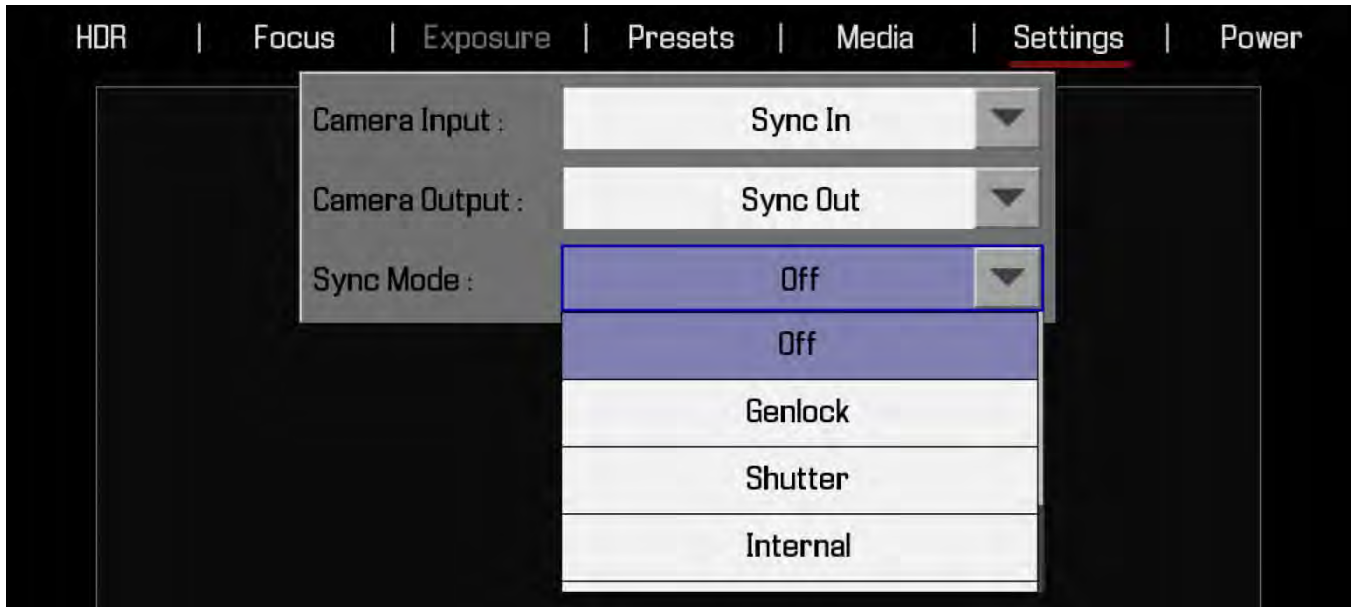
Provides an Output Tally to act as a General Purpose Output tally signal.



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SYNC MODE

Allows the shutter timing (scan start) to be synced to an external signal.



Available options are OFF, GENLOCK, SHUTTER, INTERNAL, PROXY, and SLAVE. Default is Off.

OFF – Shutter start time is defined by internal camera timing.

GENLOCK – Shutter start time is slaved to an external RS170A tri-level sync signal .a.k.a “Genlock”.

SHUTTER – Shutter start time is slaved to an external Shutter Sync signal.

INTERNAL – Not implemented at this time.

PROXY – Not implemented at this time.

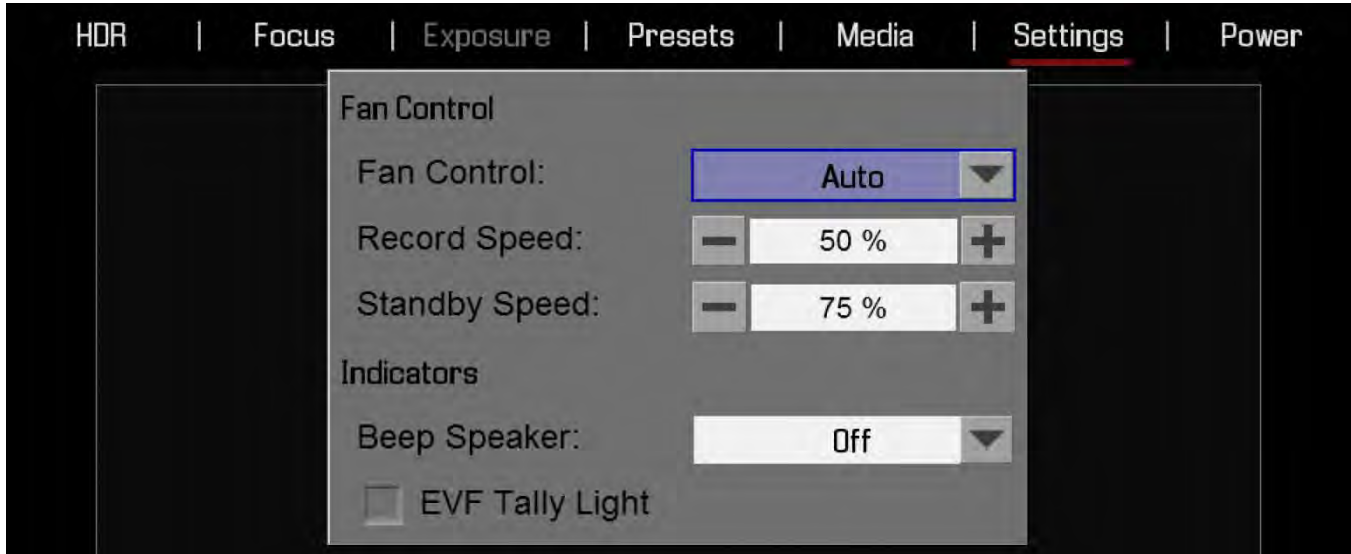
SLAVE – Not implemented at this time.

IMPORTANT: If Sync > Genlock mode is selected, **DO NOT** set fps to higher than 72fps, and to a speed **NOT** a multiple of the project base rate and genlock input.

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SYSTEM

Available options are FAN CONTROL, RECORD SPEED and STANDBY SPEED as well as BEEP SPEAKER and EVF TALLY LIGHT.



FAN CONTROL

Specifies cooling fan operation. Available options are AUTO and MANUAL. Manual will run the fan at the speeds specified in RECORD SPEED and STANDBY SPEED. Default setting is AUTO.

Auto

This setting selects VARIABLE speed fan operation in standby based on the camera core temperature.

Manual

This setting allows you to set a fixed fan speed to be used during Record and Standby modes.

Record Speed

Sets a fixed fan speed to be used during Record. Range 35 – 100%. Default is 50%.

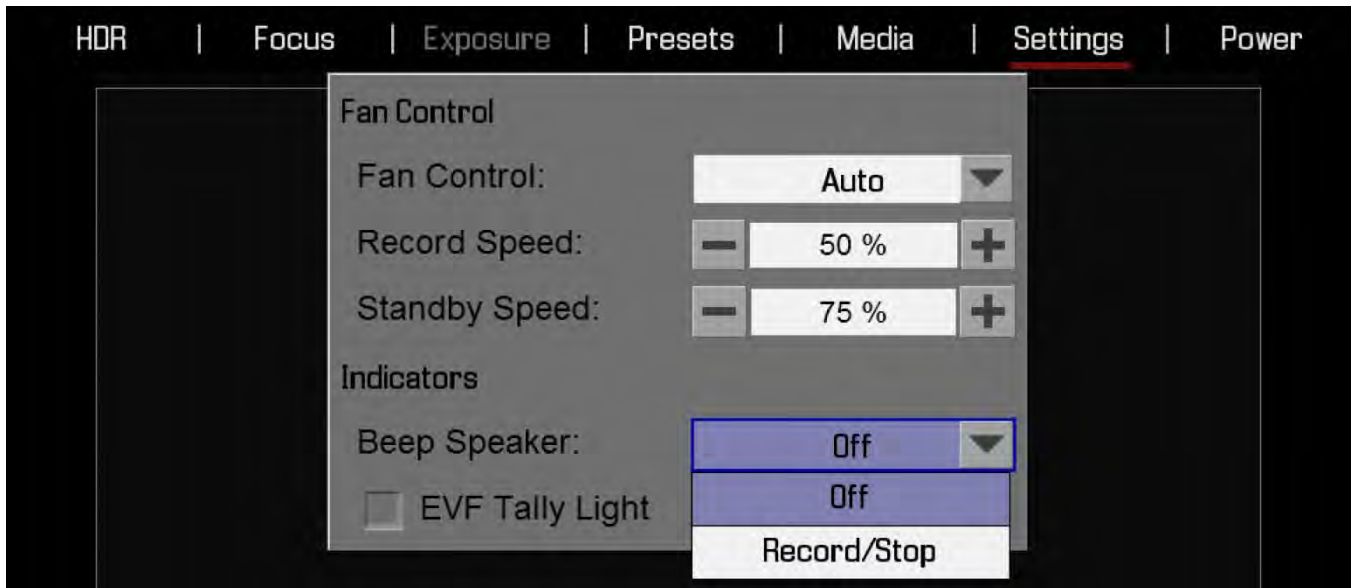
Standby Speed

Sets a fixed fan speed to be used during Standby. Range 45 – 100%. Default is 75%.

INDICATORS

Beep Speaker

Available options are OFF and RECORD/STOP. When RECORD/STOP is selected, an audible beep will be heard when record is started and another when record is stopped.



EVF Tally Light

When checked, enables the Record Tally Red LED on the front of the EVF.

MAINTENANCE

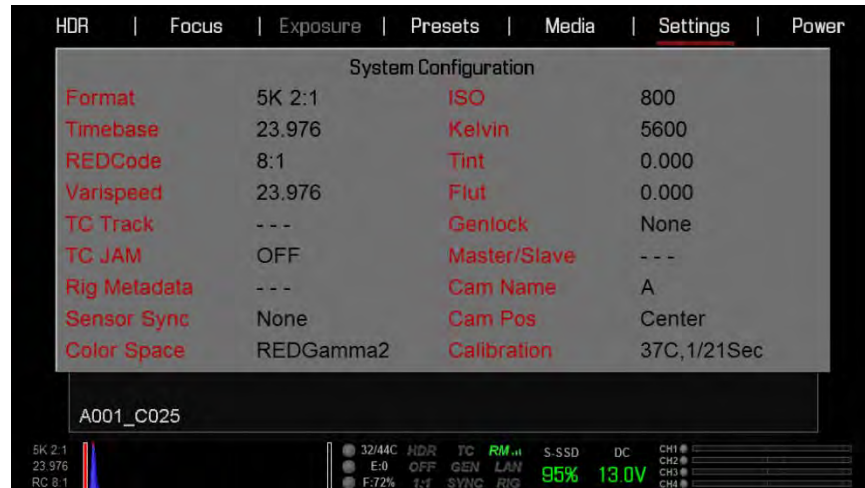
The maintenance menu allows the user to check system status and information, save the camera diagnostic LOG to attached media, perform a software update, calibrate the sensor, perform a camera self test, and reset system settings to factory defaults.



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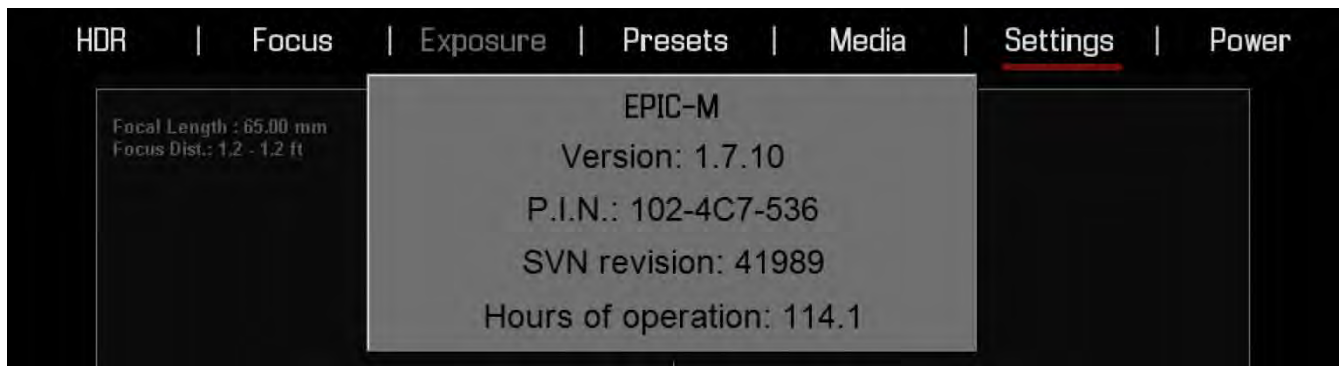
SYSTEM STATUS

When selected the Viewfinder output(s) will display the System Status screen. This screen provides a summary of all operational settings currently applied to the camera.



SYSTEM INFO

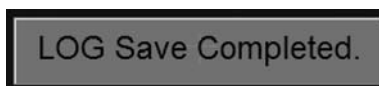
When selected the Viewfinder output(s) will display the camera Model, current firmware Version, installed and camera P.I.N. EPIC-M shown, EPIC-X similar.



SAVE LOG

Select to write camera's .LOG file to the REDMAG 1.8" SSD. The .LOG file is a diagnostic tool that can assist RED with camera troubleshooting. After capture, upload the .LOG file to the RED customer service team contactable at www.RED.com/support.

After successfully writing the log file to media, viewfinder output(s) will display LOG SAVE COMPLETED.



If media is not attached to the camera when attempting to perform a write log request, external monitors will display NO MEDIA ATTACHED.

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NOTE: Log files will be stored as *.txt files in the 1.8" SSD root directory.

SW UPDATE

NOTE: Firmware upgrade currently uses a force upgrade procedure as outlined in APPENDIX A: UPGRADING CAMERA FIRMWARE.

IMPORTANT: After upgrading your camera firmware to v1.6.46 or higher, you **CANNOT** roll back the firmware to lower than 1.6.46.

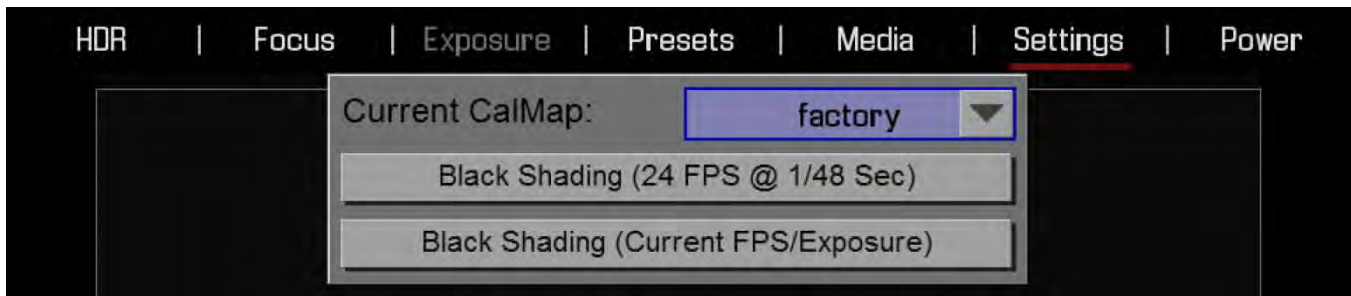
Update SW initiates a camera software (firmware) update. If a software update is on the attached media, you will be given the option to upgrade the camera (earlier firmware version shown for reference ONLY).



For complete, detailed procedure, go to APPENDIX A: UPDATING CAMERA FIRMWARE.

CALIBRATION

Sensor calibration is a process where the camera generates a calibration map to correct for pixel defects and offsets based on current system and environmental settings. This allows you to perform a Black Shading calibration of the MYSTERIUM X sensor two (2) different ways; at 24 FPS @ 1/48 SEC or using your current FPS/Exposure settings.



To calibrate the sensor the image needs to be as dark as possible:

- At a minimum put a lens cap on the lens (WARNING: Not all lens-caps completely block IR. They are made to protect the lens, not necessarily to block light...)
- Preferably, take off the lens, and use the lens-mount cap provided by RED.
- If possible use a dark room.
- Just closing the Iris is NOT sufficient.

Additionally a SSD needs to be inserted in the camera to store the raw images during calibration.

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Calibration is required:

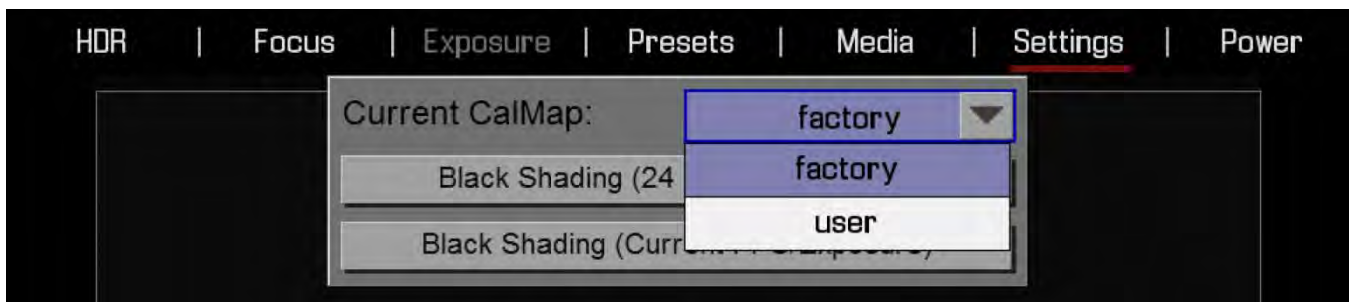
- If the temperature deviates significantly from the currently used calibration it is recommended to recalibrate the sensor.
- If very long exposure (~longer than 1/24 Sec) is used it is recommended to recalibrate.

After Calibration with a lens cap on and ISO set to maximum the sensor should show a uniform noise profile over the whole area without any falloffs on any side. You can check at which temperature/exposure time the currently used calibration was taken on under SETTINGS > MAINTENANCE > SYSTEM STATUS under Calibration.

Calibration maps will still be available after performing a system restore under SETTINGS > MAINTENANCE > RESTORE SYSTEM, however the factory calibration map will be reselected.

CURRENT CALMAP

Calibration maps are stored in the camera. Due to the nature of the camera, different calibration maps are needed for different situations.



Factory

This is the calibration map generated during production. This map is always present and selected as default on first use after performing a system restore under SETTINGS > MAINTENANCE > RESTORE SYSTEM.

User

The user can select the CURRENT CALMAP. The dialog only shows the calmaps stored in memory (FACTORY and USER in this case).

BLACK SHADING (24 FPS @ 1/48 SEC)

This option uses fixed settings which are the same used for the factory calibration (around 23 Deg C).

BLACK SHADING (CURRENT FPS/EXPOSURE SETTINGS)

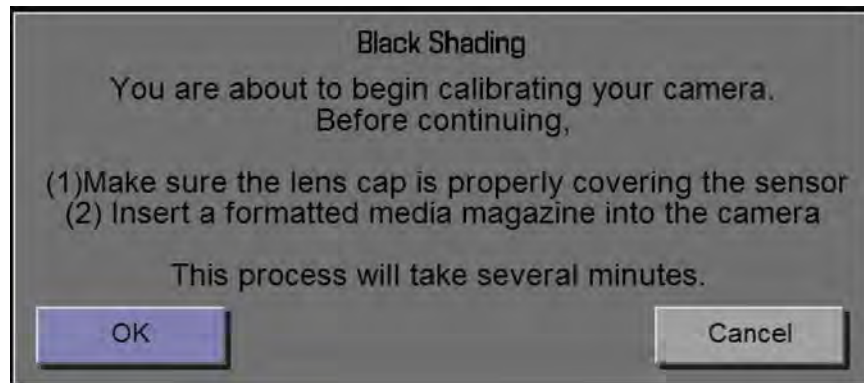
This option generates a calibration with the currently set frame rate/exposure. This can be used to generate a calibration for long exposures. After calibration (Which takes about 10 min) the new map is automatically selected.

BLACK SHADING PROCEDURE

The calibration procedures are the same for both BLACK SHADING options.

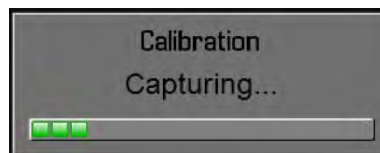
The calibration procedures are the same for both Black Shading (24 FPS @ 1/48 SEC) and Black Shading (Current FPS/Exposure) options.

When selected, a screen will appear asking if you wish to proceed with Black Shading calibration.

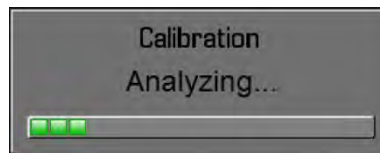


Black Shading calibration procedure:

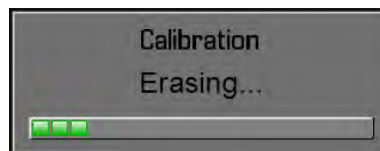
1. Ensure the sensor is NOT exposed to the calibration light source by installing the lens cap properly.
2. Ensure a properly formatted SSD is attached to the camera and properly formatted.
3. Select OK to perform the Black Shading calibration.
4. A status screen will show progress of the Capturing step.



5. Once Capturing is complete, a status screen will show progress of the Analyzing step.

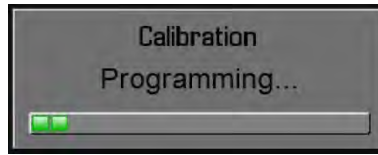


6. Once Analyzing is complete, a status screen will show progress of the Erasing step.

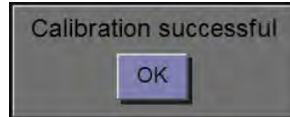


7. Once Erasing is complete, a status screen will show progress of the Programming step.

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- The camera will perform this procedure twice.
- After Programming, CALIBRATION SUCCESSFUL will be displayed. Select OK to complete Black Shading calibration.



SELF TEST

When selected allows you to perform a self-test for the sensor and LCD Touchscreen.



ENABLE / DISABLE SENSOR TEST PATTERN

When selected enables / disables the sensor test pattern (White Screen). To turn on, select ENABLE SENSOR TEST PATTERN.



