

RED ONE Digital Cinema Camera



Operations Guide

Firmware Build 9

(Version 1.5.0)

Sections:

1. Before You Start
 2. Camera Assembly
 3. Physical Controls
 4. Theory of Operation
 5. Basic Operation
 6. Sensor Menu Controls
 7. AV Menu Controls
 8. System Menu Controls
 9. Upgrading camera firmware
 10. Digital Media Management
- Appendix A: Post Production
- Appendix B: Power and Timecode I/O

1. Before you start.

Congratulations on your purchase of a RED ONE camera.

Carefully unpack the camera body and any accessories, and visit www.red.com/register to register ownership of your camera. Registration will help us assist you in providing camera ownership records to insurance and police authorities in the event of camera loss or theft.



RED ONE Digital Cinema Camera

The RED ONE camera ships as standard with a PL mount. To protect against dust and other contaminants entering the optical path, ensure that the lens cap is used at all times when a lens is not mounted on the camera. Additional mounts and adaptors are available for use with non-PL mount lenses. Please visit www.red.com/contactus for additional information.

Operational hints and information about specific camera applications can be found on our web site www.red.com/support at the on-line community www.reduser.net.

If you have a technical problem, or receive a camera damaged in shipment, please log on to our service web site at www.red.com/support or call +1.949.206.7900 for the support team.

A wide range of options and accessories are available to customize your RED ONE camera.

The Basic Production Pack includes a top bracket and top handle, a base plate that accepts 19mm rods; two 19mm rods, an adjustable grip handle, a combination shoulder pad/wedge plate adaptor, V mount battery plate, and a digital magazine cradle.



RED ONE camera body with Basic Production Package (lens and tripod not included)

The distance from the digital magazine cradle to the camera back may be adjusted to counter balance the weight of the lens. In addition the shoulder pad/wedge plate adaptor can slide against the base plate and be locked in position. The adaptor includes wedge plate mounting holes, so there is no need to remove this component between on-the-shoulder and tripod applications. Additional rods, brackets and grips may be added to the Basic Production Pack to configure the camera to a wide variety of studio and field production applications.

The RED ONE Power Pack includes two 140Wh batteries, RED CHARGER and an auxiliary power cable. When connected to a 120V/240V AC power source, the charger sequentially fast charges two batteries, or supplies the camera with 100W @13.8V regulated DC power.

2. Camera Assembly

The RED RAIL BASE PLATE, TOP BRACKET, and HANDLES are attached to the camera body using ¼ - 20 hex screws. A HEX driver is supplied with the camera. The rails and shoulder pad / wedge plate adapter slide into the base plate. The RED CRADLE, which holds a RED DRIVE and the V mount battery plate, attaches to the Universal Rail mount plate using a hex screw. This is mounted to the camera using 19mm rods.

If using RED-DRIVE, plate it into the RED-CRADLE and secure it with the four thumbscrews. Then connect the RED e-SATA cable to the RED-DRIVE and to the e-SATA input on the rear of the camera body. Connect the power cable from the battery plate adapter to the DC input on the rear of the camera body.

The RED-LCD and RED-EVF viewfinder are mounted to the camera body using a RED ARM. Attach the RED ARM to the camera body using the shorter threaded screw. There are attachment points on the camera body or on the RED RAIL TOP BRACKET. Attach the other threaded end of the arm to the RED-LCD or RED-EVF.

Then connect the cable from the camera body to the RED-LCD or RED-EVF. Carefully align the red dots on the socket and plug, and push firmly to establish contact.



The RED-LCD and RED-EVF cables are interchangeable; but the outputs are not. The RED-EVF should be connected to the upper output, a RED-LCD should be connected to the lower output.

Remove the lens cap and mount the PL lens you wish to use. The lens will have four metal tabs with cutouts for the registration pin in the mount. If using S4/i compatible lenses the data pins should be at the top of the lens.

Attach matte box and motors, and any auxiliary power cables required to power these items.

Insert the digital media, such as 8GB compact flash (CF) card, or connect a RED-DRIVE via the e-SATA cable.



Compact Flash Module

Attach a RED-BRICK 140 battery, or connect to a RED-CHARGER via the supplied power cable.

Next adjust the balance of the camera. The RED CRADLE/Universal Rail mount unit slides on 19mm rods so you can adjust the distance between the RED CRADLE and camera back. Find the position that best offsets the weight of the lens. Tighten the butterfly locks to maintain that position.

The shoulder pad/wedge plate adaptor is also designed to slide within the RED RAIL base plate until you lock it in place. You don't need to remove it to mount the camera on a tripod.

Press the On/Off switch to power the camera. The rear status display will illuminate, and after 45 - 60 seconds it will display the camera PIN, firmware build and firmware version number.