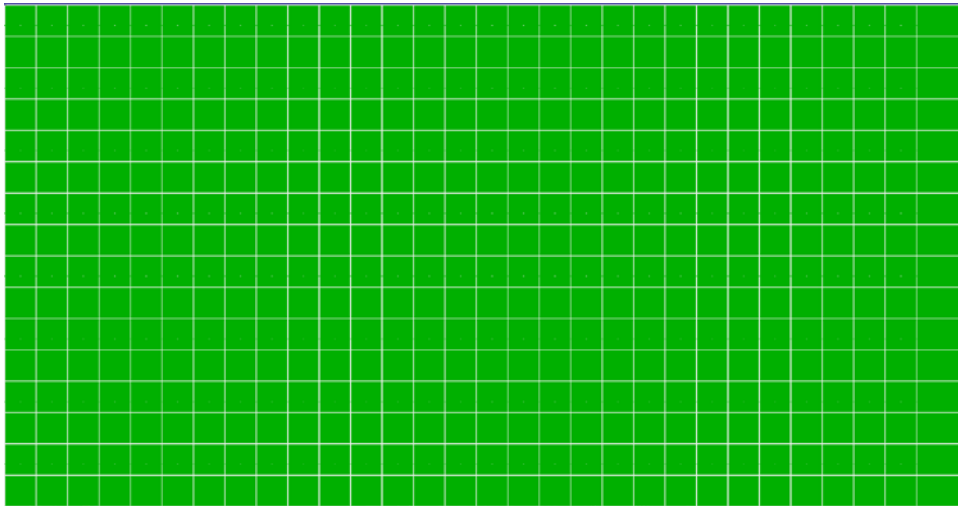
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To turn off, select DISABLE SENSOR TEST PATTERN.

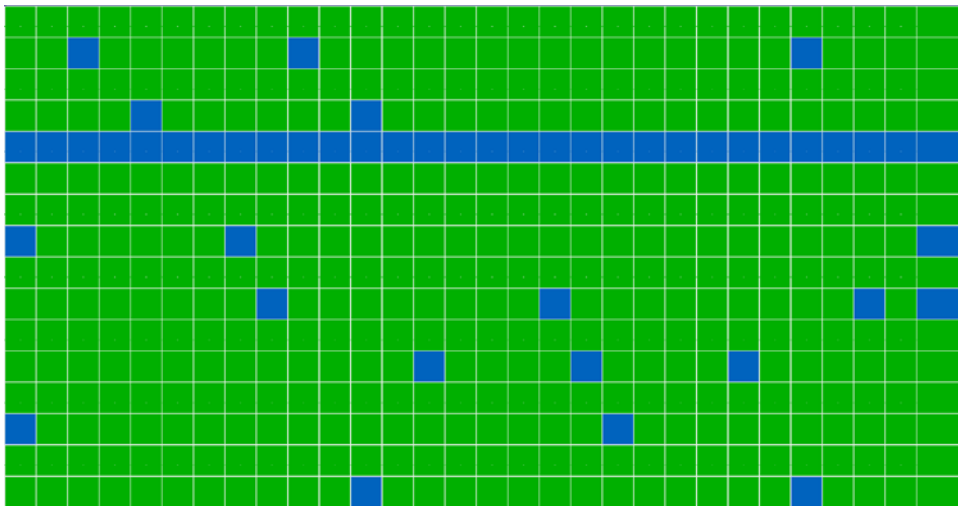


TOUCHSCREEN

When selected allows you to perform a touchscreen self-test.



When the touchscreen self-test is on, you can verify all areas of the touch screen respond to touch. Simply touch each box using your finger. The touchscreen responds to the touch and the Green box turns Blue.



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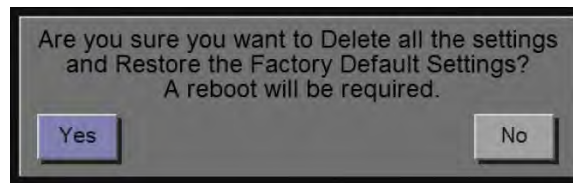
To exit the Touchscreen Self-Test:

- Place your finger on the touchscreen and hold it there until the main screen appears.
- Press the Enter or Menu button on the Side Handle or REDmote.

RESTORE SYSTEM

Restore System permits ALL camera configuration and setup data to be reset to factory default values.

When selected, you will be asked to confirm if you want to delete all settings and restore the factory default settings. After settings are restored, “DEFAULT SETTINGS RESTORED, INITIALIZING RESTART...” Camera will automatically power down and will require you to manually power it up.

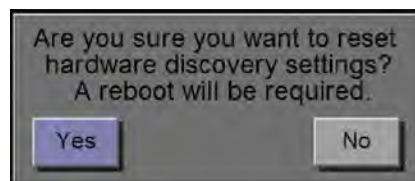


NOTE: User key settings will be reset as well as any other changes from the cameras default settings. The REDmote will also require paring to communicate wirelessly with the camera.

REDISCOVER

Rediscovered all hardware and caches the data for future boot cycles.

When selected, you will be asked to confirm if you want to reset all hardware discovery settings. After settings are reset, “RESET HARDWARE DISCOVERY SUCCESSFUL, INITIALIZING RESTART...” Camera will automatically power down and will require you to manually power it up.



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POWER

The power menu displays the current power status of all attached power sources as well as allow you to shutdown the camera.

POWER STATUS

The power status is displayed for the BRAIN, SIDE HANDLE, REAR 1, REAR 2, REAR 3, and REAR 4.

Below is what is displayed when the camera is connected to DC power and a REDvolt is installed into the side handle. REAR 1-4 denote the battery locations available in the optional QUAD BATTERY MODULE.



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Below is what is displayed when a RED BRICK is connected to the camera DC IN connector and a REDvolt is installed into the side handle. Note that Brain is displayed in a percentage as opposed to a voltage as when connected to DC power.



SHUTDOWN

Power OFF controls are interlocked to prevent accidental powering down of the camera. For details on the different ways to power down your RED EPIC, refer to BASIC OPERATION > POWER DOWN.

1. Enter the Secondary Menu using the touch screen, REDmote or Side Handle.
2. Select POWER.
3. Select SHUTDOWN. The camera will immediately power down.



APPENDIX A: UPGRADING CAMERA FIRMWARE

RED EPIC camera functionality may be upgraded by installing the latest firmware.

Camera firmware is identified by Version and SVN number, which will be displayed by the camera on the LCD display when SYSTEM INFO is selected. A higher number reflects a later release.

Make a habit of frequently visiting www.RED.com/support to check for later versions of camera firmware, Operations Guide updates, and postproduction software.

Your REDmote also requires a firmware upgrade. Go to APPENDIX E: REDMOTE OPERATION > MAINTENANCE > UPGRADING REDMOTE FIRMWARE.

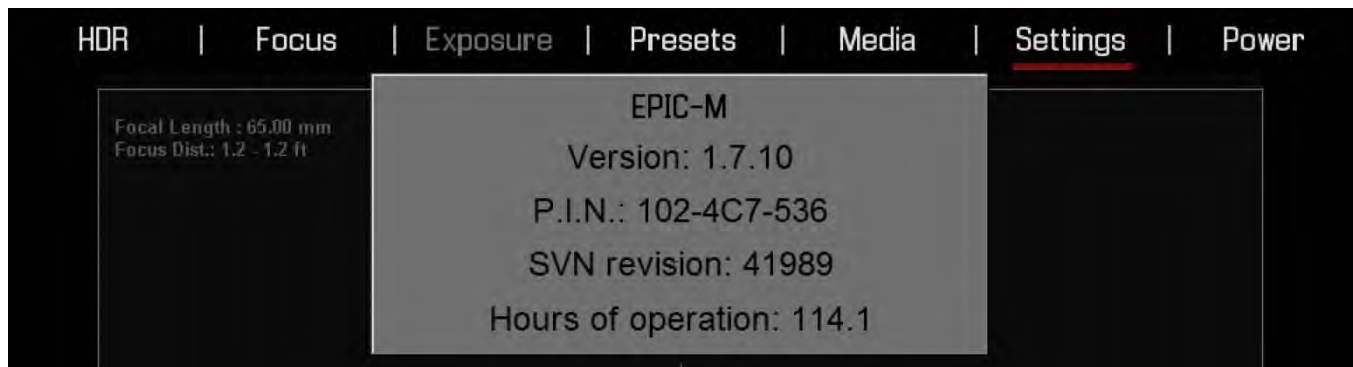
IMPORTANT: After upgrading your camera firmware to v1.6.46 or higher, you CANNOT roll back the firmware to lower than 1.6.46.

VERIFY CURRENT CAMERA FIRMWARE

With the camera ON, select SECONDARY MENUS > SETTINGS > MAINTENANCE > SYSTEM INFO.



The camera's P.I.N. number and current firmware version will be displayed. EPIC-M shown, EPIC-X similar. Earlier firmware version shown for reference only.



UPGRADE PROCEDURE

1. Download v1.7.10 firmware from <http://www.RED.com/support>.
2. Uncompress the v1.7.10 firmware zip file.

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3. Using RED STATION® REDMAG 1.8", copy the "force_upgrade" folder and its contents to the top level of the REDMAG" 1.8" SSD directory.
4. Eject or unmount the SSD, then remove the SSD from RED STATION.
5. Ensure camera is powered down.
6. Remove Side Handle and/or REDmote if installed on the camera.
7. Connect an AC power adapter to the camera.

IMPORTANT: DO NOT USE BATTERIES TO POWER CAMERA DURING THIS PROCEDURE.

8. Insert the SSD into your EPIC and power up. Force upgrade will automatically run on power up only and will not display anything on the external monitors. During upgrade, the fans will run at hi speed and the PWR and REC LEDs will blink Green. After about 45 seconds, the LEDs will stop blinking and the camera will power down.
9. Remove the SSD from the camera, wait 10 seconds.
10. Power up the camera. The green lights will flash for about a minute (if original build was earlier than 1.6.20).

IMPORTANT: THE CAMERA MUST NOT BE SHUTDOWN OR LOSE POWER AT THIS POINT OR THE CAMERA WILL NOT COME BACK UP.

11. Go to SECONDARY MENUS > SETTINGS > MAINTENANCE > SYSTEM INFO and verify that the camera monitor output(s) report back - Version 1.7.10 and PIN (value specific to camera)
12. Installation is now complete.

IMPORTANT: If after upgrading your EPIC to v1.6.20 or higher series firmware, you receive a "New fan available, please contact RED" notification on the camera, please contact RED technical support for assistance.

Press OK to use your camera as normal - the message will appear each time the camera is powered up. Pressing OK, HIDE will hide the message when the camera is powered up, however, be mindful that until the fan is changed, the camera temperature should be monitored. If the fan is not replaced as RED recommends and the camera is damaged by overheating, the camera warranty will be voided.

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Once the updated fan has been installed and the camera is powered up, the message will continue to appear. Press OK, then go to **SECONDARY MENUS > SETTINGS > MAINTENANCE > REDISCOVER** and perform the rediscover procedure to clear the message..



NOTE: After the firmware upgrade, it is mandatory that you re-format the REDMAG SSDs before use. Refer to **APPENDIX B: MANAGING DIGITAL MEDIA > FORMATTING MEDIA**.

NOTE: Once firmware is upgraded (on REDmote or camera), the REDmote must be paired to the camera again.

IMPORTANT: Before formatting your media, be sure to copy any clips, presets or log files you want to keep to your computer to prevent unwanted loss of your files. Refer to **APPENDIX B: MANAGING DIGITAL MEDIA > COPYING MEDIA**.

MULTIPLE CAMERAS

If multiple cameras are to be upgraded, unmount the external media from the camera, and perform STEPS 3 through 12 of the previous procedure for each camera.

APPENDIX B: MANAGING DIGITAL MEDIA

MEDIA

REDMAG 1.8" SSD is available with capacities of 64GB, 128GB or 256GB. Record duration is dependent on resolution, quality and frame rate, but a 64GB SSD will typically provide 24 minutes of 24fps 5K RAW recording.

IMPORTANT: After connecting REDMAG 1.8" SSD to the camera and BEFORE recording, you should format the media using the camera (even if formatting was previously performed on a computer). Go to ADANCED MENU > MEDIA > FORMAT to properly format media before recording.

FORMATTING MEDIA

Media must be formatted prior to using it for recording. Formatting is performed on camera, although media may be erased on a Macintosh OS X personal computer, allowing the camera to just add the necessary project profile and clip log data.

NOTE: Media formatted on-camera will use a name and root volume in the format:

Camera Letter + Reel Number + Month + Day + ** where ** is a two digit alphanumeric random number generated by the camera for each file e.g. A001_0512A6.RDM

Clips recorded to the media follow similar naming conventions

A001_C001_0512A6_001.RDC **and** A001_C001_0512A6_H.mov etc.

IMPORTANT: Media must always be un-mounted prior to removal or disconnection from the camera. This ensures power is removed from the digital media and any open data files are closed. Failure to do so may result in lost data or corrupted files. Refer to REMOVE MEDIA FROM CAMERA (UNMOUNT).

This procedure outlines the formatting of REDMAG 1.8" SSD media using the RED EPIC camera. Formatting the SSD media will take about 10 seconds.

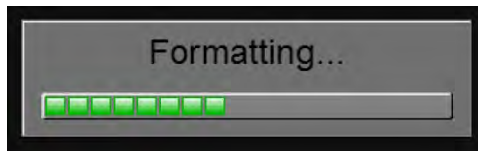
1. Insert SSD into camera.
 - Insert the REDMAG 1.8" SSD with the RED logo facing outward (away from camera body). SSD firmly into its slot, but without using excessive force to prevent damage.
2. When SSD media is inserted into the camera, the camera will recognize if the media is unformatted:
 - On LCD, EVF and external monitors, in the media section of the GUI, NONE will be displayed twice (as opposed to when no media is inserted, the GUI displays NONE with three dashes below "---").
 - On REDmote, NONE will be displayed twice (as opposed to when no media is inserted, the GUI displays NONE with three dashes below "---").
 - On the Side Handle, NA will be displayed (same as if no media is present).

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3. To format the media select SECONDARY MENUS > MEDIA > FORMAT MEDIA.

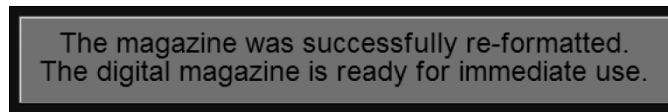


- Viewfinder output(s) will display “FORMATTING”.



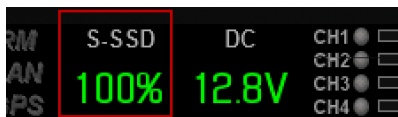
NOTE: If when selecting **FORMAT**, the display indicates **FORMAT FAILED**, refer to **MEDIA ERRORS**.

4. Once formatting is completed, the Viewfinder output(s) will display “THE MAGAZINE WAS SUCCESSFULLY FORMATTED THE DIGITAL MAGAZINE IS READY FOR IMMEDIATE USE”.



MEDIA CAPACITY REMAINING STATUS

The Viewfinder output(s) will display the remaining media capacity in the MEDIA indicator (100% is shown).



At 10%, remaining capacity the media status will turn yellow, at 5% it will turn red. At 2%, remaining the camera will cease recording. This reserves a small amount of capacity for ancillary data to be written to the media.

NOTE: When media is full, the Side SSD LED will flash Red.

EJECT MEDIA FROM CAMERA (UNMOUNT)

IMPORTANT: Media must always be Ejected (un-mounted) prior to removal or disconnection from the camera. This ensures power is removed from the digital media and any open data files are closed. Failure to do so may result in lost data or corrupted files.

Removing an SSD without first un-mounting it will not physically damage the media, however it does increase the risk of file corruption, so it's good operational practice to un-mount the media if possible before removing or disconnecting.

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IMPORTANT: Unmounting the digital media takes a few seconds, protects the integrity of your recorded data and helps clips mount instantly to your workstation once in postproduction, so it's a recommended habit to develop. If you do not un-mount the media the camera will offer a warning – your files may not be damaged, but you will have been warned!

NOTE: The camera will respond to physical removal of the media without un-mounting and display "MEDIA REMOVED PRIOR TO UNMOUNT – DATA INTEGRITY RISK".

USING REDMOTE / TOUCHSCREEN LCD

1. Go to SECONDARY MENU > MEDIA.



2. Select EJECT MEDIA.
3. When media is ejected, Viewfinder output(s) will display "MEDIA EJECTED SUCCESSFULLY".



4. Media can now be removed from the camera.

USING SIDE HANDLE

1. By default, the lower of the three (3) SYSTEM KEYS is set to Eject Media when pressed.



2. When media is ejected, Viewfinder output(s) will display "MEDIA EJECTED SUCCESSFULLY".

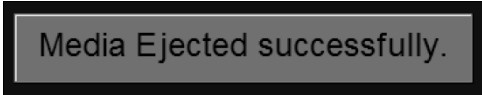


3. Media can now be removed from the camera.

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USING SIDE SSD

1. Press both User Keys 1 and 2 at the same time to eject REDMAG 1.8” SSD Media.
2. When media is ejected, Viewfinder output(s) will display “MEDIA EJECTED SUCCESSFULLY”.



Media Ejected successfully.

3. Media can now be removed from the camera.

COPYING MEDIA

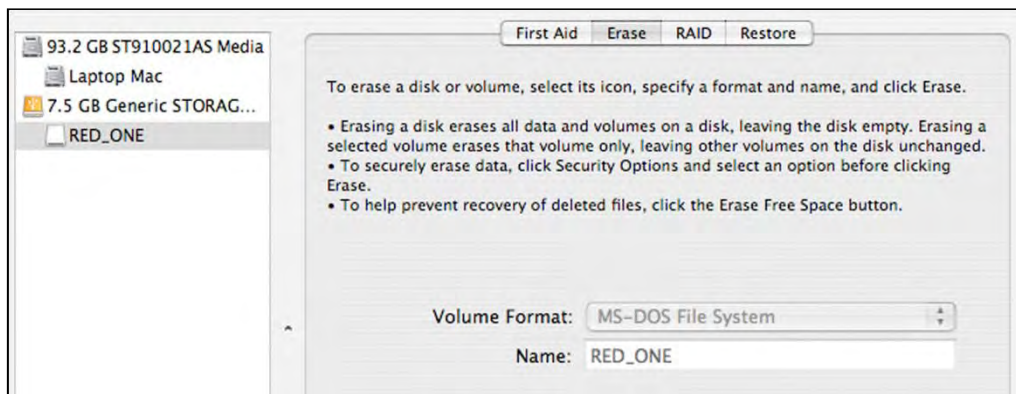
For use when media is connected directly to your computer. When copying media, it is recommended that you drag the complete .RDM folder on the digital magazine to the archive storage media. This copies all the media and metadata files. You will not need to copy the log, magazine profile, or presets files, but if you do so, it will do no harm.

ERASING MEDIA

NOTE: If the media was formatted using **SECURE FORMAT**, you cannot erase the media using an external source. erasing of the media must be performed by formatting on the camera.

MACINTOSH OS X

1. Connect the REDMAG 1.8” SSD via RED STATION REDMAG 1.8”.
2. Open the Disk Utility.



3. Carefully choose the drive from the list on the left.
4. Select the Erase tab.
5. Choose MS-DOS (FAT) as the Volume Format. You can add a Name if desired, however the camera will overwrite this.

IMPORTANT: Before performing the next step, double-check that this is the correct SSD that you wish to erase DATA FROM.

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6. Select Erase. When the pop up window appears click on the Erase button.
7. When the media is erased, drag its icon to the trashcan and physically disconnect it.
8. The media will need to be formatting by the camera before use. Refer to FORMATTING MEDIA.

WINDOWS

1. Connect the REDMAG 1.8" SSD via RED STATION REDMAG 1.8".
2. Open Windows Explorer (go to my computer icon, right click and select EXPLORE).
3. Double-click on the drive you wish to erase files from.
4. Select all the files on the drive you wish to erase.

IMPORTANT: Before performing the next step, double-check that this is the correct SSD that you wish to erase DATA FROM.

5. Press the "DELETE" key on the keyboard, select FILE > DELETE or right-click on selected file and choose DELETE. When the pop up window appears click YES.
6. The media will need to be formatting by the camera before use. Refer to FORMATTING MEDIA.

APPENDIX C: CHARGING BATTERIES

REDVOLT

BATTERY LED ARRAY

The REDVOLT battery LED array consists of three (3) LED's and a button.



REDvolt LED Array

When button is pressed, LEDs will illuminate in relation to battery life available (in 33.3% steps). If single LED blinks or no LEDs illuminate when pressed, battery requires charging.

BATTERY PERFORMANCE

When fully charged to 16.4V (+/- 0.2V), the REDVOLT battery is designed to provide approximately 30-45 minutes of operational time when powering in the RED EPIC camera (this may vary depending on installed accessories and loads).

DISCHARGE PROTECTION

The battery is equipped with discharge protection. When battery voltage reaches lower than 10V (+/- 0.12V) the battery stops supplying output voltage (discharging).

RED TRAVELCHARGER™

The RED Travelcharger has been designed to charge REDVOLT Li-ion batteries or equivalent. A completely discharged battery can be fully charged in approximately 90 minutes. The battery can also be partially charged, to approximately 80% capacity, in approximately 60 minutes.



RED Travelcharger with REDvolt Installed

OPERATION

INDICATOR

- Red Solid = Charger ON, no battery connected.
- Yellow Flashing = Charger ON, battery connected and charging.
- Green Solid = Charger ON, battery fully charged.
- Red/Green Alternate Flashing = Charger ON, fail condition.

PRE CHARGE

The battery can be partially charged to 80% of capacity in approximately 60 minutes.

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FULL CHARGE

The battery is fully charged when voltage reaches 16.4V (+/- 0.2V) in approximately 90 minutes.

CHARGER TIME-OUT

The charger automatically times-out after 105 minutes if battery does not reach full charge.

OVERCHARGE PROTECTION

Charging will automatically stop if battery voltage reaches higher than 17.0V (+/- 0.12V).

CHARGING BATTERIES

1. Plug the supplied AC power cord into the charger's AC input and then into the AC power source.
2. Verify that the charger's LED status bar is solid Red (indicating ready to receive battery for charging).
3. Insert a REDVOLT battery into the charger. Charger status LED flashes Yellow while charging.
4. Leave the battery to charge for the appropriate time as shown in the table (assuming battery is discharged completely).

Charging REDVOLT using RED TRAVELCHARGER

| CHARGE AMOUNT% (MINUTES) |
|--------------------------|
| 80 (60) |
| 100 (90) |

5. The battery is completely charged when the charger status LED turns solid Green.
6. Remove the battery from the charger and repeat operation as necessary for additional batteries.

APPENDIX D: INPUT / OUTPUT CONNECTORS

BRAIN FRONT



| | | | |
|----------|------------------------|----------|------------------------|
| A | MIC-1 3.5mm Audio Jack | B | MIC-2 3.5mm Audio Jack |
|----------|------------------------|----------|------------------------|

Figure18: Brain Connectors - Front

MIC-1, MIC-2 (MICROPHONE AUDIO)

Two 3.5mm phone jacks on the front of the brain support two independent channels of balanced or unbalanced analog microphone level audio inputs.