The P.I.N: is a unique product identification code in the format ABC_123_XYZ. This code is included in the metadata recorded with each image. The PIN provides tracking data for customer service and assistance in authenticating legal ownership of the camera.

When the camera is ready for use, the lower LED to the right of the status display turns green.

3. Physical Controls

This section describes the physical controls on the RED ONE camera body.



A. PL Lens Mount

B. Record

C. User Keys

A PL mount is provided as standard with the RED ONE camera. The mount is compatible with the majority of S35mm, 35mm and S16mm cinematography lenses; and with B4 lenses via the optional B4 to PL converter. The PL mount includes an S4/i interface, which permits the camera to communicate with S4/i equipped lenses from RED Digital Cinema, Cooke Optics, Ltd and other lens manufacturers supporting the S4/i protocols.

On the left side of the camera body are three additional User Keys. The red key defaults to RECORD start/stop, and the two smaller keys enable AUTO WB and FOCUS check functions.

An SD Memory card slot is provided below this group of keys, and may be used for camera setup storage and software upgrades. A 512MB SD card is provided with the camera.



A Headphone	B Dual Link HD-SDI (A)	C Dual Link HD-SDI (B)
D HDMI Out	E Preview HD-SDI	F Video Genlock
G USB-2 (peripheral)	H USB-2 (computer)	I Audio Monitor
J Timecode	K Audio Ch 1- 4	L RED-EVF
M RED-LCD	N Aux / RS232	

The right side of the camera contains all the video, audio and time code inputs and outputs.

From top left to bottom right, these comprise a 3.5mm stereo headphone jack, and four DIN 1.0/2.3 video connectors that support dual link HD-SDI, Preview HD-SDI and Video Genlock.

To the right, HDMI a USB-2 type A port for USB peripherals, and a USB-2 type B port to link the camera to a computer, 5-pin mini-XLR stereo audio output and a 5-pin LEMO time code input and output. Four three-pin mini-XLR audio inputs are in the next group. Finally there are three LEMO connectors that provide video and power for the RED-EVF and RED-LCD, and an Aux/RS232 port that can interface to a variety of lens motors or controllers.

A DIN 1.0 / 2.3 to BNC video adaptor cable is provided with the camera.



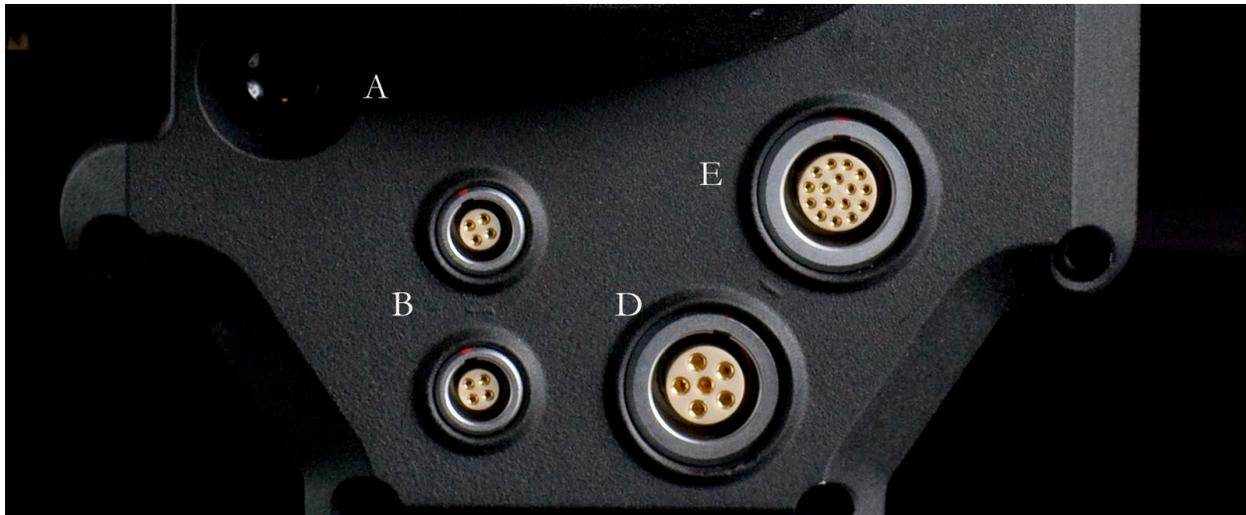
- | | | |
|-----------------------|-------------------|----------------------|
| A User Menu A. B. C | B Status Display | C Tally & Ready Lamp |
| D Sensor Menu Key | E EXIT Key | F UNDO key |
| G Record Start / Stop | H Joystick | I A/V Menu Key |
| | J System Menu Key | |

On the rear of the camera, several buttons surround a daylight readable status display.

The five buttons above the display are used for Clip playback control. From left to right the keys are Clip Start / Previous Clip, Play Reverse, Play/Stop, Fast Fwd and Clip End / Next Clip.

To the left of the status display are three Quick Menu buttons, which directly access Exposure, Shutter Speed and Color Temp (White Balance) menus. Below the status display are seven buttons, Sensor Menu, Exit, AV Menu, the Joystick, Undo, System menu, and RECORD start/stop.

The status display reports key camera status values, and is complimented by two LED's: the red LED provides a record tally, the green LED indicates the camera is ready for operation.



- A Power On/Off switch B Aux Power
C Aux Power D 11.5 - 17V D.C Input
E e-SATA Interface (to RED-DRIVE or RED-RAM magazine)

Underneath the camera menus key group are the power on/off switch, the 6 pin DC power input, a custom e-SATA data (REDCODE RAW) port and two Auxiliary Power outputs that provide battery loop through power outputs.

The e-SATA interface is used to connect local digital media such as RED-DRIVE and RED-RAM. The two auxiliary power outputs can supply up to 1.5 amps of unregulated 11.5 – 17V DC power each to power accessories such as range finders or compact lens motors.

To power the camera up from a RED BRICK battery, press the power on/off switch once.

To power the camera up from a RED-CHARGER, connect it via the supplied power cable. Plug the RED-CHARGER into an AC power source and switch it on. After the green LED illuminates on the RED-CHARGER, the camera can be powered on by pressing its On/Off switch.

Note: You must wait 5 seconds after the cameras green status LED goes off before attempting to power it back on again. If you do not wait, there may be no response. If there is still no response after waiting 10 seconds, disconnect the power input cable, reattach it, and try again.

4. Theory of Operation

The RED ONE Digital Cinema camera provides high performance digital imaging over a wide range of frame rates and optical formats including Super 35mm, 35mm and Super16mm. The camera is supplied as standard with a PL mount, and may be configured with 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 S35/35mm format PL mount prime and zoom lenses are available from RED Digital Cinema.

Other lens mounts, including Canon FD, and Nikon F will be available from RED and 3rd parties, permitting the use of Nikkor and Canon photographic lenses. To use these mounts the PL mount must be removed. This should be done in a dust-free environment, as the camera's optical path will be exposed to the elements.

A B4 mount to PL mount adaptor is also available to permit use of 2/3" HD lenses on the RED ONE camera. The optical coverage is provided is equivalent to S16 mm. Hence, the maximum recording resolution with these lenses will be 2K RAW.

Mysterium™ Sensor

The Mysterium™ sensor has been specifically designed for use with the RED ONE camera, and provides variable frame rate imaging over 1- 60fps (1-120fps in 2K windowed mode).

Mysterium is color balanced for 5,000 degrees Kelvin, but may be electronically compensated for operation at any color temperature in the range 1,700 to 10,000 Kelvin. White Balance presets at 3200K and 5600K are available for Tungsten and Daylight lighting.

Mysterium includes an integrated 12bit resolution analog to digital converter for each pixel, and is capable of delivering up to 66dB dynamic range (11 stops) when operating at the default Exposure Index of 320 ASA.

Image Processing

The data received from the Mysterium sensor is formatted as unprocessed 12 bit RAW data, (pixel defect corrected but not color processed) a technique common to digital photography. RAW data may be recorded in-camera using wavelet based compression (REDCODE RAW) to compact flash, hard disk drive or flash drive media.

The RAW output data of the sensor is also converted to white balanced RGB 4:4:4 monitor video that conforms to the SMPTE/EBU REC709 color gamut. It may be lightly color processed to illustrate a "look", and feeds the RED-EVF, RED-LCD, HD-SDI and HDMI outputs.

Monitoring Outputs

The RED ONE camera supports a variety of monitoring options.

RED-EVF: 1280 x 848 resolution RGB 4:4:4 progressive video display with Surround View, frame guides and safe action / title overlays, zebra and false color exposure overlays, waveforms, camera status and operation menus.

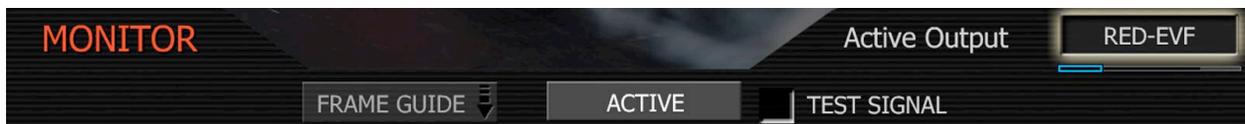
RED-LCD: 1024 x 600 resolution RGB 4:4:4 progressive video display with Surround View, frame guides and safe action / title overlays, zebra and false color exposure overlays, waveforms, camera status and operation menus.