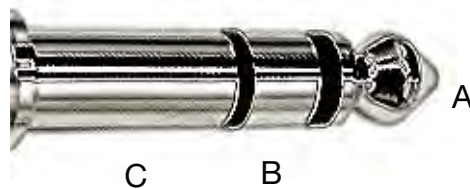


Figure 19: Microphone Input Connector

| PIN | SIGNAL | DESCRIPTION | DIRECTION |
|------------|--------|--------------------------------|-----------|
| A (TIP) | IN + | Mic Input (+48V Phantom Power) | In |
| B (RING) | IN - | Mic Input (+48V Phantom Power) | In |
| C (SLEEVE) | GND | Camera ground | -- |

Microphone Level analog audio input signals are routed via a high quality A/D and pre-amplifier, whose Gain may be controlled using the Input Level control to achieve the desired audio reference / recording level. Each microphone input supports +48V @ 10mA Phantom Power as a user selectable option.

To assist with reference level setup, the camera provides a color-coded Peak Level Meter in the Graphical User Interface, with a solid vertical witness mark that indicates 0dBu / 0.775 v RMS / -20dBFS.

Peak Level Meter range is -36dBu to +20dBu (-54dBFS to 0dBFS) and provides input clip indication.

BRAIN REAR



| | |
|---|----------------------|
| A | HD-SDI |
| B | Headphone |
| C | SYNC (Video Sync) |
| D | CTRL (RS232 Control) |
| E | GIG-E (Ethernet) |
| F | DC IN (Power Input) |
| G | HDMI |

Figure 20: Brain Connectors - Rear

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HD-SDI

A standard size BNC connector provides a high definition video output.

| PIN | SIGNAL | DESCRIPTION | DIRECTION |
|---------------|--------|-------------------|-----------|
| Center | HD-SDI | SMPTE-292M HD-SDI | Out |
| Shield/Screen | GROUND | Camera ground | -- |

HD-SDI Output

The HD-SDI output provides a 720p or 1080p 10-bit 4:2:2 progressive scan video feed at 23.98, 24.00, 25.00 or 29.97 Hz when in 1.5GHz HD-SDI mode, and 50.00 or 59.94 Hz when in 3GHz HD-SDI mode.

The HD-SDI output may be specified as a PROGRAM output (clean feed video) or as a PREVIEW output (with SurroundView™ look around, Clip Name, Timecode and Safe Action / Safe Title frame guides).

In addition to video data, the HD-SDI output also provides two (2) channels of embedded audio, Time of Day timecode, record tally flag and Clip Name information as SMPTE RP-188 VITC2 HANC metadata.

NOTE: Default setting is PROGRAM.

NOTE: HD-SDI video output is Progressive Scan; it does not support 1080i or 1080PsF modes.

HEADPHONE

A 3.5mm stereo jack provides two channels of adjustable level analog audio for monitor headphones.

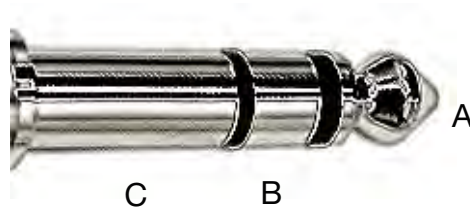


Figure 21: Headphone Output Connector

| PIN | SIGNAL | DESCRIPTION | DIRECTION |
|------------|--------|---------------------|-----------|
| A (TIP) | LEFT | Left channel audio | Out |
| B (RING) | RIGHT | Right channel audio | Out |
| C (SLEEVE) | GND | Camera ground | -- |

The camera's four audio channels may be monitored in pairs: either 1L - 2R or 3L - 4 R or as a quad mix of 1+3L - 2+4R based on the MIX parameter. Default is 1L-2R.

Output volume may be adjusted as follows.

Volume: (master volume) Adjusts headphone volume equally for left and right outputs.

Range is -18dB to 0dB in 1dB steps. Default is -9dB.

NOTE: for maximum output signal quality, only use high impedance headphones.

SYNC (VIDEO SYNC)

A 4-pin LEMO connector supports shutter synchronization input, GPI, timecode and genlock signals.

The shutter Sync Input signal acts as an immediate response hardware trigger to commence a scan. This is useful for motion control and other applications where the camera is driven by a master timing device. When using SYNC as the camera shutter timing reference, fine shutter start time timing (SHUTTER PHASE) is disabled, make any timing adjustments at the external SYNC generator itself.

Alternatively, this input pin may be used as a GPI (General Purpose Input) trigger, whose function is programmed in the USER KEYS menu. Default is Record Start / Stop.

A SMPTE timecode input signal provides a frame accurate time stamp for each frame of recorded video. External TC must be chosen in the Project > Timecode menu. When SMPTE timecode is detected it will align the internal TC at every :00 frame crossing to the external time.

A Video Genlock input signal may be used as a vertical interval reference signal for applications that require precise synchronization between cameras, such as 3D and live broadcasts. When using GENLOCK as the camera shutter timing reference, fine shutter start time timing (SHUTTER PHASE) may be adjusted. The HD-SDI monitor output will automatically be synced to the genlock when the signal is detected.

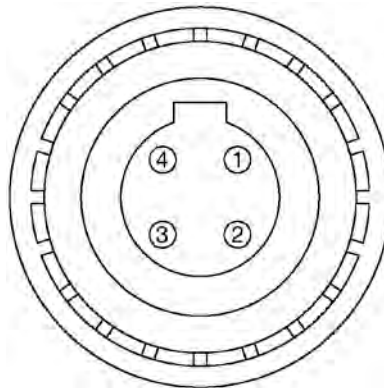


Figure 22: View into camera SYNC (Video Sync) Interface connector

Mating Connector: FGG.00.304.CLAD27Z

| PIN | SIGNAL | DESCRIPTION |
|-----|----------|----------------------------------|
| 1 | GROUND | Common Ground |
| 2 | SS/GPI | Shutter Sync / GPI Trigger Input |
| 3 | TIMECODE | SMPTE unbalanced timecode Input |
| 4 | GENLOCK | RS170A Tri-Level Sync Input |

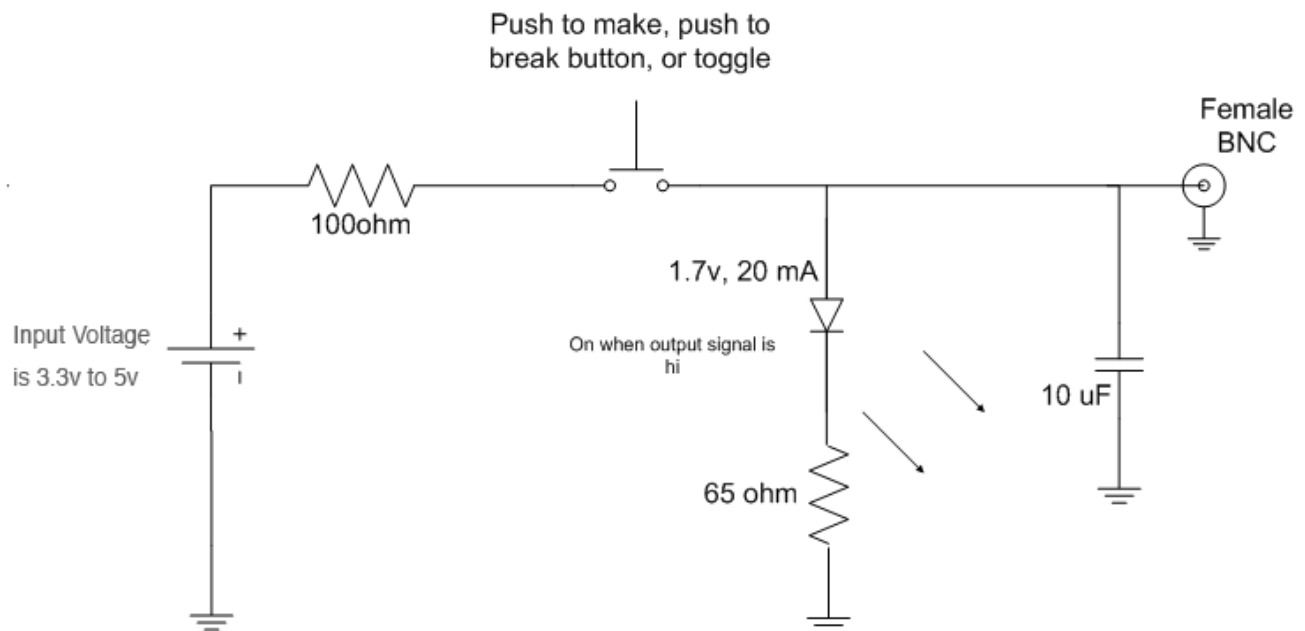
NOTE: The Shutter Sync / GPI Trigger uses a Schmitt trigger; 5 volt tolerant; 3.3v recommended. Current must be supplied by trigger source. Both edges of the input signal can be used as a trigger event.

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For example, when GPI trigger is used as a Record Start / Stop.

- **Start Record:** Ground - 3.3V Transition
- **During Record:** Hold at 3.3V
- **Stop Record:** 3.3V - Ground Transition
- **During Stop:** Hold at Ground

Trigger button circuit



Component values are approximate, use available standard values

NOTE: A pre-fabricated SYNC interface cable is available from RED Digital Cinema.

- **P/N 790-0154 – Video Sync – Camera to 3 BNC – 3 ft. (1m)**
- **White BNC:** Shutter Sync / GPI
- **Yellow BNC:** SMPTE Timecode
- **Green BNC:** RS170A Genlock

CTRL (RS232 CONTROL)

A 4-pin LEMO connector supports RS232 remote control for stereoscopic camera image capture, and third party metadata ingest applications.

The shutter Sync Output signal acts as an immediate response hardware tally of a scan. This is useful for 3D or motion control applications where a slave camera or lighting device needs to be synchronized to a master camera.

Alternatively, this output pin may be used as a GPO (General Purpose Output) tally, whose function is programmed in the USER KEYS menu. Default is Record Tally.

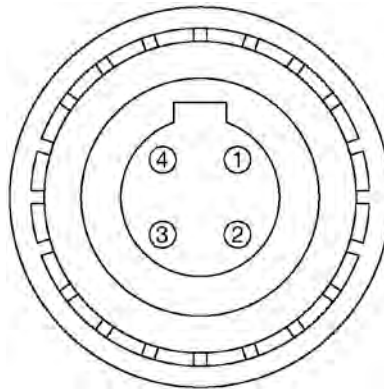


Figure 23: View into camera CTRL (RS232 Control) Interface connector

Mating Connector: LEMO FGG.00.304.CLAD27Z

| PIN | SIGNAL | DESCRIPTION |
|-----|--------|---------------------------|
| 1 | GROUND | Common Ground |
| 2 | 232 RX | RS232 RX |
| 3 | SS/GPO | Shutter Sync / GPO Output |
| 4 | 232 TX | RS232 TX |

NOTE: When active, the GPO tally presents 3.3V @ 0.04 Amps maximum between pins 1 and 3. When used as Sync Out, the signal is rising edge pulse at start of exposure. As a Tally, it is rising edge at start of record, falling edge at end of record.

NOTE: A pre-fabricated CTRL interface cable is available from RED Digital Cinema.

- P/N 790-0152 – RS232 – Camera to DB-9 – 3 ft. (1m)
- DB-9 Pin 1: Shutter Sync / GPO
- DB-9 Pin 2: RS232 Tx
- DB-9 Pin 3: RS232 Rx
- DB-9 Pin 4: Ground

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GIG-E (ETHERNET)

A 9-pin LEMO connector supports a Gigabit Ethernet port for remote camera setup, master / slave camera-to-camera control and external metadata ingest.

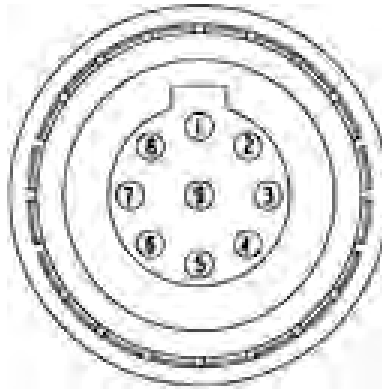


Figure 24: View into Ethernet Interface connector

Mating connector: FGG.0B.309.CLAD32Z

| PIN | SIGNAL | DESCRIPTION | DIRECTION |
|-----|---------|----------------|-----------|
| 1 | B1_DC + | Data Pair C+ | -- |
| 2 | B1_DC - | Data Pair C- | -- |
| 3 | B1_DD+ | Data Pair D+ | -- |
| 4 | B1_DD - | Data Pair D- | -- |
| 5 | B1_DA- | Data Pair A- | -- |
| 6 | B1_DA+ | Data Pair A+ | -- |
| 7 | B1_DB+ | Data Pair B+ | -- |
| 8 | B1_DB- | Data Pair B- | -- |
| 9 | - | Do Not Connect | -- |

NOTE: Two pre-fabricated Ethernet interface cables are available from RED Digital Cinema.

- P/N 790-0163 – Ethernet – Camera to Camera – 3 ft. (1m)
- P/N 790-0159 – Ethernet – Camera to RJ45 – 3 ft. (1m)

DC IN (POWER INPUT)

The 6-pin LEMO connector accepts a DC voltage between +11.5V and +17V DC. Power conditioning circuits provide protection against reverse-polarity connection, ESD, under voltage, and over current.

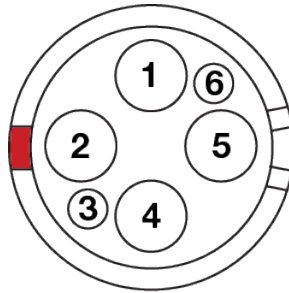


Figure 25: View into camera DC IN Power Input connector

Mating Connector: LEMO FGJ.1B.306.CWLD72Z

| PIN | SIGNAL | DESCRIPTION |
|-----|----------|------------------------------|
| 1 | +VBATT | Power input, +11.5 to +17VDC |
| 2 | | |
| 3 | SCL-BATT | Serial Battery Bus Clock |
| 4 | GROUND | Power Return (Camera Ground) |
| 5 | | |
| 6 | SCA-BATT | Serial Battery Bus Data |

WARNING: It is very important that both pairs of +VBATT and GROUND pins are wired up. DO NOT fabricate power cables with just one each of +VBATT and GROUND pins wired, as this may cause damage to the camera's power supply; this is not covered by Warranty.

NOTE: Two pre-fabricated DC Power input cables are available from RED Digital Cinema.

- P/N 790-0138 – DC Power – REDBRICK® to Camera – 18 in. (0.5m)
- P/N 790-0164 – DC Power – XLR to Camera – 10 ft. (3m)

HDMI OUT

The HDMI output supports an HDTV compatible 10-bit 4:2:2 progressive scan video signal (with embedded audio) at 720p and 1080p resolution.

The HDMI output may be specified as a PROGRAM output (clean feed video) or as a PREVIEW output (with SurroundView™ look around, Clip Name, Timecode and Safe Action / Safe Title frame guides).

In addition to video data, the HDMI output also provides 4 channels of embedded audio.

NOTE: Default setting is PREVIEW.

NOTE: HDMI video output is Progressive Scan; it does not support 1080i or 1080PsF modes.

SIDE SSD MODULE



Figure 26: Side SSD Module

An optional Side SSD Module may be mounted on the left side of the camera Brain. On the rear face of this module is a slot for inserting REDMAG 1.8"SSD media. Do not attempt to insert any other media type, or any foreign objects into this slot, or damage to the Side SSD Module and / or the camera Brain may occur.

The VIEWFINDER output Module to the front face of the Side SSD provides digital video, communications and power interconnection between the camera and a RED EVF or RED LCD digital display. Due to the requirement for absolute data integrity this requires a custom cable manufactured by RED, the pin-out of this interface is not published.

NOTE: Pre-fabricated EVF / LCD cables are available from RED Digital Cinema.

- P/N 790-0157 – EVF / LCD Cable – Right Angle to Right Angle – 6 in. (0.15m)
- P/N 790-0153 – EVF / LCD Cable – Right Angle to Straight – 18 in. (0.5m)

REDMOTE

This section describes the physical connectors on the REDmote.



| | | | |
|----------|----------|----------|------------------|
| A | Mini USB | B | Camera Interface |
|----------|----------|----------|------------------|

Figure 27: REDmote Connections

The Mini USB connector (A) may be used to charge the REDmote from a 3rd party USB power source.

The REDmote interface connector (B) allows communication between the REDmote and EPIC Brain or any expansion module when installed. Make sure these contacts are kept clean and free of any grease that may interfere with electrical contact.

APPENDIX E: REDMOTE OPERATION

CONTROL, CONNECTORS AND DISPLAY

This section describes powering of the REDmote, physical controls, connectors and displays.

CONTROLS

This section describes the physical controls on the REDmote.



Figure 28: REDmote Controls

| | | | | | |
|----------|---------------------|----------|------------------------|----------|-----------------------|
| A | Still/Motion Switch | F | User Function Keys A-D | K | Soft Menu Buttons 4-8 |
| B | Release Button - L | G | MENU Button | L | Power/Lock Switch |
| C | Record Status LED | H | Soft Menu Buttons 1-3 | M | Release Button - R |
| D | Power Status LED | I | Navigation Group | N | USB Power Port |
| E | Zoom Rocker Switch | J | Focus / Record Button | | |

STILL / MOTION TOGGLE SWITCH

On the upper left edge of the REDmote is the STILLS/MOVIE toggle switch (A) used to switch between STILLS operation (DOWN) and MOVIE operation (UP). The toggle switch is set to the MOVIE position, the

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camera settings and defaults become movie specific. When the toggle switch is set to the STILLS position, the camera settings and defaults become still photography specific.

LEDS

UPPER

The upper LED is used to signal power and record status.

- Red - Startup / Recording.

LOWER

The lower LED is used to signal connection status.

- Green - Connected.
- Blinking Green - Searching.

ZOOM ROCKER SWITCH

The pressure sensitive ZOOM rocker switch (E) may be assigned by the operator to one of a number of operational controls. Refer to SECONDARY MENUS > SETTINGS > SETUP > KEYS / SHORTCUTS.

USER FUNCTION KEYS

Below the Menu buttons are four (4) User Function Keys A-D (F). The specific function of these keys may be programmed by the user. Refer to SECONDARY MENUS > SETTINGS > SETUP > KEYS / SHORTCUTS.

Default settings for User Function Keys A-D are as follow:

- User Key A – Press to execute user defined function. Default: Toggles AF Indicator
- User Key B – Press to execute user defined function. Default: Toggles False Color > RAW Check
- User Key C – Press to execute user defined function. Default: Toggles False Color > 1:1 Focus Check
- User Key D – Press to execute user defined function. Default: Toggles False Color > Exposure Check

MENU BUTTON

Below and to the left of the User Keys is the MENU button (G) - press once enter the menus at the top level, press twice in quick succession to re-enter menus at the last location from which you exited them.

SOFT MENU BUTTONS 1-3

Below the LCD are three (3) Soft Menu Buttons 1-3 (H) whose functions are defined on the LCD screen. For complete information refer to OPERATION > REDMOTE MENUS > SOFT MENU BUTTONS 1-3.

NAVIGATION GROUP

The Navigation Group (I) allows navigation through allowing navigation of camera menus and adjustment of selected parameters.

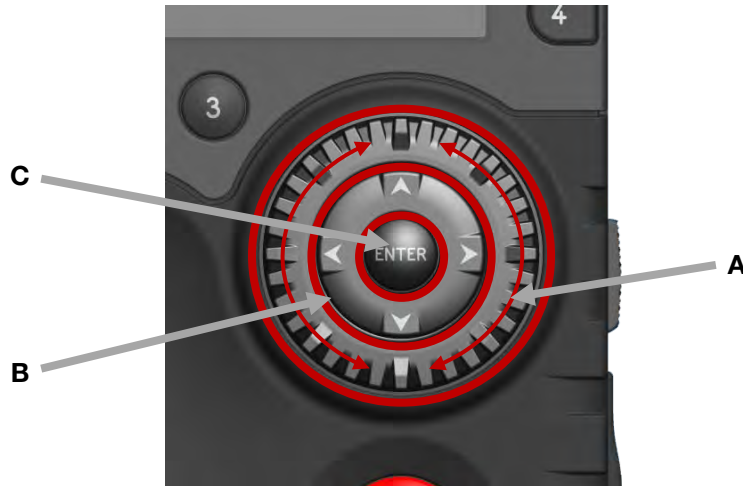


Figure 29: Side Handle Navigation Group

| | | | | | |
|----------|--------------|----------|-----------------|----------|--------------|
| A | Scroll Wheel | B | Directional Pad | C | Enter Button |
|----------|--------------|----------|-----------------|----------|--------------|

The Navigation Group has three (3) separate operational capabilities.

SCROLL WHEEL

The Scroll Wheel (A) allows the operator to select and adjust the values of selected camera parameters.

DIRECTIONAL PAD

The Directional Pad (B) allows Left / Right / Up / Down navigation thru camera menus to select a desired parameter for adjustment.

ENTER BUTTON

The Enter button (C) located at the center, allows confirmation of a parameter adjustment. This may also be referred to as the Center Key.

FOCUS AND RECORD BUTTON

Below the Navigation Group is the focus and record button (J). This is a dual throw action switch. A half press initiates Auto Focus; a full press initiates still capture, or starts /stops a movie recording.

When recording, the upper LED will illuminate Red and a Red dot will appear to the immediate left of the Timecode on the REDmote LCD display.

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SOFT MENU BUTTONS 4-8

To the right of the LCD are five (5) Soft Menu buttons 4-8 (H). These are pages displaying camera settings. For complete information refer to OPERATION > REDMOTE MENUS > SOFT MENU BUTTONS 4-8.

POWER / LOCK SWITCH

Below the ambient light sensor is the Power / Lock switch (T).

Sliding and holding in the switch in the POWER direction for longer than 2 seconds will Power UP or Power DOWN the REDmote.

Moving the switch to the LOCK position will lockout all REDmote buttons to prevent unintentional operation. When in the LOCK position, a padlock icon will be displayed in the REDmote LCD display.

USB POWER PORT

On the lower right side is a USB port that may be used to charge the REDmote internal battery. Refer to CHARGING / BATTERY LIFE > CHARGING USING USB CONNECTOR for complete information.

OPERATION

REDMOTE MENUS

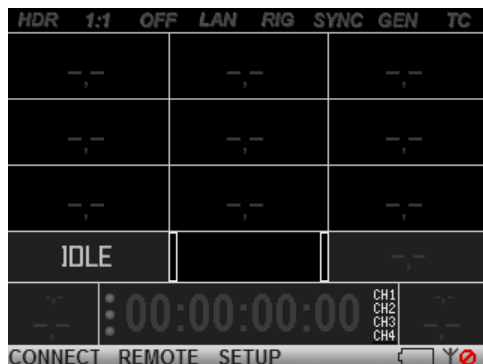
SOFT MENU BUTTONS 1-3

Located below the main screen are Soft Menu Buttons 1-3. Directly above those buttons are menu options controlled by the corresponding button.