PREVIEW: 1280 x 720 resolution 4:2:2 video output (720p@50.00/59.94/60.00Hz) with Surround View, frame guides and safe action / title overlays on the HDMI and HD-SDI ports.

HDMI: 1280 x 848 resolution 4:2:2 video output with Surround View, frame guides and safe action / title overlays, waveforms, camera status and operation menus on the HDMI port. This output signal should be compatible with most SXGA or higher resolution computer monitors*.

Note: Only one monitor output can be active at this time. PREVIEW is the default selection. To activate RED-EVF, RED-LCD or HDMI, you will need to select that monitor output as follows -

Press the SYSTEM menu key, and then push the joystick right to highlight MONITOR.



Press the joystick in, and then push the joystick to the right to highlight ACTIVE

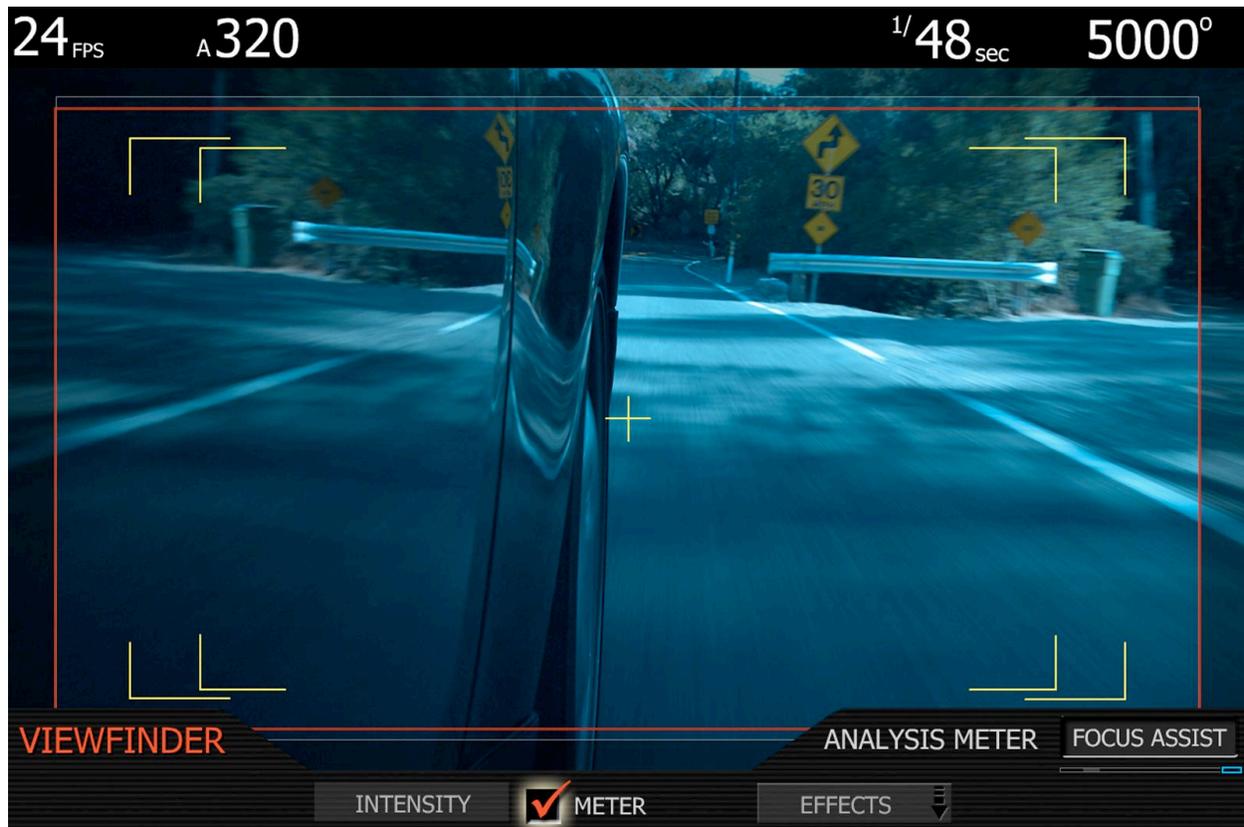
Rotate the joystick to select RED-EVF, RED-LCD or HDMI as the new active monitor output.

Press the EXIT key to return to the main camera menu. The monitor setting will be held in camera memory. Once it is set it will not need to be re-set when power cycling the camera.

*Note: RED has tested Dell 1708FP (1280 x 1024) and the LG L206W (1680 x 1050) PC monitors with an HDMI to DVI adaptor cable. You should test for PC monitor compatibility.

RED-LCD and RED-EVF

The optional RED-LCD and RED-EVF are specialized video monitors that may be attached to the camera body, and provide a variety of tools to assist framing, focus and exposure.