RED EPIC® OPERATION GUIDE

1 CONNECT

Used when wireless function is used. Pressing Soft Menu Button 1 Connect will display a list of cached cameras and RESCAN.



When the RESCAN is displayed, press the ENTER button to search for paired cameras. If previously connected you will get a list of paired cameras.



The REDmote will ping for cameras it has been paired to. When a paired camera or cameras is/are found, the available cameras will be displayed on the screen.

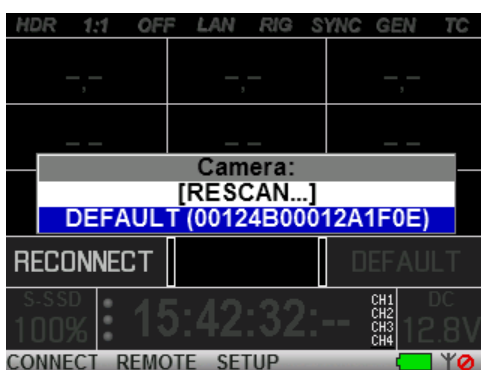


RED EPIC® OPERATION GUIDE

Select the desired camera to connect to for wireless operation and press the Enter button.

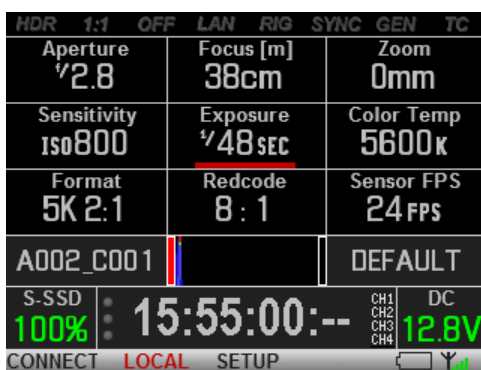


The REDmote will connect to the selected paired camera.



2 REMOTE

When selected will toggle between REMOTE and LOCAL (in Red text).



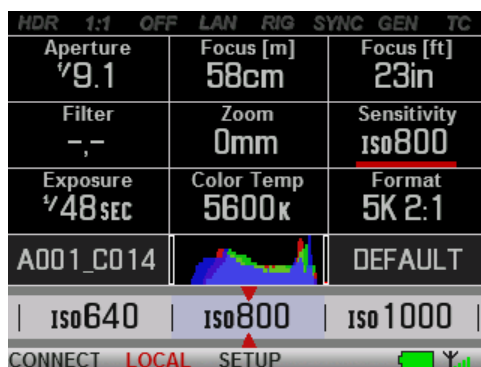
Remote

Allows you to control the camera settings, however to see these settings you must be able to see the LCD or external monitors.

Local

Allows you to control the camera setting directly on the REDmote as opposed to having to see the setting on the LCD or external monitors to adjust. As the settings are changed, they will be reflected on the camera LCD and external monitors, however the menu will not open on the camera as changes are made.

NOTE: You can enter local mode while in the REDmote is IDLE.



Customizing Available Adjustment Parameters

Local also gives you the options to setup what parameters you would like to be able to adjust directly, using the REDmote. You can assign the parameters to one of the 5 pages of information available under Soft Menu Buttons 4-8.

This feature allows you to put similar or frequently used setting together for ease of adjustment.

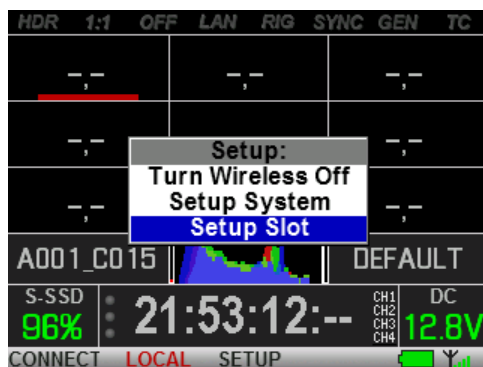
NOTE: You do not need to be connected (either wirelessly or wired) to setup the slot assignments.

To customize parameters:

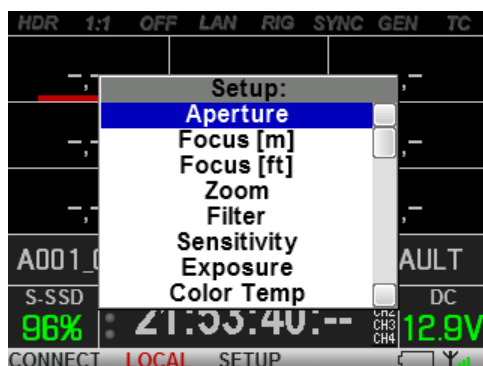
1. Ensure camera is on and wirelessly connected to REDmote.
2. Press Soft Menu Button 2 to display LOCAL above Soft Menu Button 2.
3. Select the page you would like to set the parameter on. Refer to SOFT MENU BUTTONS 4-8.

RED EPIC® OPERATION GUIDE

4. Use the directional arrows on the Navigational Control to move the Red cursor to the desired location to place the parameter.
5. Press Soft Menu Button 3 Setup. The Setup window will appear on screen.



6. Select "Setup Slot".
7. A new Setup window will appear displaying available parameters to display.

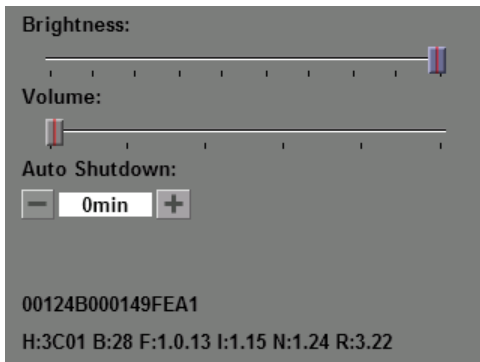


8. Select the desired parameter and press the Enter button.
9. You may now control this parameter directly from the REDmote.

RED EPIC® OPERATION GUIDE

3 SETUP

When selected will give you the option to turn the Wireless connection ON or OFF or open the Setup System menu screen.



Available options are REDmote LCD screen brightness, REDmote confirmation tone volume and Auto Shutdown time.

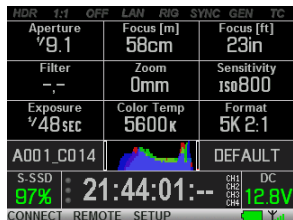
Below those options is the MAC address for the REDmote and setting parameters of the REDmote. In particular "F:" indicates the current firmware build of the REDmote.

Auto Shutdown

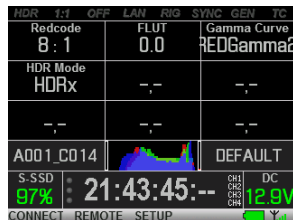
When set will shut the REDmote down in the specified amount of time when the REDmote is detached from the camera AND the buttons have not been pressed during that time.

SOFT MENU BUTTONS 4-8

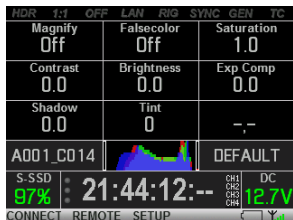
To the right of the LCD are five (5) Soft Menu buttons 4-8 (H). These are pages of information showing camera settings and parameters. The available parameters can be customized. Refer to SOFT MENU BUTTONS 1-3 > 2 REMOTE.



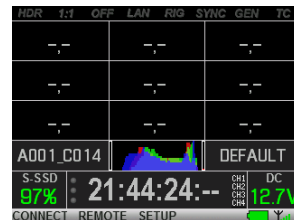
Page 1 (button 4)



Page 2 (button 5)



Page 3 (button 6)



Page 4 and 5 (button 7 & 8)

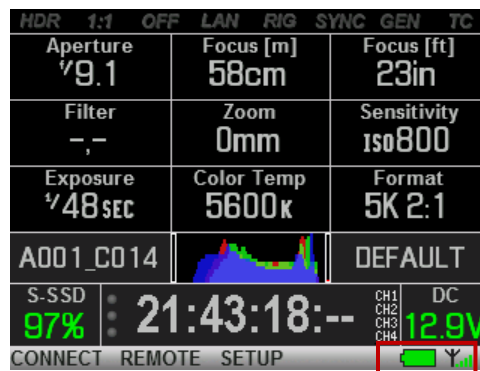
RED EPIC® OPERATION GUIDE

CHARGING / BATTERY LIFE

INDICATORS

CHARGE STATUS

Charge status is shown by a “Battery” indicator at the lower Right corner of the screen. When battery charge is good, indicator is Green. When battery charge is marginal, indicator will be Yellow. When battery charge is low, the indicator turns Red. Ensure the battery is fully charged to Green before operating camera in a wireless configuration.



When disconnected from camera and ON, the indicator will reflect the current charge level (Green, Yellow or Red). When connected to camera or connected to computer using USB cable, the indicator will flash at the current charge level to indicate the battery is charging.

BATTERY STATUS (CURRENT CHARGE LEVEL)

Battery life is shown by an indicator at the lower Right corner of the screen (same indicator as charge). When battery life is good, indicator is Green, when battery life is marginal, indicator will be Yellow. When battery life becomes low and requires recharging, the indicator turns Red.

BATTERY LIFE

When using the REDmote in wireless configuration, the battery will last approximately 8 hours before charging is necessary.

NOTE: When not using the REDmote, for maximum battery storage life, use the Power / Lock Switch to power down the REDmote completely by pressing down in the power off position and using the displayed menu to shut down the REDmote and/or the REDmote and camera. Refer to POWER UP / DOWN > POWER DOWN. If the Power / Lock Switch is pressed down in the power off position and held until the REDmote powers down, the battery storage life will be reduced greatly as there will be a slight power draw on the REDmote when shut down using this procedure.

CHARGING

CHARGE TIME

A fully discharged REDmote battery will be fully charged in approximately 7 hours.

USING CAMERA

While connected to the camera, the REDmote will automatically recharge its internal battery. Charge status is indicated by the Green Battery Icon at the top-right of the REDmote LCD display screen. A fully discharged REDmote battery will be re-charged in approximately 8 hours if connected to a powered camera. A much faster charge time may be achieved with a USB based power source such as laptop P.C.

USING USB CONNECTOR

The REDmote can be charged by connecting a Mini-USB-to-USB cable between REDmote and a computer or a cell phone charger.

NOTE: The REDmote can be charged using the Mini-USB connector while connected and controlling a camera wirelessly.

NOTE: If the computer / cable / hub does not provide enough voltage, the REDmote will not charge and show a "Error Charging" message.

1. Connect the USB connector to any computer (computer must be ON to charge REDmote).
2. Connect the Mini-USB end to the REDmote USB Port located on the lower right side (under rubber protective cover).
3. If the REDmote is powered down (and paired camera is OFF), the REDmote will power UP, display STARTING UP, display SEARCHING (with flashing Green LED), then settle into IDLE mode.
4. Green battery indicator will blink, indicating REDmote is charging.
5. A fully discharged REDmote battery will be fully charged in approximately 7 hours.

CONNECTING / REMOVING

This section describes how to physically connect / remove the REDmote to / from an EPIC or SCARLET Brain or to / from the back on an expansion module. On the lower left and right sides of the REDmote are V-lock release buttons (B, M) that must be depressed to release the REDmote from the camera or module.

PHYSICAL

CONNECTING (DOCKING)

1. Place the female V-Mount of the REDmote over the male V-Mount of the camera/module.



2. Press down until a click is heard which indicated the REDmote is securely attached.
3. The REDmote will confirm by displaying “DOCKED” momentarily (if REDmote is ON when docked).

NOTE: If the camera is ON and the REDmote is OFF, the REDmote will automatically power UP when connected.

REMOVING (UNDOCKING)

1. Depress the two (2) release buttons located on the sides of the REDmote.
2. Slide the REDmote upward to release from the V-Mount of the camera/module.
3. Remove the REDmote.



4. If the REDmote is on when undocked, “Reconnecting” will be displayed and the Green LED will flash. The REDmote will connect with the camera wirelessly (if the REDmote has been paired with the camera previously).

WIRELESS CONNECTION

PAIR CAMERA WITH REDMOTE

When the REDmote is wirelessly connected to the camera, the camera ID will be stored in the REDmote until the REDmote firmware is upgraded. After setting up the wireless connection, the REDmote will automatically locate and connect to the camera whenever both are powered on.

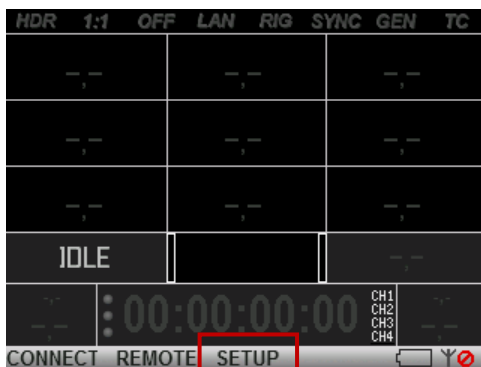
The camera can be paired with one and only one REDmote. The REDmote has no knowledge of what cameras are paired with it (until it searches for cameras).

To communicate to a desired camera wirelessly using the REDmote, perform the following procedure:

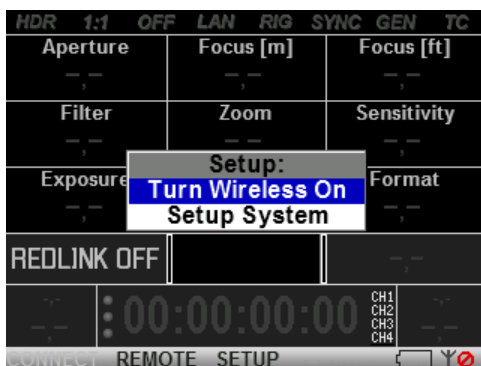
1. Ensure the REDmote and camera are both are powered up.
2. Ensure REDmote is NOT physically connected to the camera.

RED EPIC® OPERATION GUIDE

- On REDmote, press Soft Menu Button 3 under SETUP.

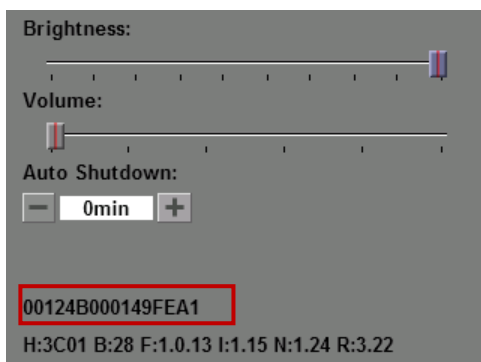


- Ensure Wireless is On (REDmote will display the option "Turn Wireless Off"). If "Turn Wireless On" is displayed, select it and press the Enter button. In addition, if Wireless is Off, REDLINK OFF will be displayed.



NOTE: If wireless needed to be turned on you, will need to press Soft Menu Button 3 again to get back into Setup options.

- Select "Setup System" to display the Setup System screen. Note the 16-digit number near the bottom of the screen.

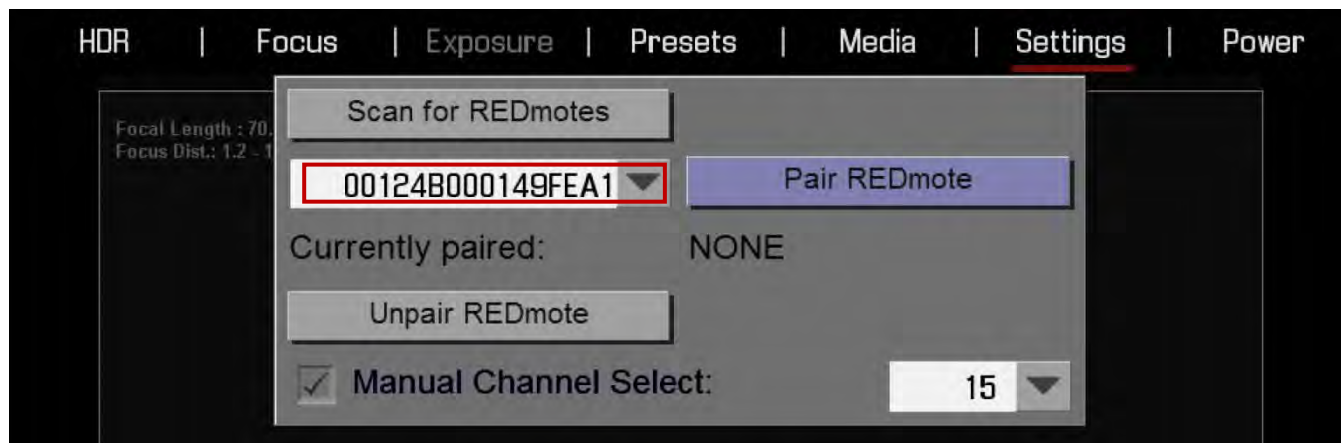


- On the camera go to SECONDARY MENUS > SETTINGS > SETUP > REDMOTE.

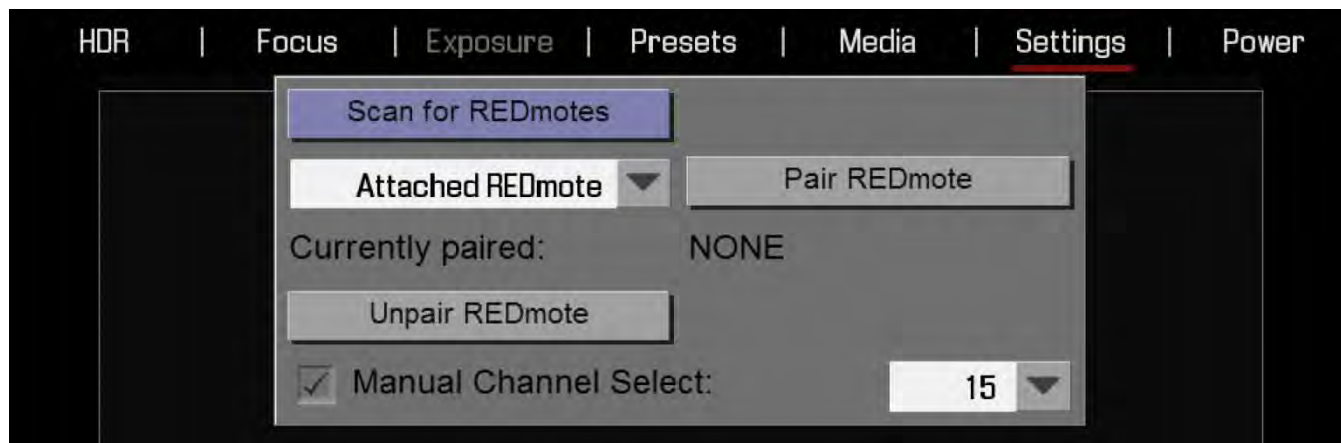
IMPORTANT: Ensure REDmote displays IDLE on the screen in the lower Left before continuing to the next step.

RED EPIC® OPERATION GUIDE

- Under “SCAN FOR REDMOTES” there is a drop down menu. Locate the device with the same 16-digit number as displayed on the REDmote Setup System screen.



- You can also pair the attached REDmote by selecting ATTACHED REDMOTE.



- Select “PAIR REDMOTE” on the camera.

NOTE: If after upgrading your EPIC to v1.7.xx and upgrading your REDmote to v1.0.13, your REDmote will not wirelessly connect to your EPIC and "REDLINK upgrade required, please contact RED!" is displayed on the camera, then your EPIC and REDmote may need to be sent back to RED for evaluation/updating. Please save a .LOG file and send to RED Technical Support to diagnose and confirm next steps.

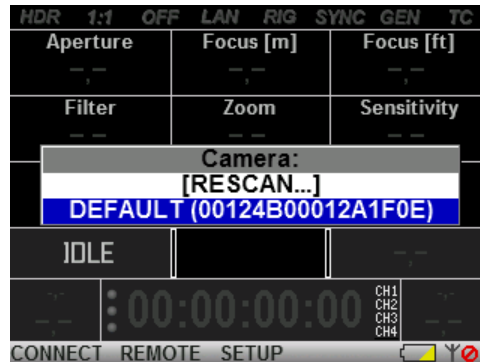
REDLINK upgrade required, please contact RED!

RED EPIC® OPERATION GUIDE

CONNECT REDMOTE TO A PAIRED CAMERA

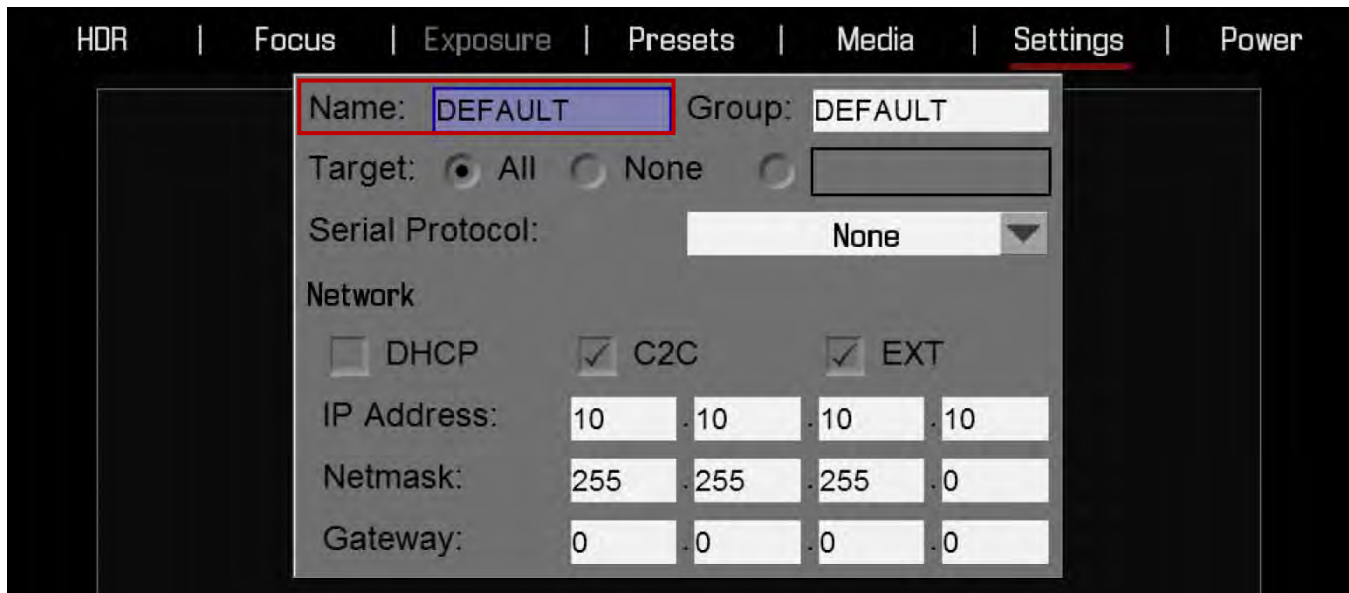
The REDmote is not aware of which cameras are paired with it (when you search for cameras to connect to it will ask the camera if it is paired or not so it only displays paired cameras in the connection list).