- Surround View, which is an additional visible area outside the actual recorded image.
- Frame guidelines show common film presentation and television formats such as 2.40:1 and 1.85:1, picture center, and/or television aspect ratios such as 16:9, 14:9 and 4:3.
- Focus is aided by the high resolution of the displays and FOCUS check, a 2x image magnify function, complimented by a selectable waveform based focus assist meter.
- Exposure is assisted by zebras, false color and a selection of exposure meters.

System information including instantaneous frame rate, exposure index, shutter speed, color temperature, recording format, clip name, timecode, battery and media remaining is provided in the LCD/EVF monitor outputs, and the rear status display on the camera back. For applications when a RED-LCD or RED-EVF are not desired – for example when working on a crane – the Surround View video, frame guides and camera information are also available on the Preview HD-SDI output, for remote camera monitoring up to 200 ft away.

Digital Magazines

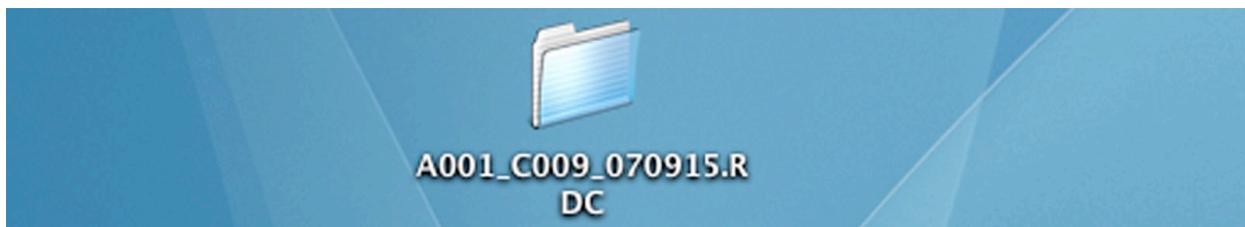
REDCODE RAW compressed video, time code and other metadata, may be recorded to on-board or attached digital media devices including -

RED FLASH CF – An internal reader/writer that utilizes high speed Compact Flash media.

RED-DRIVE – A hard disk memory based Digital Magazine of up to 320GB capacity.

RED-RAM – A solid-state flash memory based Digital Magazine of up to 64GB capacity.

Either type of Digital Magazine may be connected to a computer via FireWire or USB-2. Each clip is recorded with a unique clip name and placed in a clip folder like this -



Record Indication

On record, the RED ONE camera provides a variety of record tallies. Timecode, normally displayed in white colored text, will turn red, and a small red dot will appear in the top left corner of the monitor. The upper LED to the right of the status display screen will turn red, and if using an EVF, the front LED will also turn red.

If media is not present, the camera will provide a warning as follows – RECORDING ERROR NO_DIGIMAG. If this warning is displayed, check the physical mounting of the CF card, or that the RED-DRIVE is attached to the e-SATA port using the supplied 16 pin LEMO cable.

Metadata

RED-ONE cameras record Metadata, which is data that describes the precise characteristics of the picture and sound data captured in each frame of footage. This may include camera specific setup information, project and clip management information, Edge code, Time code, date and location, lens settings, and video and audio processing information.

Post Production

Compressed REDCODE RAW images may be post processed using RED ALERT! or REDCINE applications. These applications convert RAW sensor data to RGB video, and correct white balance, exposure, tonal response and color timing. The processed footage may then be exported to a variety of industry standard file formats for use in postproduction.

File Naming Conventions

As each recording is made, the RED ONE camera calculates a Clip Number, starting at clip 001 for each new piece of digital media. The Clip Number and Slate data are combined to create the Clip Name identifying each recording. In a similar manner, any time digital media is formatted by the camera, a unique camera ID letter and Reel Number are assigned to that media. This allows each clip to be uniquely identified, even operating in a multi-camera shoot.

e.g. for each clip, a Clip Name is created using the structure: A001_C001_070828.RDC

Where A = camera A, 001 = reel 001, C001 = clip 001, 07 = 2007 and 0828 = Aug 28.

Three cameras identified as A, B and C can therefore have individually recognizable clips

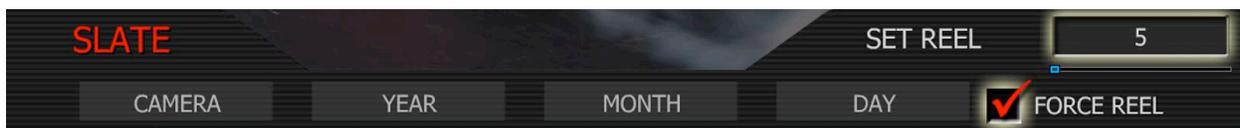
A001_C001_070828.RDC B001_C001_070828.RDC and C001_C001_070828.RDC

A single camera identified as A can have individually recognizable reel numbers, such as

A001_C001_070828.RDC, A002_C001_070828.RDC, and A003_C001_070828.RDC

Under normal operation, the reel number continues to increment each time a new piece of digital media is mounted by the camera; up to a maximum value of 999. However the reel number may be manually reset to 001 or other value, for example at the start of each day.