1. On the REDmote press Soft Menu Button 1 under CONNECT.
2. REDmote will display the name (DEFAULT in this case) and MAC address (in parenthesis) of the camera. This can take 20-30 seconds if RESCAN is selected, otherwise a cached list of cameras found during the last search will be displayed.



NOTE: If more than one camera has been PAIRED with a REDmote, multiple cameras will be listed.

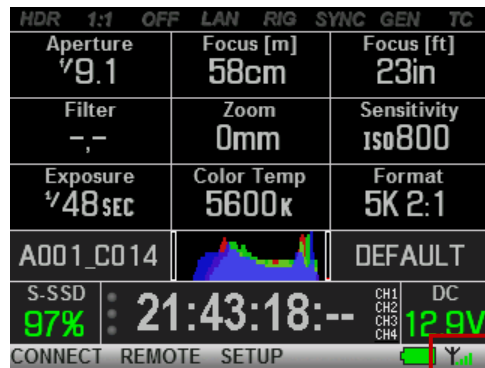
NOTE: The camera name can be setup on the camera under **SETTINGS > SETUP > COMMUNICATION**. Select **NAME** and a keyboard will appear, allowing you to select the camera name. This can also be performed after pairing the REDmote.



3. Select the desired camera and press the Enter button.

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- The REDmote will connect to the camera and display the cameras current settings and status. The wireless connection will be shown in the lower Right corner of the REDmote screen.



- The camera LCD or external monitors will confirm the REDmote is connected by displaying RM in Green with a signal symbol next to it.



RECONNECT WHEN SIGNAL IS LOST

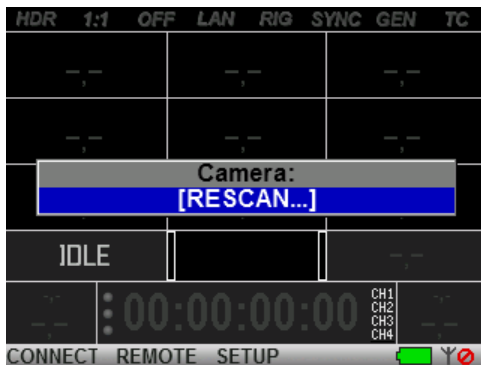
The REDmote keeps track of which camera it was last paired with for quick re-connect on next startup, undocking, or loss of wireless signal.

When the camera is turned off or the REDmote is turned on while the camera is off, REDmote will display “Searching” and the Green LED will flash (as the REDmote attempts to connect with the camera after losing the cameras wireless signal) until the REDmote is turned off or the camera is turned back on and REDmote automatically connects.



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If no camera is found, REDmote will go into IDLE mode and display “Camera: RESCAN...”



When the camera is turned back on, the REDmote will not automatically pair (if the REDmote is left powered up or is powered up before the camera).

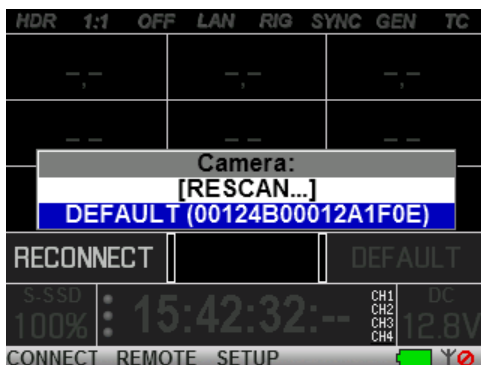
1. To reconnect REDmote to the camera (assuming the camera and REDmote have been paired before):
 - a. If the “Camera: RESCAN...” is NOT displayed, press Soft Menu Button 1 under CONNECT. The REDmote will display “Searching”.
 - b. If the “Camera: RESCAN...” is displayed, press the ENTER button. The REDmote will display “Searching”.
2. When a camera is found, the REDmote will display “Camera: RESCAN...” and below that the name and MAC address (in parenthesis) of the camera.

NOTE: If more than one camera has been connected wirelessly to this REDmote, multiple cameras will be listed.

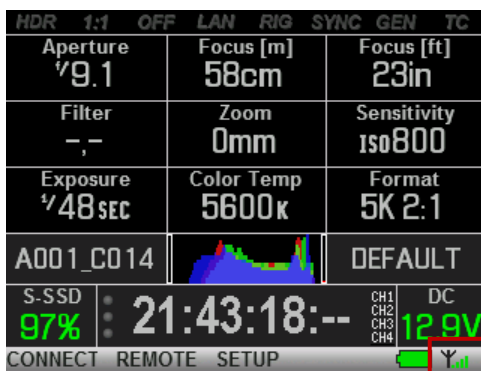


RED EPIC® OPERATION GUIDE

3. Select the desired camera and press the Enter button. The REDmote will display “Connecting”.



4. The REDmote will connect to the camera and display the cameras current settings and status. The wireless connection will be shown in the lower Right corner of the REDmote screen.



POWER UP / DOWN

Located on the upper right side of the REDmote is the Power / Lock Switch (refer to CONTROLS).

POWER UP

CONNECTED TO CAMERA

If the REDmote is physically attached to a camera, when the camera is powered UP the REDmote will automatically power UP along with the camera.

NOT CONNECTED TO CAMERA

To manually power UP the REDmote, depress and hold the Power / Lock Switch in the Down direction for 2 seconds then release.

RED EPIC® OPERATION GUIDE

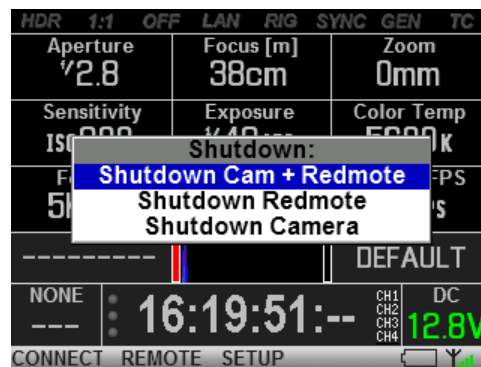
POWER DOWN

USING CAMERA

When the REDmote is connected to the camera and the camera is powered down, the REDmote will also power down. When disconnected from the camera, the REDmote will not power down with the camera.

USING REDMOTE

1. To power DOWN the REDmote, depress and hold the Power / Lock Switch in the Down direction momentarily, then release.
2. A screen will display with options to power down the REDmote, the camera or both the REDmote AND the camera together.



3. Select the desired power down function.

NOTE: When not using the REDmote, for maximum battery storage life, use the Power / Lock Switch to power down the REDmote completely by pressing down in the power off position and using the displayed menu to shut down the REDmote and/or the REDmote and camera. Refer to POWER UP / DOWN > POWER DOWN. If the Power / Lock Switch is pressed down in the power off position and held until the REDmote powers down, the battery storage life will be reduced greatly as there will be a slight power draw on the REDmote when shut down using this procedure.

ACCESSING CAMERA CONTROLS / SETTINGS

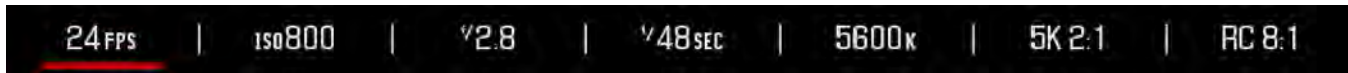
The Navigation Group is used to navigate through the camera's menus. Refer to CAMERA OPERATIONAL CONTROLS > REDMOTE > NAVIGATION GROUP. The camera settings and status are displayed on the REDmote Color LED display. Refer to BASIC OPERATION > GRAPHICAL USER INTERFACE AND NAVIGATION > REDMOTE.

The operations will be the same whether connected physically to the camera, or wirelessly.

CHANGING CAMERA SETTINGS

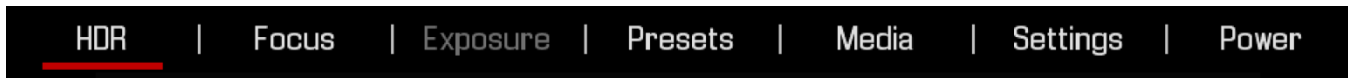
USING CAMERA LCD / EXTERNAL MONITOR AS REFERENCE

To adjust a parameter value displayed on the camera's Upper Status Group, first note the red colored bar (located under 24fps in this example), indicating the currently active parameter for instant adjustment.



Use the NAVIGATION GROUP directional pad to move the cursor to a different parameter if desired, then press the ENTER key to select that parameter and use the Scroll Wheel to adjust that parameter's value. To confirm the change in parameter value and to exit the adjustment menu, press the ENTER button.

To access the camera's menus, press the MENU button at the lower left. The MENU displays on the EVF, LCD or external monitors if the LCD and/or EVF are not connected disconnected.



Use the NAV GROUP to make changes to the cameras settings. Use the scroll wheel and directional pad to move the cursor to navigate and make changes to the desired settings. When a desired setting change is made, press the ENTER button or the directional pad UP arrow to exit from that setting.

Exiting Menus to Main Screen

To EXIT from the Secondary Menus and return to the main screen:

- Press the MENU button until the main screen is displayed.

USING REDMOTE LCD STAND-ALONE

The LOCAL function of the REDmote allows you to control the camera settings directly on the REDmote LCD as opposed to having to see the settings on the camera LCD or external monitors. For complete details refer to REDMOTE MENU > SOFT MENU BUTTONS 1-3 > 2 REMOTE > LOCAL.

RECORDING

IMPORTANT: Before recording from a REDmote ensure the camera is properly powered, set up and media is connected. Refer to BASIC OPERATION.

To record, press the Red REC (record) button on the REDmote (or any of the other available record buttons).

- If media is connected and properly formatted, the upper LED will illuminate Red and the Timecode text will change to Red.
- If media is NOT connected, the camera LCD will indicate "NO MEDIA ATTACHED".

To stop recording, press the record button a second time.

MAINTENANCE

UPGRADING REDMOTE FIRMWARE

The REDmote Update program allows you to upgrade the firmware on your REDmote.

NOTE: Once firmware is upgraded (on REDmote or camera) the REDmote must be paired to the camera again.

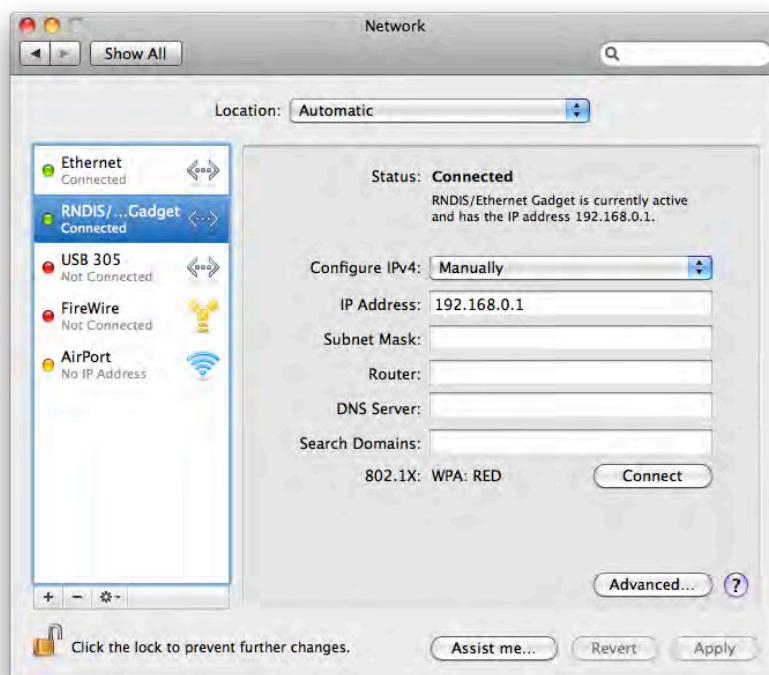
IMPORTANT: After upgrading your REDmote firmware to v1.0.13, you CANNOT roll back the firmware to lower than v771.

SETUP

CONFIGURING REDMOTE CONNECTION WITH COMPUTER

The first step in upgrading REDmote firmware is to establish communication between the MAC and the REDmote.

1. Connect a USB to mini-USB cable between the computer and the USB connector on the REDmote.
2. Go to System Preferences and choose Network. This may open automatically when the REDmote is connected.
3. Look for a device called RNDIS/ ...Gadget.



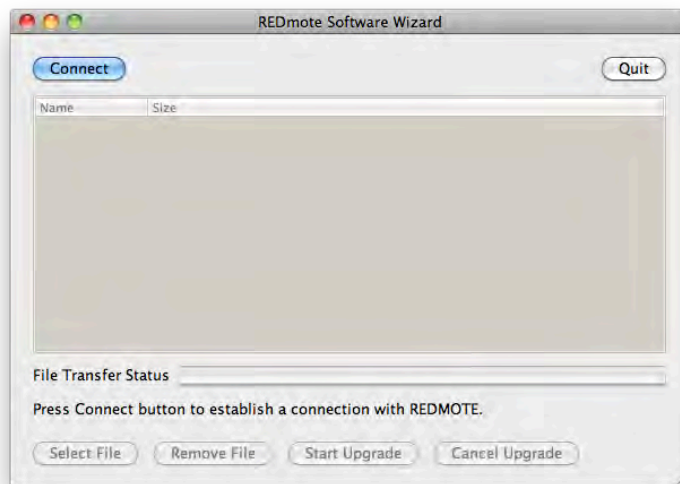
4. Change Configure IPv4 setting to “Manually” (as shown).
5. In the IP Address field, enter 192.168.0.1 (as shown).
6. The Status should change to “Connected” after changes.
7. Click “Apply’ at the bottom of the Network window.
8. Proceed to UPGRADING REDMOTE FIRMWARE.

UPDATING REDMOTE FIRMWARE

The following information will guide you through proper updating of your REDmote firmware.

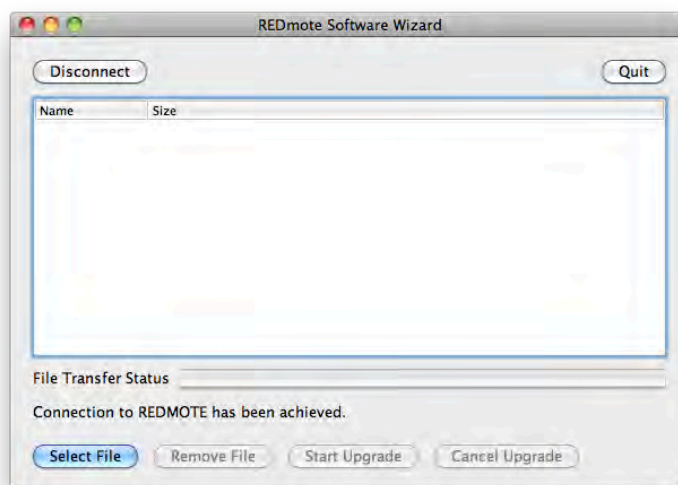
MAC ONLY

1. Download the camera upgrade epic_vX.X.XX zip file located at <http://www.red.com/support>.
2. The file will unzip automatically when downloaded. The REDmote Upgrade is located in this download.
3. Navigate to the downloads folder and open the newly created epic_vX.X.XX folder; or open it directly from the downloads window.
4. Open the REDmoteUpgrade_VXXX folder.
5. Open the MAC folder.
6. Double-click the REDmoteUpgradeApp. A Terminal window will open and the REDmote Software Wizard will open.

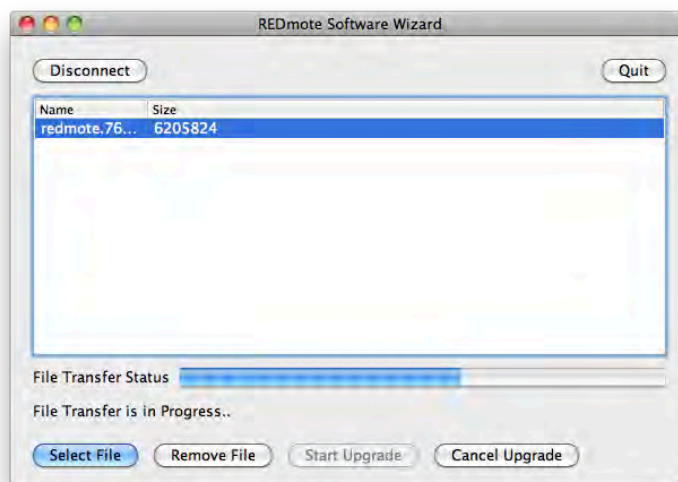


RED EPIC® OPERATION GUIDE

- Click Connect. When REDmote has been established, "Connection to REDMOTE has been achieved" will be displayed.



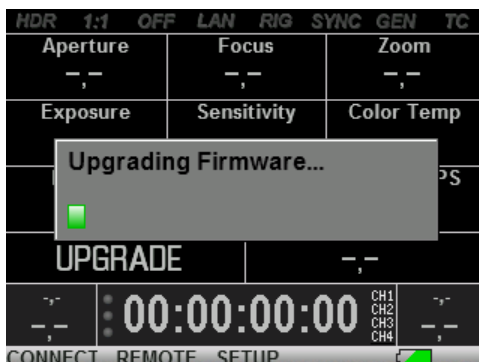
- Click "Select File" and navigate to the redmote.1.bin file located in the REDmote_firmware_vXXX folder.
- Select "Start upgrade".



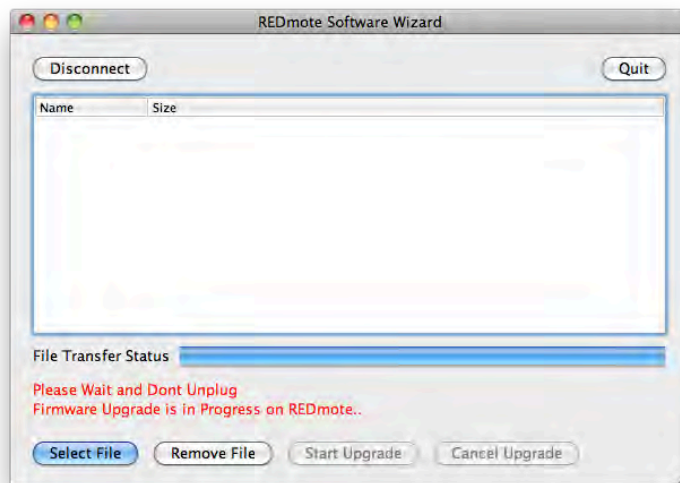
- File transfer status will be displayed as a Blue bar.

RED EPIC® OPERATION GUIDE

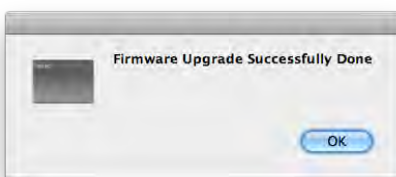
11. “Updating Firmware” will be displayed with a Green status bar showing upgrade progress. REDmote will also display UPGRADE during this process.



12. Once the File Transfer Status is completed, the REDmote Software Wizard will display “Please Wait and Don’t Unplug – Firmware Upgrade is in Progress on REDmote”.



13. After a few more seconds, the REDmote Software Wizard will display “Firmware Upgrade Successfully Done”. Select OK.



14. The REDmote Software Wizard will disconnect from the REDmote.
15. REDmote will reboot.
16. REDmote upgrade is complete. REDmote will display “POWER UP”, then “SEARCHING” once the upgrade has completed. Finally displaying “Camera: RESCAN...” and going into IDLE mode.

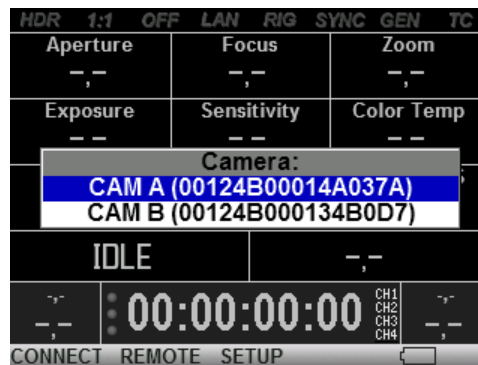
17. REDmote upgrade is complete. You can now reconnect to the camera.

NOTE: Pairing of the REDmote may not be necessary after upgrading the REDmote firmware, however after upgrading the camera firmware, you must pair the REDmote again.

OPERATING MULTIPLE CAMERAS USING A SINGLE REDMOTE

To operate multiple cameras using a single REDmote, first the REDmote must be paired to multiple cameras. Refer to OPERATION > WIRELESS CONNECTION for pairing instructions.

After pairing REDmote to the desired cameras, press Soft Menu Button 1 for CONNECT. Available cameras will be listed to connect with wirelessly.



Select the camera you wish to control and press the ENTER button. When you want to switch to a different camera, press Soft Menu Button 1 again to list available cameras and re-select.

APPENDIX F: 3D SETUP / OPERATION

OVERVIEW

The following information outlines basic procedures to connect two (2) RED EPIC cameras together in a Master / Slave configuration for 3D operation, operation of cameras in Master / Slave configuration and clip naming conventions for clips recorded on those cameras. The MASTER camera will control only the METADAT parameters of both cameras. On the SLAVE camera, any other setting outside of these will need to be manually changed before recording.

CAMERA SETUP

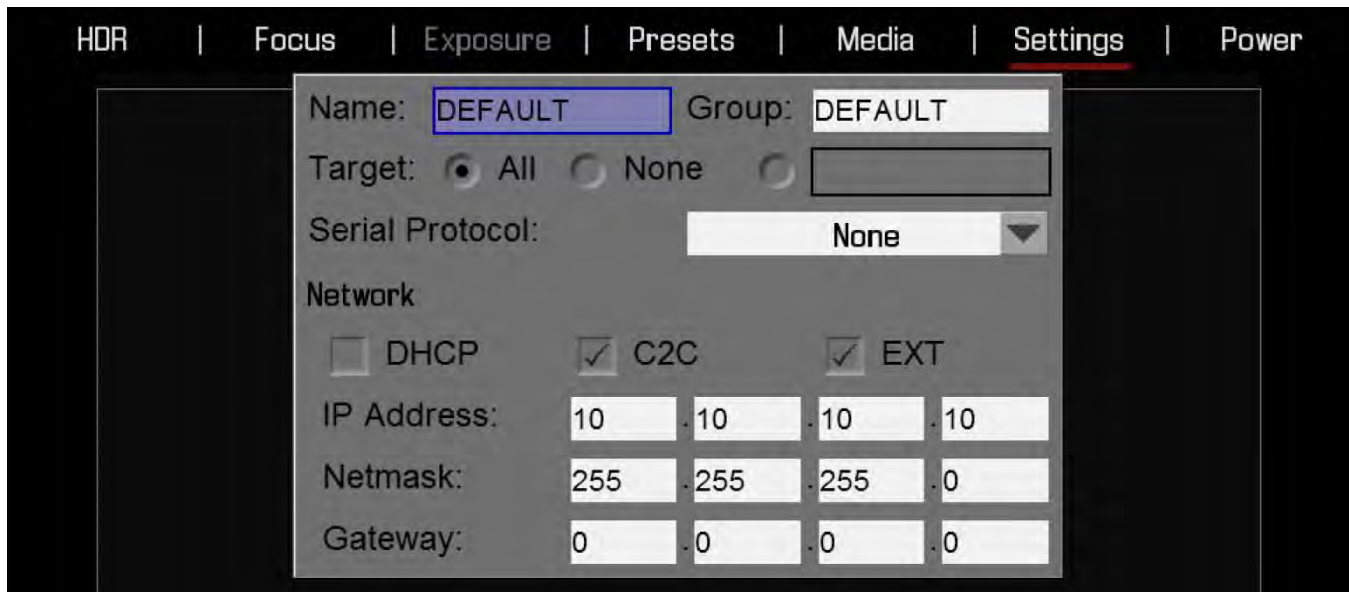
Select one camera to be designated as Master and a second to be designated as Slave.

NOTE: Cameras can be set up in a MASTER / MASTER and SLAVE / SLAVE configuration. To set as MASTER / MASTER select ALL under TARGET for both cameras. This will allow either camera to make changes and control record start/stop of both cameras. To set as SLAVE / SLAVE select NONE under TARGET for both cameras.

MASTER CAMERA

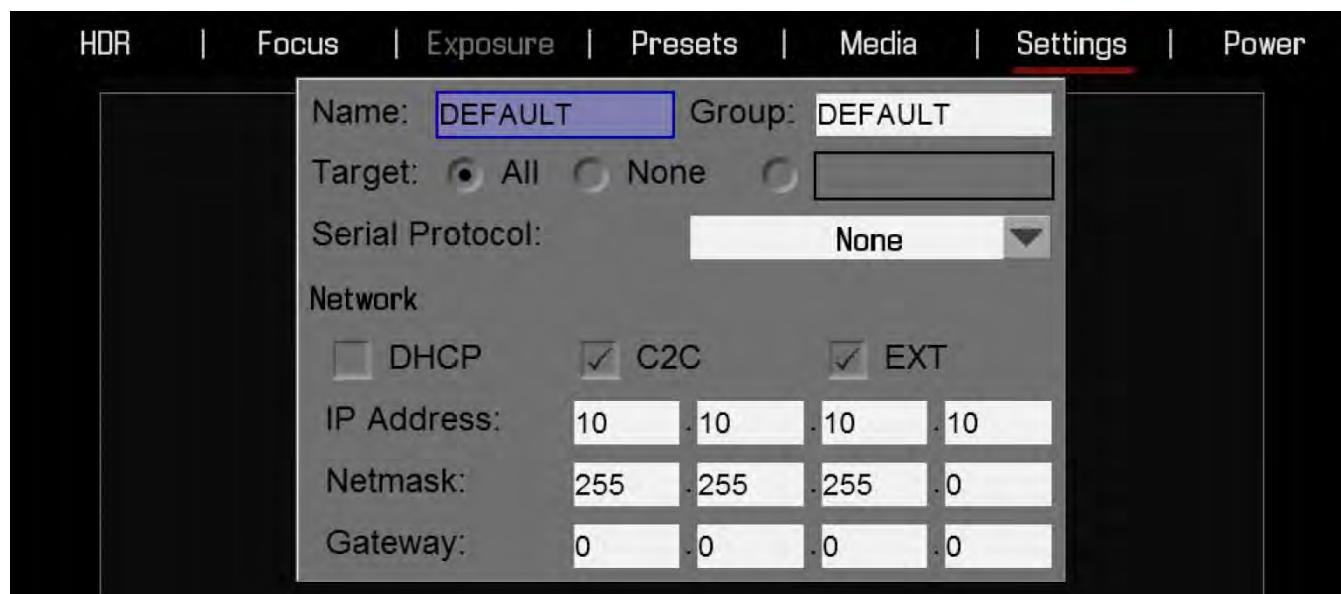
Perform the following steps on the Master camera:

1. Go to SECONDARY MENUS > SETTINGS > SETUP > COMMUNICATION > NAME and give the camera a unique NAME (CAM A, LEFT, etc...).



2. Under TARGET select ALL.

3. Give the camera a unique IP address.

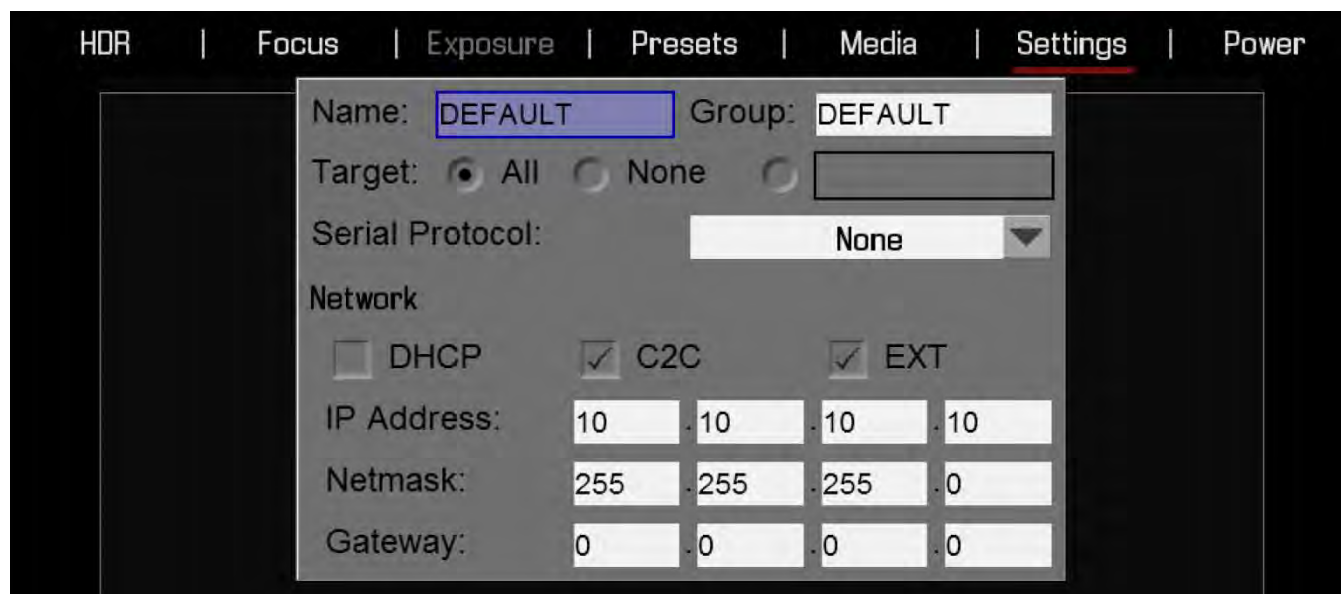


4. Go to SLAVE CAMERA.

SLAVE CAMERA

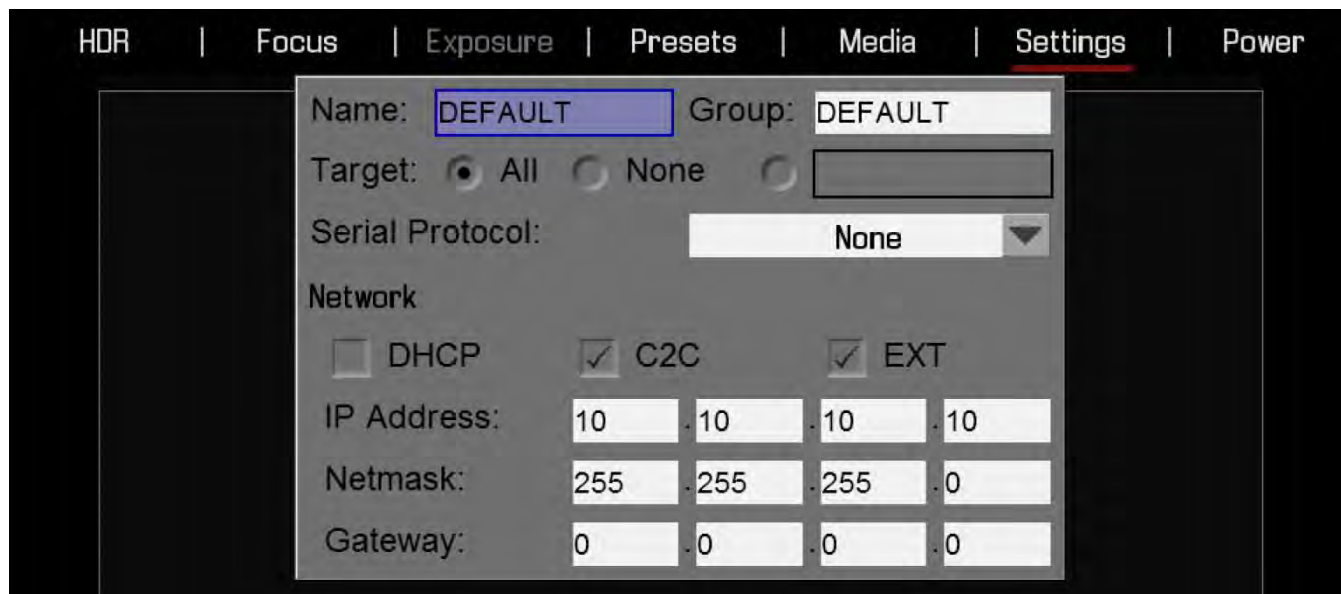
Perform the following steps on the Slave camera:

1. Go to SECONDARY MENUS > SETTINGS > SETUP > COMMUNICATION > NAME and give the camera a unique NAME (CAM B, RIGHT, etc...).



2. Under TARGET select NONE.

3. Give the Slave camera a unique IP address different from the Master.

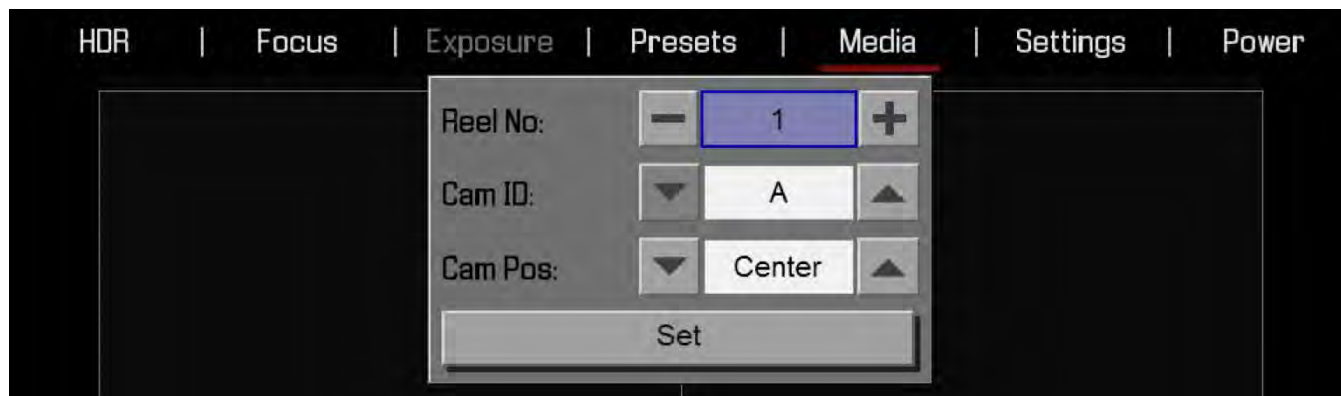


CLIP NAMING CONVENTIONS

REEL NO. / SLATE (CAMERA ID) / CAMERA POSITION

Before shooting in Master / Slave or Master / Master configuration for a Stereo / 3D production, make sure the Camera Slate (Reel No. and Cam ID) are set to the same value for both Master and Slave cameras. Then change the Cam Pos value from the system default of CENTER, to either LEFT or RIGHT to identify the "left eye" and "right eye" camera in the stereo pair.

The Reel No, Cam ID and Cam Pos can be set when formatting the media or after formatting by using the SET option. Refer to SECONDARY MENUS > MEDIA.



NOTE: *** are month xx + day xx + wildcard xx**

When Master is set to LEFT, Slave is set to RIGHT and both Cam IDs are A, the first clip recorded is:

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- **Master:** A001_L001_*****.R3D
- **Slave:** A001_R001_*****.R3D

If Master and Slave are both accidentally set to CENTER and both Cam IDs are different (Master = A / Slave = B), the first clip recorded is:

IMPORTANT: This position is NOT recommended when recording in Master / Slave configuration.

- **Master:** A001_C001_*****.R3D
- **Slave:** B001_C001_*****.R3D

If Master and Slave cameras are both accidentally set to CENTER and still share the same CAM ID, the first clip recorded on each camera will have the same general file structure, with the exception of the two wildcard characters, which provide full protection against file name duplication:

IMPORTANT: This position is NOT recommended when recording in Master / Slave configuration.

- **Master:** A001_C001_*****.R3D
- **Slave:** A001_C001_*****.R3D

CONNECTING CAMERAS

1. While still powered up, connect both cameras together using a Master/Slave GIG-E Cable P/N 790-0163 connected between the GIG-E connectors on the rear of the camera body.



2. Power down both cameras, then power back up. When properly connected, LAN will illuminate Green on the UI.
3. Connect a SYNC cable P/N 790-0154 to each camera and connect as desired to your 3rd party device.
 - Yellow connector is for Timecode.
 - Green connector is for Genlock.
 - White connector is multi-purpose (example: for remote trigger for start/stop recording).
4. Go to SETTINGS > SETUP > GPIO/SYNC > SYNC MODE and select GENLOCK.
5. Adjust camera project frame rate to match the attached 3rd party device.
6. When properly connected and synced, TC, GEN and SYNC will illuminate Green on the UI.

OPERATION

CHANGING SETTINGS

When changes are made to the Master camera settings, the Slave camera setting will also change, but not in real-time. For example, when you change the Frame Rate on the Master camera, you will not see the change on the Slave camera until you set the Master camera at the new Frame Rate.

Also when making changes to the Secondary menu settings, the Slave camera will not display those changes unless it effects items displayed on the main screen (example: when HDRx is enabled on the Master camera, HDR will change to HDRx on the Slave camera).

RECORDING

When the power/record button is pressed on the Master camera to start/stop recording, the Slave camera will also start/stop recording.

POWER DOWN

When the Master camera is powered down using the Secondary Menu > Power, the Slave camera will also power down.

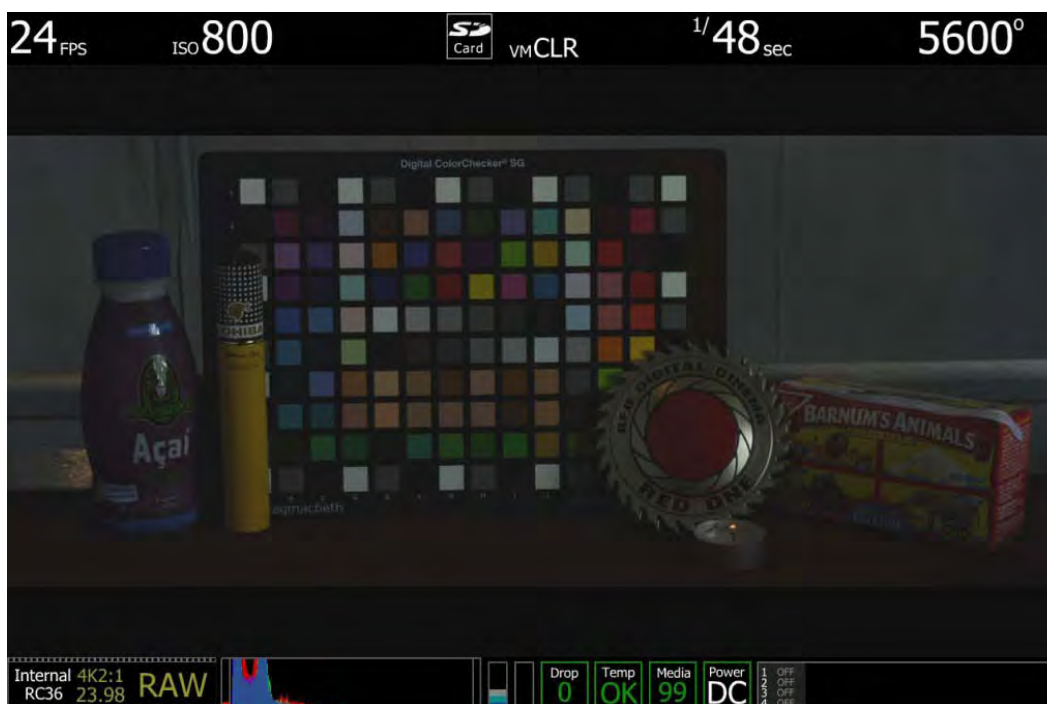
APPENDIX G: EXPOSURE – USING FALSE COLOR AND ISO

NOTE: The following section uses a RED ONE camera display to illustrate exposure tools; however, the same principles apply to EPIC camera systems.

RED EPIC provides several advanced exposure indication tools. In the following examples, we will show how these tools respond to a reference scene that is under-exposed, over-exposed and then correctly exposed. Each scene will have its unique characteristics so the “correct exposure” is a matter of judgment, balancing the desire to avoid clipping any highlights and also avoiding underexpose of elements in deep shadow – which may therefore be prone to noise when developed in post production.

The following reference scene includes highlight and shadow elements and was shot at ISO 800.

UNDEREXPOSURE (~ 2 STOPS)



ISO 800 - Monitor Output

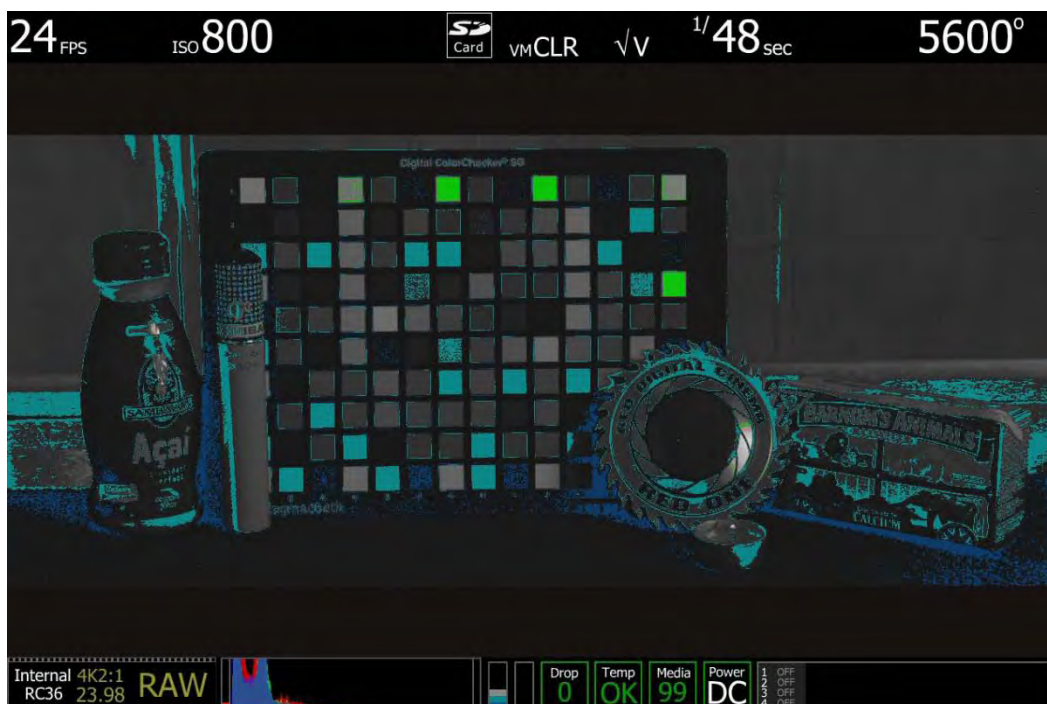
In the image above it is obvious the camera is under exposed. The initial clues are the monitor is very dark, and the histogram is justified to the left. Also note that red bar at the left edge of the histogram and the vertical color stack to the right of the histogram is only at grey. These indicators are saying a significant amount of the sensor’s RAW data is “in the noise” and that the peak level of the sensor’s RAW data is at a very low level – in fact less than halfway.

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ISO 800 - False Color: Exposure

Select False Color – Exposure: note the \sqrt{E} icon in the GUI when active. This mode allows us to visualize where in the image underexposure is taking place. These areas are indicated in purple. It is clear those areas are under the matchbox and coin, and between the bottle and cigar holder.