A001_C001_070829.RDC and then force to 1 for A001_C001_070830.RDC



Using the same technique, virtual reels can also be created on a single piece of digital media.

A001_C023_070828.RDC and then force to 5 for A005_C024_070829.RDC

Timecode

As each recording is made, the RED ONE camera records two independent timecode tracks.

Edge Code is a SMPTE timecode track that always starts at 1.00.00.00 on the first frame of each piece of digital media. It is a sequential code that is continuous from frame to frame and also between clips. Edge Code is also equivalent to RUN RECORD on a video camcorder.

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

When in VariSpeed recording mode, both timecode counters update at the same frame rate as the recording. This ensures that valid SMPTE timecode is created without count jumps that would affect clip playback or editing. If using an external timecode source with Jam Sync enabled, the clip's master time reference point is the first frame of the recorded clip.

Power consumption

The camera draws approximately 60 watts in a typical configuration. A RED BRICK 140Wh battery will run the camera and typical accessories for about 90 minutes. The camera is normally cooled by passive convection from the camera body, assisted as required by a fan.

When using the RED CHARGER, recharge time for a single RED BRICK battery is 200 minutes. The battery can also be partially charged, to approximately 80% capacity, in 120 minutes.

Charge times may be significantly longer on other V lock compatible battery chargers.

Operating the camera from the RED-CHARGER.

Plug the RED-CHARGER into an AC power source between (120 - 240V). Plug one end of the supplied 6 pin power cable into the Aux power output of the RED CHARGER and the other end into the D.C power input of the camera. Now turn on the RED-CHARGER.

When the LED above the charger's Aux power output turns green, you can turn on the camera.

Note: The maximum sustainable power load of the RED-CHARGER is 100W @13.8V. The output of the charger 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 RED-CHARGER and repeat the above procedure.

5. Basic Operation

This section describes the basic controls of the RED-ONE camera and how to initiate a project.

Control System and Status Display

Command inputs to the camera are made from the rear status display and associated buttons.

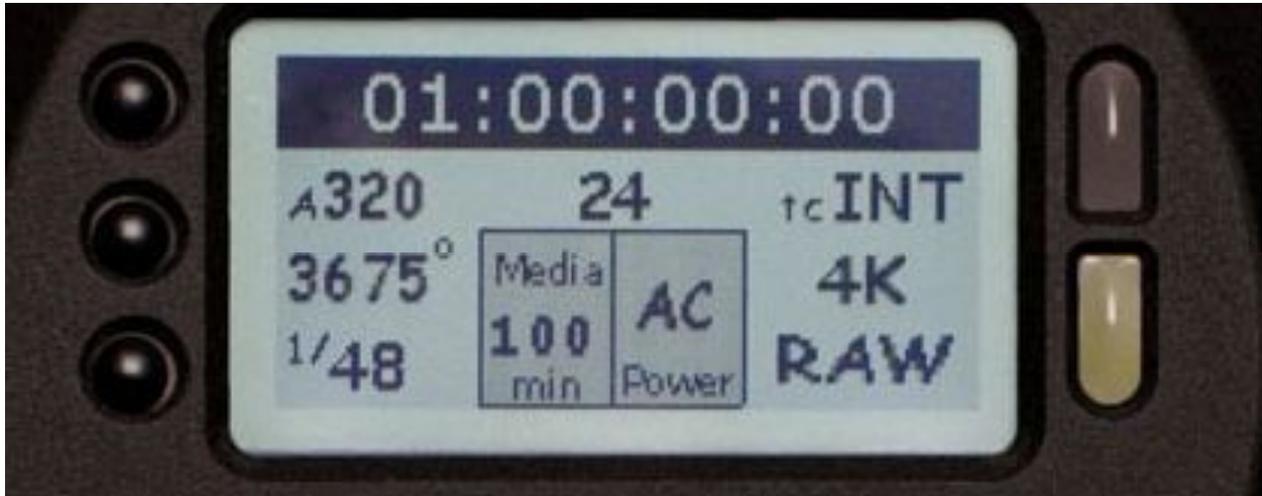


- A - Quick Access Access to Exposure, White Balance and Shutter Speed
- B - Menu Access Access to Sensor, A/V and System menus
- C - Menu Control Menu Off and Undo keys
- D - Joystick The joystick is a multi-axis controller to navigate the camera menus.
- E - Record Record Stop / Start key

The five buttons above the display are used for Clip playback control. From left to right the keys are Clip Start / Previous Clip, Play Reverse, Play/Stop, Fast Fwd and Clip End / Next Clip.

Status Display

The status display mounted at the rear of the RED ONE camera provides a snapshot of the camera setup. The elements include –



Timecode / Status	reports current timecode value, clip name or system messages*
ASA Value	reports current exposure index
Project Frame Rate	report the project frame rate, 23.98 fps in this example
Timecode	reports timecode lock status
White Balance	reports current color temperature
Media	reports remaining media capacity in %
Battery	reports remaining battery capacity or connection to AC power
Shutter Speed	reports current exposure time
Format	reports video recording format, 4K 2:1 in this example

* The timecode value reported may be Edge Code or Time Code as selected by the user.

Setting up a project.

Before recording, the camera must be instructed to follow a Project Frame Rate and a Record Resolution. These values are set in the PROJECT sub menu located in the SYSTEM menu.

1. Press the SYSTEM menu key, then the PROJECT key. This highlights the PROJECT sub-menu



2. Push the joystick right, then press to enter the CONFIGURE menu to set the FRAME RATE.



- FRAME RATE Choose between 23.98, 24.00 and 25.00 fps Project Frame Rates.
(2K recordings also support 29.97 and 30.00 fps Project Frame Rates)

Note: only one Project Frame Rate may be used on a single piece of digital media. Setting a Project Frame rate establishes the timebase to be used for playback, editing and timecodes.

3. After selecting the frame rate select the recording RESOLUTION.

- RESOLUTION Choose 4K, 4K 2:1 (35mm) or 2K (S16mm/B4) Capture Resolution.

4. After selecting the resolution, press the joystick, then push the joystick up to return to the CONFIGURE menu. Then Push the joystick left, then press to enter the SLATE menu.



- CAMERA Select a letter between A – Z. The default is camera letter is A.
- REEL Select a number between 1 and 999. The default reel number is 1.
- YEAR / MONTH / DATE Not usually reset and maintained in battery backed up memory.

After making and adjustments to the SLATE menu, press the EXIT key to exit the menus.

Recording

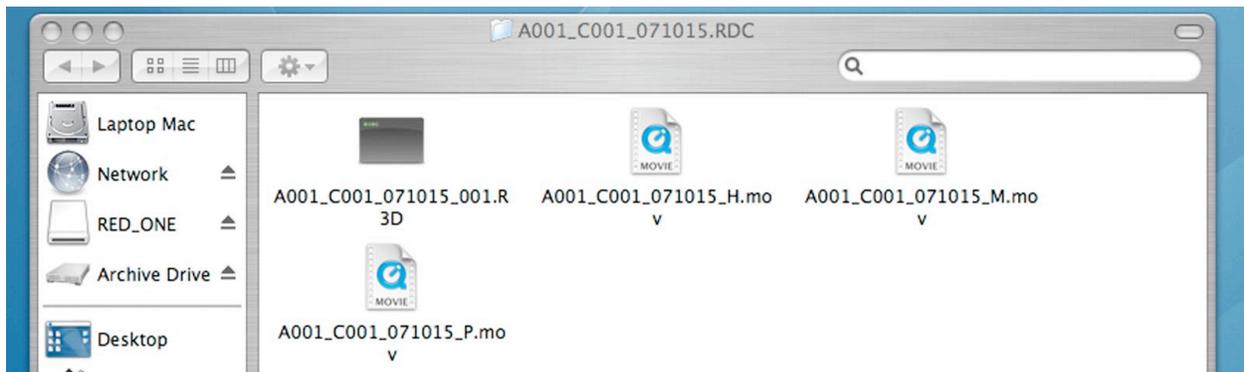
Check that you have a RED-DRIVE attached, or Compact Flash card inserted in the camera.

To initiate a recording, press either RECORD button. Press once to begin recording and again to stop recording. The camera will automatically create a file name for every clip recorded on the digital magazine or media.

REDCODE RAW recordings store the Color Temperature and Exposure (ASA) values you enter as metadata. This metadata is used to color balance the viewfinder and other monitor outputs. It is also used in REDALERT! as the initial White Balance point – change it if you wish – when you process the RAW footage. Timecode generated by the camera is Non Drop Frame (NDF).

Digital media 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 on another digital media, such as data tape or a hard disk drive.

Each clip is recorded to the digital media in a separate folder and with a unique clip name. To copy the clip from the digital media to a Macintosh or Windows computer, just drag and drop its folder to the computer's storage device. If you open the Clip folder, it will look like this –



There will be one or more REDCODE RAW data files (.R3D) containing RAW sensor data, plus audio and metadata, and three QuickTime reference movies, which allows a QuickTime Player to display the recorded RAW data at _H high, _M medium or _P proxy resolutions.