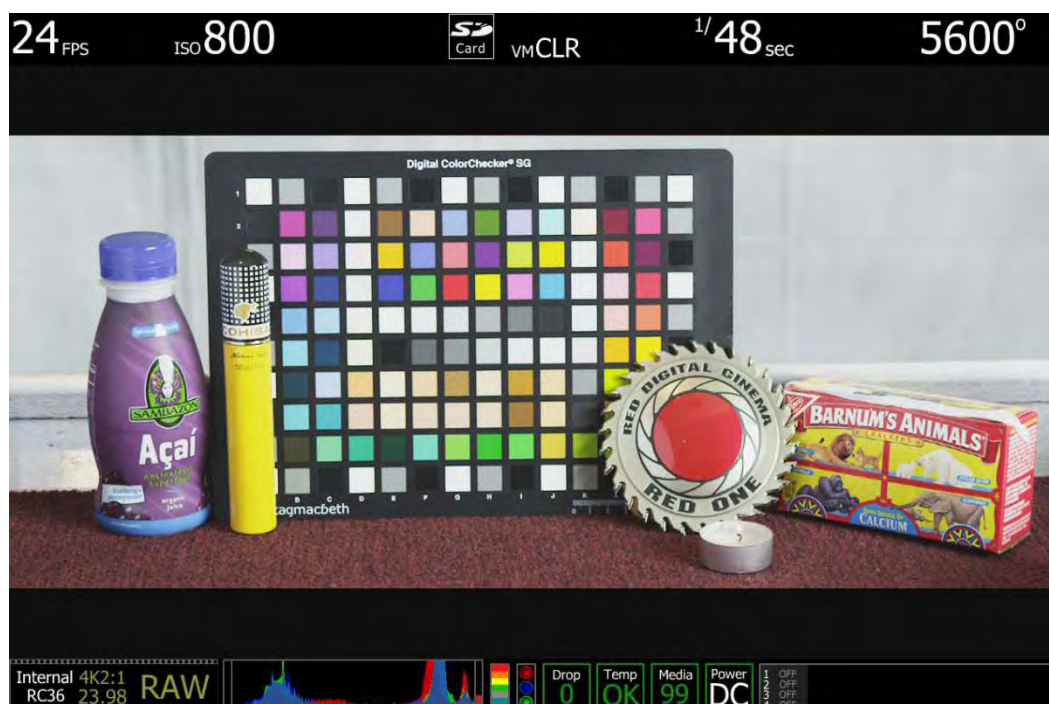
ISO 800 - False Color: Video

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Select False Color – Video: note the \sqrt{V} icon in the GUI when active. This mode allows us to check the RGB video levels of the scene. As the peak white chips on the test chart are showing up in green and the underexpose areas are showing up in dark blue, this says the monitor path video levels are only ranging between 44 IRE and 1 IRE.

Because the scene is under exposed, when the recorded .R3D file is color corrected in post-production, the scene's highlight information will certainly not be clipped, however the shadow information will probably display with significant noise once pushed to an acceptable brightness.

OVEREXPOSURE (~ 2 STOPS)



ISO 800 - Monitor Output

In the image above it is obvious the camera is over exposed. The monitor is very bright and the histogram is justified to the right. Note the red bar at the right edge of the histogram and the vertical color stack to the right of the histogram is showing red plus the three traffic lights to the right of that are all illuminated. These indicators are suggesting that a significant portion of the sensor's RAW data is "at clip", and this clipping is occurring on Red, Green and Blue channels.

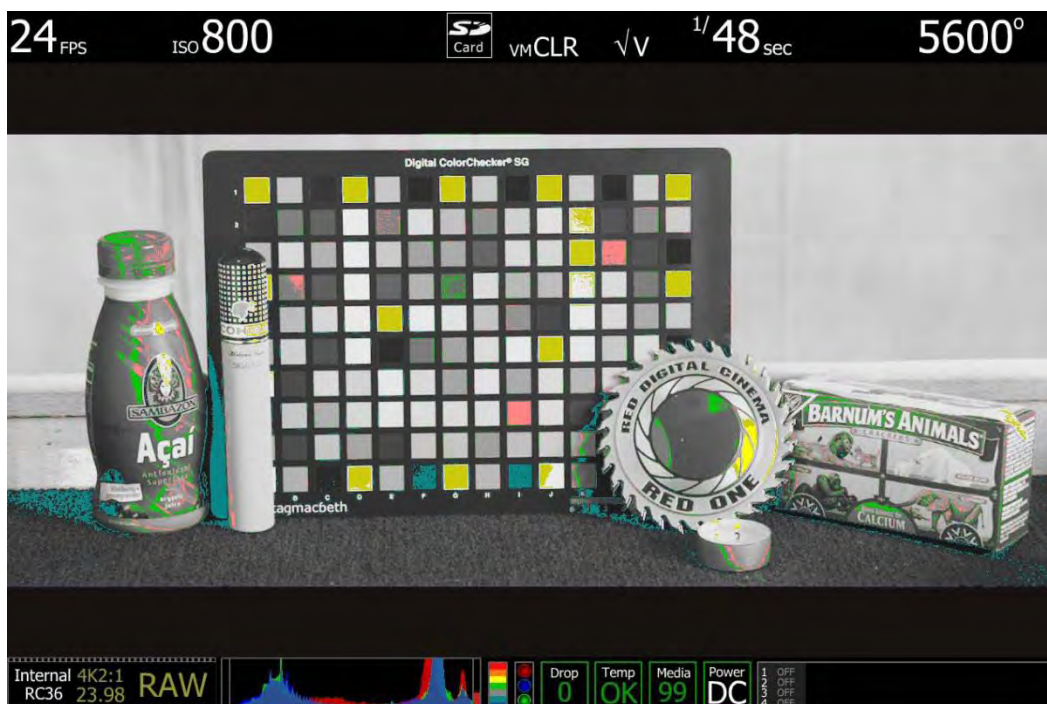
RED EPIC® OPERATION GUIDE



ISO 800 - False Color: Exposure

Select False Color – Exposure: note the \sqrt{E} icon in the GUI when active. This mode allows us to visualize where in the image over exposure is taking place. These areas are indicated in red. It is clear those areas are on the highlight on coin, and at the top right edge of the color chip test chart.

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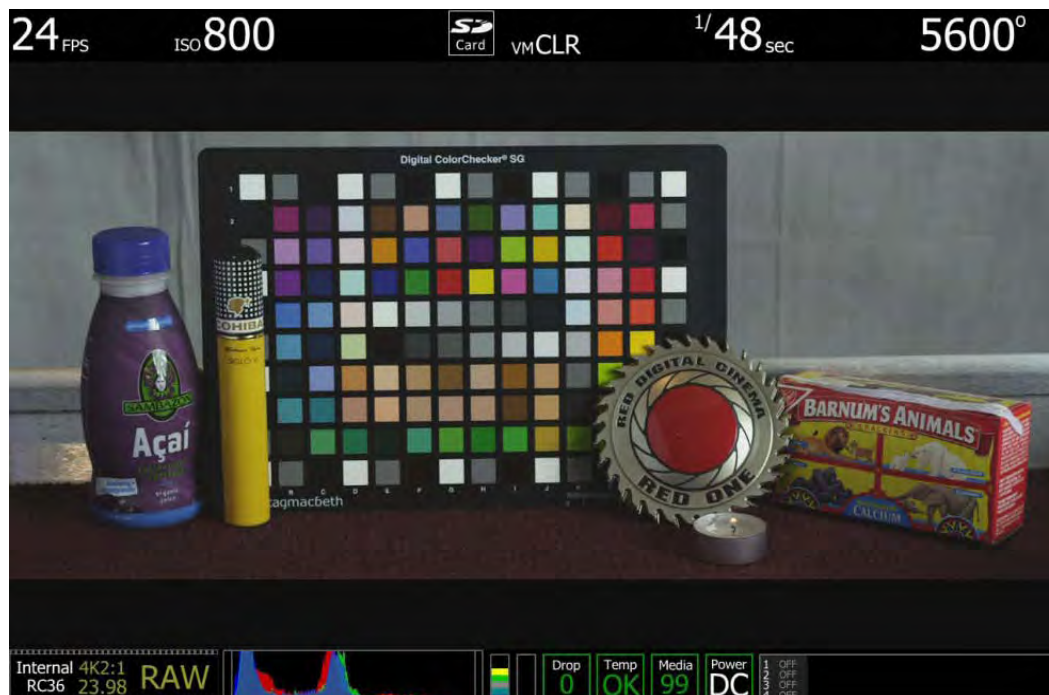


ISO 800 - False Color: Video

Select False Color – Video: note the \sqrt{V} icon in the GUI when active. This mode allows us to check the RGB video levels of the scene. As all the white chips on the test chart are Yellow, this suggests that a significant portion of the monitor path video is at the maximum legal 100 IRE value.

Because the scene is over exposed, when the recorded .R3D file is color corrected in post-production, the scene's highlight information will almost certainly be clipped, however the shadow information will probably display cleanly once pulled back down to an acceptable brightness.

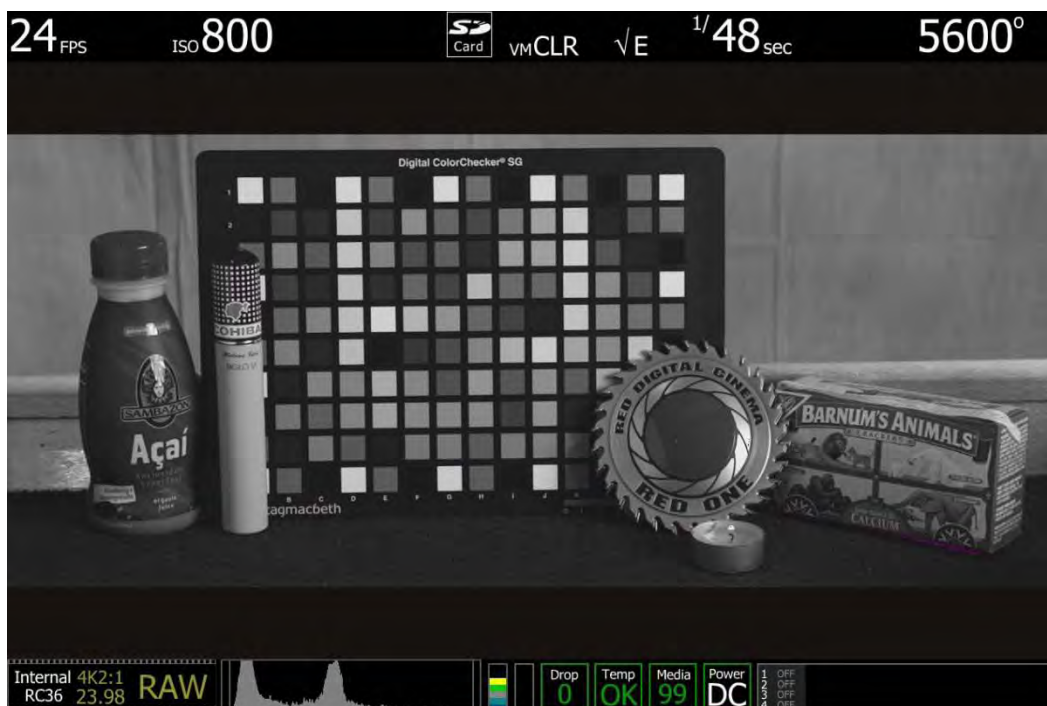
APPROPRIATE EXPOSURE



ISO 800 - Monitor Output

In this image, the camera is appropriately exposed for this scene. The monitor is neither very dark nor very bright and the histogram is spread evenly given that there are bright highlights on the coin we wish not to blow out. Note that there is no red bar on either the left or the right edges of the histogram and the vertical color stack to the right of the histogram is at yellow. These indicators suggest that there is no significant amount of the sensor's RAW data "in the noise" or "at clip", and that the peak level of the sensor's RAW data is about 2/3 stop below clipping.

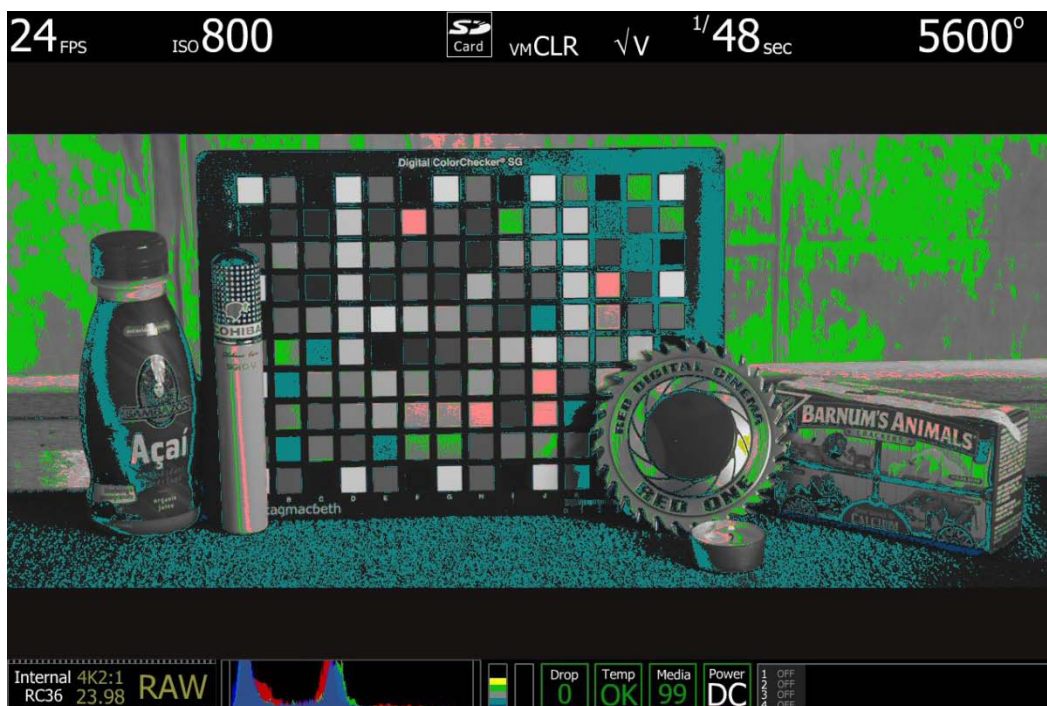
RED EPIC® OPERATION GUIDE



ISO 800 - False Color: Exposure

Select False Color – Exposure: note the \sqrt{E} icon in the GUI when active. This mode allows us to visualize where there is under exposure (purple) or over exposure (red) in the image. In this case, there is a very small area of purple under the cracker box, and just a suggestion of red on the highlight on the coin, which suggested that the sensor is appropriately exposed for this scene.

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ISO 800 - False Color: Video

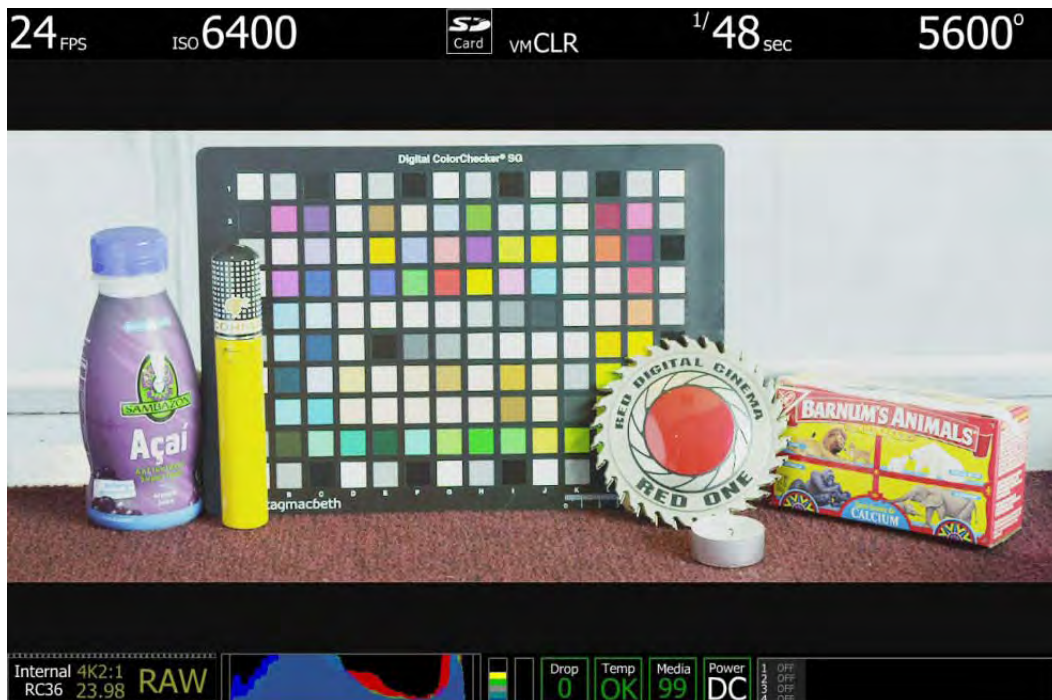
Select False Color – Video: note the \sqrt{V} icon in the GUI when active. This mode allows us to check the RGB video levels of the scene. The two green squares in the upper right corner of the color chart and green in the background indicate that the scene’s mid grey and skin tone elements, plus peak white and blacks are all at appropriate levels.

Because the scene was well exposed, when the recorded clip is color corrected in post-production, sufficient headroom exists for the scene’s highlight information to be displayed without clipping, and the shadow information can be displayed without significant noise, even if the brightness of the shadow information is pulled up.

ADJUSTING THE ISO RATING

In the following two examples, the image exposed at ISO 800 rating have had the ISO rating adjusted first to ISO 6400 and then to ISO 100.

NOTE: Although the image and Histogram both adjust to changes in the ISO rating, the sensor RAW meters do not change – they always indicate what is happening at the sensor level and hence where the image is truly in noise or at clipping.



ISO 6400 - No Exposure Adjustment

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ISO 100 - No Exposure Adjustment

In these extreme examples, it is clear that the RGB domain images are respectively very bright and very dark. The histogram data reflects that, however you can also see that the sensor RAW meters are unchanged. The exposure at the sensor at this point in time is the same. If you choose to close the iris to reduce the brightness of the first image you will be reducing exposure at the sensor – this biases exposure in favor of protecting the scene highlight. Alternatively, if you choose to open the iris to increase the brightness of the image of the second image you will be increasing exposure at the sensor – this biases exposure in favor of minimizing noise in the scene shadows.

The technique is similar in principle to re-rating a film stock. With practice, the ISO rating can be used as a tool to assist ideal exposure based on the dynamic range identified within the scene.

APPENDIX H: POST PRODUCTION

RED workflow is quite easy to understand, especially if you have experience with photographic RAW image processing, or shoot 16mm or 35mm film followed by a Telecine transfer to a non-linear video editor and on-line conform.

RAW data has a wide dynamic range and color space, so you can freely change the white balance of the footage, adjust exposure and alter highlight and shadow tonality in post-production.

The RED EPIC camera records RAW sensor data using wavelet based REDCODE RAW compression to REDMAG 1.8" SSD. The compressed RAW data is then transferred from the digital media to a Macintosh OSX or Windows XP workstation running REDCINE-X PRO post production software. These applications do not directly edit or conform the RAW data themselves, but prepare the RAW data for editing and conforming by RGB domain post-production software applications.

In film processing terms, REDCINE-X PRO act as an integrated film laboratory, telecine, and one light color corrector. They convert recorded REDCODE RAW data to RGB video, and provide basic one light image processing and color correction. Using REDCINE-X PRO footage can also be cropped, resized, or repositioned. These functions lessen the amount of time required for color correction or re-framing of shots after the final cut has been completed.

REDCINE-X PRO can also encode 4K or 2K RAW footage into a variety of uncompressed RGB and compressed 4:2:2 video formats. Provided the appropriate QuickTime codec's are available on the host computer workstation, compressed video choices include ProRes, DNxHD, DV100 and M-JPEG QuickTime movies at 1080p or 720p resolution. For film out, multi-media or special effects applications, REDCINE-X PRO may export a sequence of 2K or 4K image files in TIFF, Open EXR, DPX, JPEG, or Photoshop PSD file formats.

Creating 4:2:2 at 1080p or 720p resolution QuickTime movies provides compatibility with the majority of non-linear editing systems.

Depending on the QuickTime movie resolution, material may be taken directly to a broadcast delivery videotape format, or after the editorial decisions have been made, video can be conformed at full image resolution by replacing the lower resolution edit proxy (e.g. 720p at 8 bit quality) with a high resolution 4K, 2K or 1080p image file.

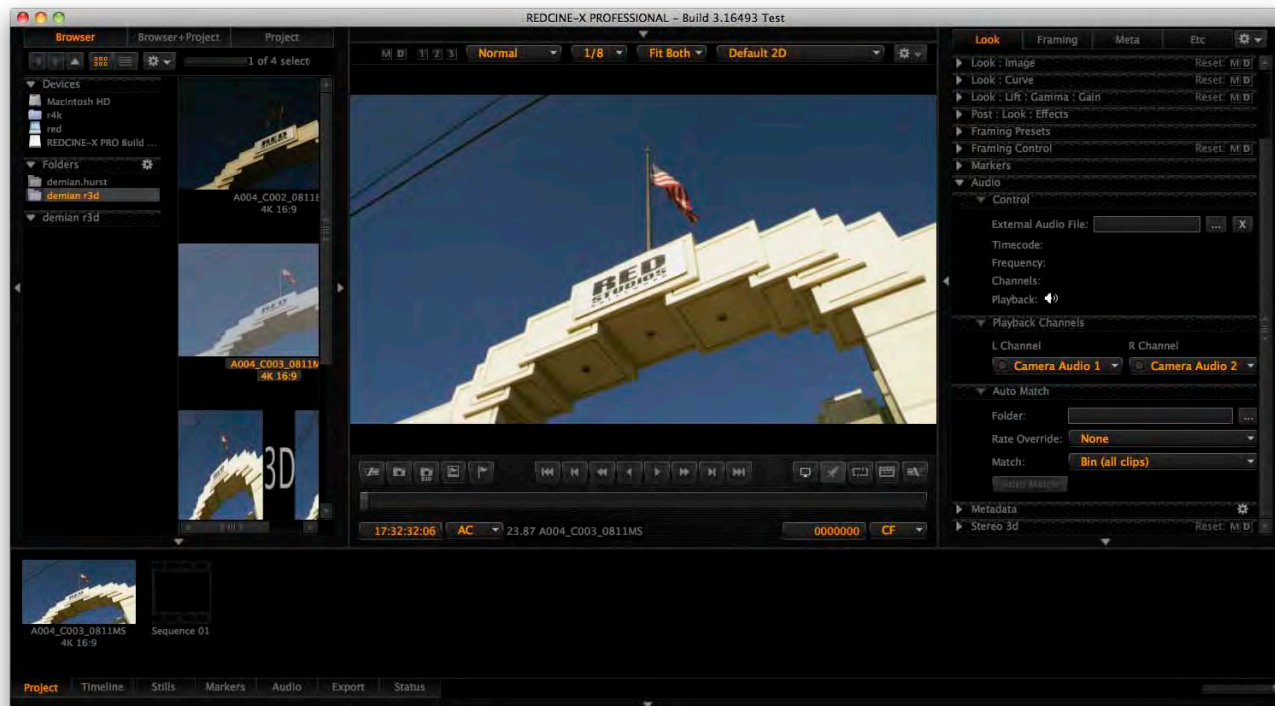
SOFTWARE TOOLS

RED Digital Cinema provides a variety of software tools to aid postproduction. For proper color rendition using a Macintosh OSX computer, your monitor should be set to Adobe 1998, or to SMPTE-C display profile. If you use the HD Cinema display profile, adjust the gamma to 2.2.

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REDCINE-X® PRO

REDCINE-X PRO is available for Intel based Mac OSX and Windows XP platforms. In addition to performing white balance and one light color correction, REDCINE-X PRO provides image pan/scan, crop and scaling operations. The application can export either a single clip, or a sequence of clips, as 4K or 2K resolution 10-bit DPX or 16-bit TIFF files. REDCINE-X PRO can also render clips into standalone QuickTime movies using specific HD video codecs. As RED EPIC shoots progressive scan images, all QuickTime movies created by REDCINE-X PRO are also progressive scan.



REDCINE-X PRO is available for download at <http://www.RED.com/support>. Included with the download is the REDCINE-X PRO Operation Guide to assist with understanding the tools available in REDCINE-X PRO.

APPENDIX I: MAINTENANCE

WARNING: DO NOT attempt to modify, dismantle or open your camera, lens or other accessory as doing so may expose you to electric shock and serious injury. There are no user-serviceable parts inside. Alteration or repairs made to the camera, lens or other accessory, except by a RED authorized service facility, will void the Limited Warranty.

CLEANING

WARNING: DO NOT rinse or immerse any element of the camera, lens or other accessory, keep them dry at all times.

WARNING: DO NOT use soaps, detergents, ammonia, acetone, alkaline cleaners, abrasive cleaning compounds, or solvents. These substances may damage lens coatings and electronic circuitry.

CAMERA AND ACCESSORY EXTERIOR SURFACES

Clean ONLY using a dry cloth. When cleaning your camera and accessories, remember that it is not waterproof and moisture can damage electronic circuitry.

BRAIN

SENSOR

Use Delkin Devices Digital Duster Kit (P/N DDSS-DUSTER2) or equivalent to clean sensor surface.

OPTICAL LOW-PASS FILTER (OLPF)

If equipped with an OLPF, use Delkin Devices Digital Duster Kit (P/N DDSS-DUSTER2) or equivalent to clean OLPF surface.

LCD SCREEN

Use Pancro Professional Lens Cleaner (P/N PANCROCLN) and Photographic Solutions Pac Pads (P/N 05011) or equivalent to clean the screen on Touchscreen and Non-Touchscreen LCDs.

EVF

Use Pancro Professional Lens Cleaner (P/N PANCROCLN) and Photographic Solutions Pac Pads (P/N 05011) or equivalent to clean the viewfinder lens. Ensure you spray the solution onto the pad and not directly onto the lens surface.

REDMOTE SCREEN

Use Pancro Professional Lens Cleaner (P/N PANCROCLN) and Photographic Solutions Pac Pads (P/N 05011) or equivalent to clean the screen on Touchscreen and Non-Touchscreen LCDs.

LENSES

Use Pancro Professional Lens Cleaner (P/N PANCROCLN) and Photographic Solutions Pac Pads (P/N 05011) or equivalent to clean the viewfinder lens. Ensure your spray the solution onto the pad and not directly onto the lens surface.

SIDE HANDLE LCD

Use Pancro Professional Lens Cleaner (P/N PANCROCLN) and Photographic Solutions Pac Pads (P/N 05011) or equivalent to clean the screen on the Side Handle LCD.

ELECTRICAL CONTACTS

This section under construction.

BACK FOCUS ADJUSTMENT

WARNING: THERE IS A SCREW-IN METAL PLUG INSTALLED IN THE CAMERA BODY COVERING THE BACK FOCUS SCREW. THIS PLUG MUST BE REMOVED BEFORE PERFORMING A BACK FOCUS ADJUSTMENT. TO REMOVE THE PLUG, USE A T-10 TORX DRIVER.

Back focus is adjusted by turning the back focus adjustment on the top of the camera's front plate using a T-10 Torx driver. This screw is indicated by a Siemens Star with an arrow pointing to its location.



Back Focus Adjustment Location

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1. Remove the screw-in plug located in the back focus adjustment opening using a T-10 Torx driver.
2. Place the camera on a level, stable surface or mount the camera on a tripod.
3. Install RED Focus to the camera PL mount.
 - A. Remove the camera lens or sensor cover if equipped.
 - B. Install RED Focus onto the camera in the position shown.
 - C. Ensure RED Focus is secured to the camera with the camera lock ring.



RED Focus Properly Installed on RED EPIC Camera

4. Power up the camera.
5. Power up RED Focus. Refer to POWER UP / DOWN.

NOTE: Remember that RED Focus will AUTOMATICALLY power down after 3 minutes. Press the Red button on the front to power back up.

6. Set the camera to Magnify. Go to SECONDARY MENUS > SETTINGS > DISPLAY > FALSE COLOR > MAGNIFY.

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NOTE: The “Focus” option located under **SECONDARY MENU > SETTINGS > DISPLAY > FALSE COLOR > FOCUS** can serve as a good double-check for proper focus during this procedure.



RED Focus Displayed Image on RED ONE Camera

7. Insert a T-10 Torx® screwdriver into the back focus adjustment screw. The screw is oriented at approximately 80° as shown.



Performing Back Focus Adjustment

8. Carefully and slowly, rotate the back focus adjustment screw to achieve optimum focus.
 - Turning CLOCKWISE moves the sensor forward.
 - Turning COUNTER-CLOCKWISE moves the sensor rearward.

NOTE: The center of the image will never be in perfect focus as the lines are less than 1/3 of a pixel in size.

9. The back focus adjustment mechanism is self-locking, and does not require a supplementary locking screw.
10. Install the screw-in plug in the back focus adjustment opening using a T-10 Torx driver.
11. This completes the RED EPIC back focus adjustment.

APPENDIX J: TROUBLESHOOTING

NO MEDIA ATTACHED

Displayed if media is not present or not formatted when pressing the record button. Connect media to camera if necessary. If media is already connected, format media and attempt to record again. Refer to APPENDIX B: MANAGING DIGITAL MEDIA for detailed information.



RECORDING HALTED: RECORD ERROR - SHUTDOWN

Displayed if media removed while recording. DO NOT remove media while camera is recording. Power down the camera, verify the media is inserted properly (inspect connectors for damage), power up and resume recording.



PRESET COULD NOT BE APPLIED

If the preset could not be applied, "Preset Could Not Be Applied" will appear to inform you. Power down camera, power back up and attempt to apply the preset that failed.



POWER SPIKE DETECTED – SHUTDOWN

If this message appears, power down the camera, power back up and continue camera operation. If error reoccurs, please file a support ticket at www.RED.com/support.

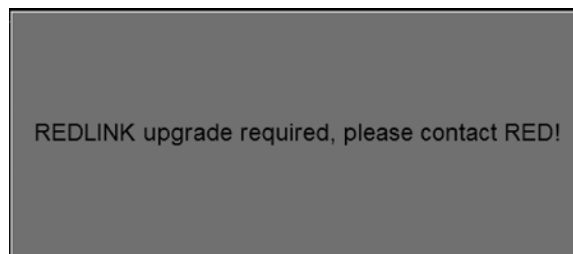


CAMERA CANNOT BE PAIRED TO REDMOTE

- Ensure REDmote display indicates IDLE before attempting to pair the camera to the REDmote.
- Ensure the REDmote is detached from the rear of the camera body and powered on.
- Ensure the REDmote wireless is turned on.
- Ensure camera does not display REDLINK Upgrade Required.

REDLINK UPGRADE REQUIRED

If after upgrading your EPIC to v1.7.xx and upgrading your REDmote to v1.0.13, your REDmote will not wirelessly connect to your EPIC and "REDLINK upgrade required, please contact RED!" is displayed on the camera, then your EPIC and REDmote may need to be sent back to RED for evaluation/updating. Please save a .LOG file and send to RED Technical Support to diagnose and confirm next steps.



NEW FAN AVAILABLE

If after upgrading your EPIC to v1.6.20 or higher series firmware, you receive a "New fan available, please contact RED" notification on the camera, please contact RED technical support for assistance.

Press OK to use your camera as normal - the message will appear each time the camera is powered up. Pressing OK, HIDE will hide the message when the camera is powered up, however, be mindful that until the fan is changed, the camera temperature should be monitored. If the fan is not replaced as RED recommends and the camera is damaged by overheating, the camera warranty will be voided.



Once the updated fan has been installed and the camera is powered up, the message will continue to appear. Press OK, then go to SECONDARY MENU > SETTINGS > MAINTENANCE > REDISCOVER and perform the rediscover procedure to clear the message.

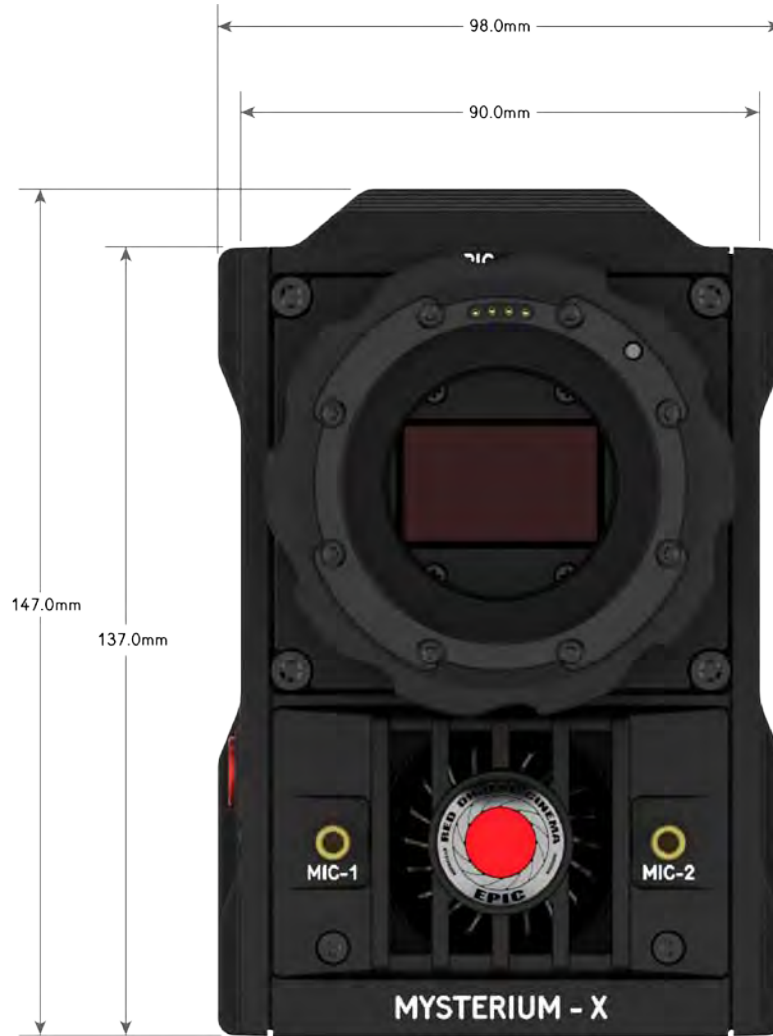
APPENDIX K: TECHNICAL DATA

TECHNICAL SPECIFICATIONS

| | |
|--|--|
| SENSOR | 14 MEGAPIXEL MYSTERIUM X |
| PIXEL ARRAY | 5120 (h) x 2700 (v) |
| S/N RATIO | 66db |
| DYNAMIC RANGE | 13.5 stops, up to 18 stops with HDRx |
| MAX IMAGE AREA | 5120 (h) x 2700 (v) |
| LENS COVERAGE | 27.7mm (h) x 14.6mm (v) x 31.4 mm (d) |
| DEPTH OF FIELD | Equivalent to S35mm (Motion) / APS-H (Still) lenses Equivalent to 16mm (Motion) lens in 2K RAW |
| ACQUISITION FORMATS | 5K RAW (Full Frame, 2:1, ANA, WS) 4K RAW (HD) 2K RAW (2.4:1) |
| PROJECT FRAME RATES | 23.98, 24, 25, 29.97, 47.96, 48, 50, 59.94 fps, all resolutions |
| DELIVERY FORMATS (FROM REDCINE-X) | 4K : DPX, TIFF, OpenEXR (RED RAY via optional encoder) 2K : DPX, TIFF, OpenEXR (RED RAY via optional encoder) 1080p RGB or 4:2:2, 720p 4:2:2 : Quicktime, JPEG Avid AAF, MXF. 1080p 4.2.0, 720p 4:2:0 : H.264, .MP4 |
| PROGRAM OUTPUT | HD-SDI Clean Feed 2K RGB, 1080p RGB or 4:2:2, 720p 4:2:2 SMPTE Timecode, HANC Metadata, 24-bit 48Khz Audio |
| MONITOR OUTPUT | HD-SDI and HDMI with Frame Guides and Look Around 2K RGB, 1080p RGB or 4:2:2, 720p RGB or 4:2:2 SMPTE Timecode, HANC Metadata, 24-bit 48Khz Audio |
| DIGITAL MEDIA | REDMAG 1.8" SSD Module: (64, 128, 256GB Media) |
| REDCODE | 12 and 16 bit RAW : Compression choices of 18:1 to 3:1 1-120 fps 5K, 4.5K 1-150 fps 4K 1-200 fps 3K 1-300 fps 2K |
| AUDIO | 2 channel, uncompressed, 24 bit, 48KHz. Optional 4 channel, and AES / EBU digital audio. |
| MONITORING OPTIONS | RED LCD 5" Touchscreen Display BOMB EVF High Definition Viewfinder |
| REMOTE CONTROL | REDmote, Wireless, Ethernet, RS232, GPI Trigger |
| WEIGHT | 4 lbs. Brain only |
| CONSTRUCTION | Aluminum Alloy |
| TEMPERATURE RANGES | Operating Range: 0 °C to +40°C (32°F to 104°F) Storage Range: -20°C to +50°C (-4°F to 122°F) |

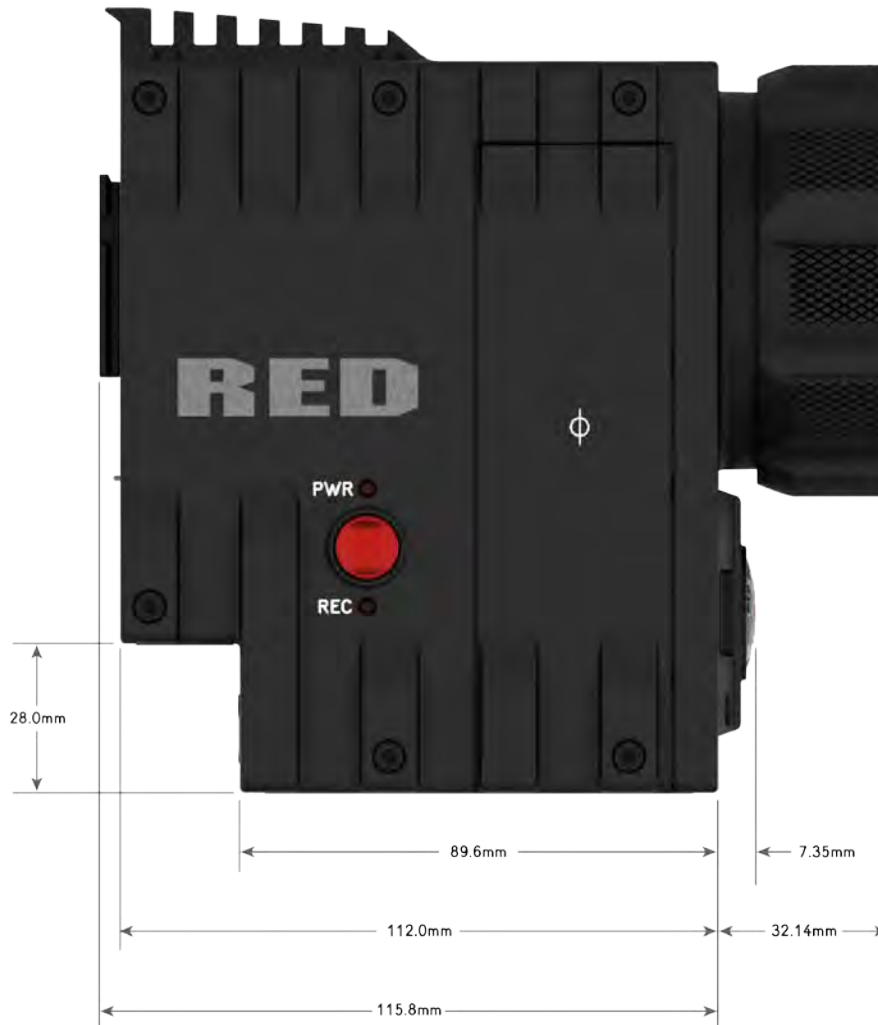
BRAIN DIMENSIONS

FRONT VIEW



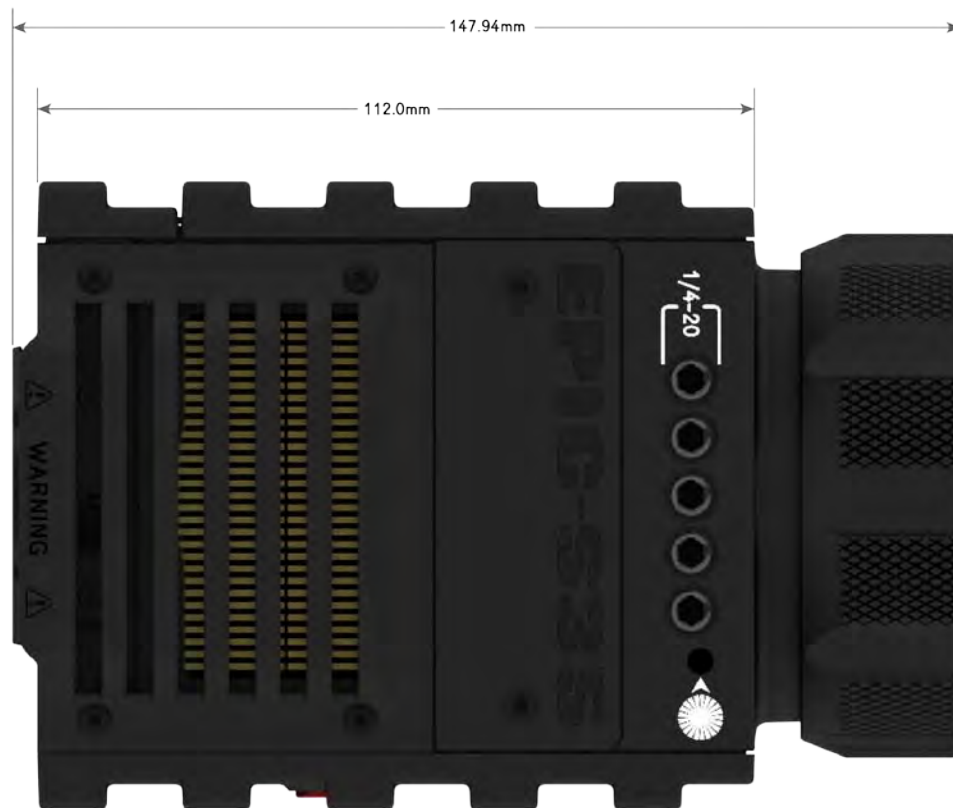
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SIDE VIEW

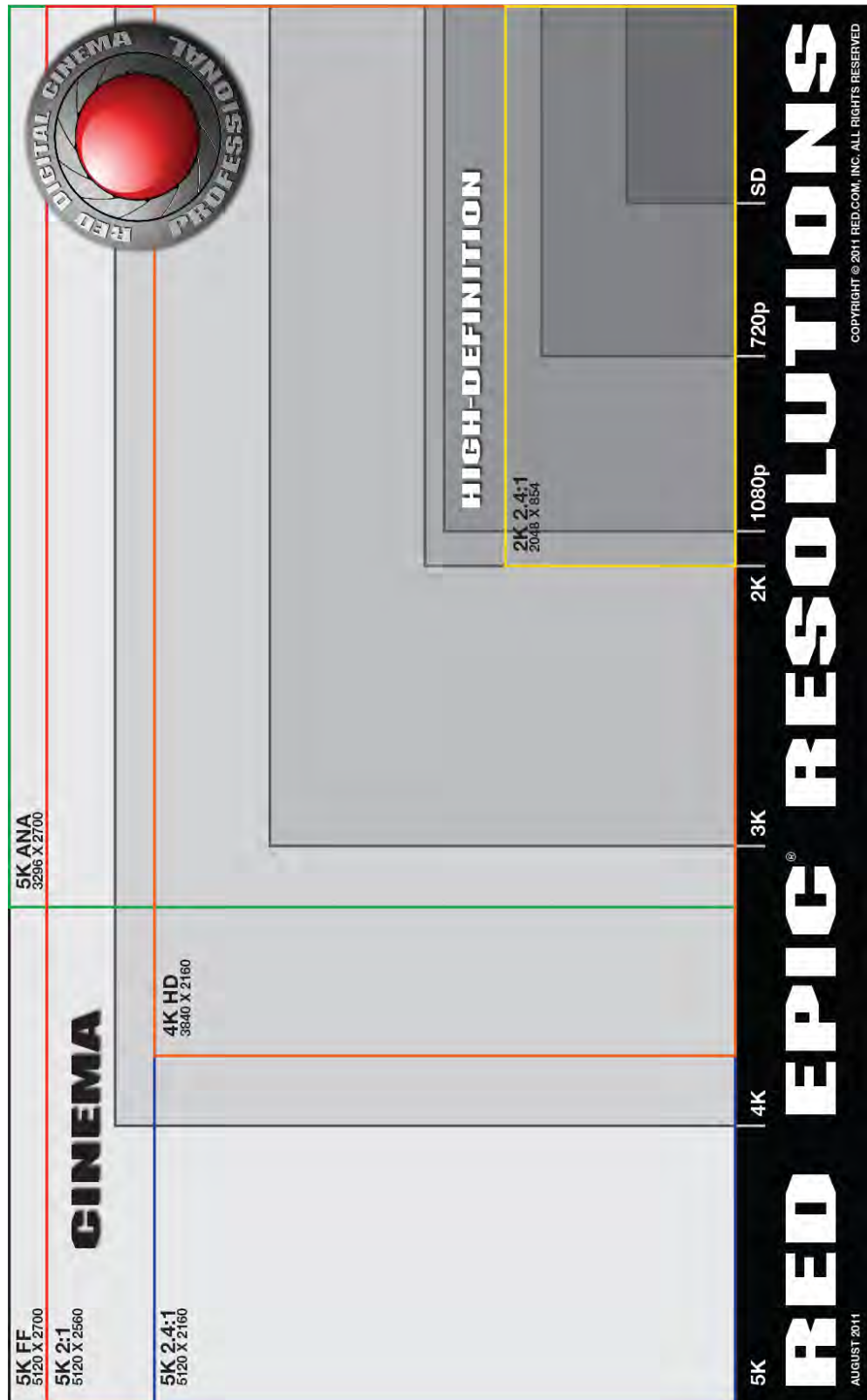


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TOP VIEW



APPENDIX L: RESOLUTION CHART



APPENDIX M: MENU MAPS