Double click on either of the QuickTime reference movies to see a preview of the .R3D file.

Playback frame rate will depend on the processor speed of your computer. If the frame rate is too low, select a smaller QuickTime movie. Typically the preview resolution will be the best choice for a battery powered laptop computer or older tower configuration model.

To operate with QuickTime on Macintosh OSX, you must install the supplied RED QuickTime component. Note: QuickTime for Windows is not supported at this time.

Playback

Playback of recorded clips is available on-camera using the Transport Control Keys.



The **I>** key is used to enter PLAYBACK mode, and to initiate playback of the last recorded Clip. After completing the recording, press it once to enter Playback mode, and a second time to start playback. Once in clip playback, this key acts as a Play/Pause toggle.

The **>>** key permits the Clip to be played back at higher speeds. Each press of this key cycles clip playback between 2 x, 8 x and 32 x speed playback.

The **<<** key permits the Clip to be played back in reverse. Each press of this key cycles clip playback between - 1 x, - 2 x and - 8 x speed playback.

The **!<** key cues the Clip to its Start Frame. If already at the Start Frame, pressing this key again will cue to the Start Frame of the previous clip recorded on the digital media, if one exists.

The **>I** key cues to the Start Frame of the next clip on the digital media if one exists.

It is necessary to exit Playback mode prior to making the next recording. To do so, press the EXIT key, located to the left of the joystick.

Note: When in Playback the timecode displayed in the monitor path mode is Time of Day.

Note: When in playback, all cursors are disabled. The full screen width is used to display the recorded signal. If monitoring with PREVIEW selected, the 1280 x 720 pixel image will be filled by a representation of your 4K or 2K recording, scaled, and with pull down added to conform to a standard 720p 59.94Hz HD video signal. Using HD-SDI or HDMI this image may be recorded or displayed by a variety of image capture cards, videotape recorders or displays.

Note: At this time there is no embedded SMPTE timecode available from the HD-SDI outputs.

Monitoring.

RED-LCD and RED-EVF monitors are factory preset digital displays. There are no saturation, peaking or contrast adjustments as found on analog monitors for correct color reproduction.

All monitor outputs on the RED ONE camera provide REC 709 standard color and gamma. Image intensity can be adjusted to compensate for ambient lighting conditions. For the RED-LCD, use the Up / Down keys on top of the display. For RED-EVF use the rotary encoder.

To assist with exposure, the RED-EVF and RED-LCD can display either a dual Zebra pattern or a False Color exposure meter overlaid on the video.

RED-LCD Controls.

The top of the RED-LCD provides two round and two triangular keys. The key on the left is for power On/Off. Press and hold for two seconds to activate.

The two center keys are used to increase or decrease backlight intensity.

The button on the right is used to toggle video from the RED-EVF to the RED-LCD if both are attached to the camera at the same time.

RED-EVF Controls



The focus ring on the viewfinder may be adjusted for optimal subject focus for your eye. The available diopter range is +1.5 to -2.0.

The User Key closest to the focus ring is used to select the Focus mode. This mode magnifies the center region of the camera's subject area by a factor of 2.

The upper center User Key is used to enable / disable COLOR TOOLS (monochrome or false color), the lower center User Key is used to enable /disable METERS (waveform displays for exposure, focus)

The large rotary switch is used to switch video from the RED-LCD to the RED-EVF if both are attached to the camera at the same time. Press and hold for two seconds for this function.

The rotary switch may also be used to adjust the viewfinder backlight intensity. Push the switch once to activate or deactivate this function. Rotation clockwise decreases the display intensity, counterclockwise increases the display intensity.

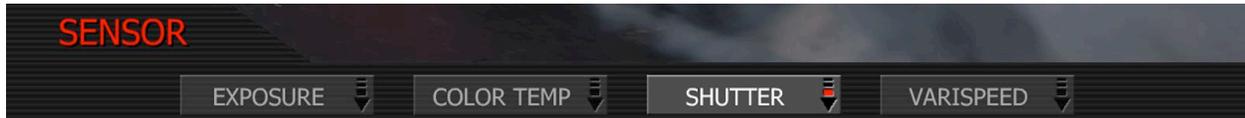
Using external HD-SDI or HDMI monitors.

To aid external monitor alignment, the RED-ONE camera provides a range of test signals including SMPTE BARS, Luminance and Chrominance Ramps, and a Chip Chart. Note that the test signal cannot be recorded; it is provided to align external video recorders or monitors connected to the camera via the HD-SDI or HDMI ports.

Consult your monitors Operations Manual for instructions on video monitor alignment.

6. SENSOR MENU Controls

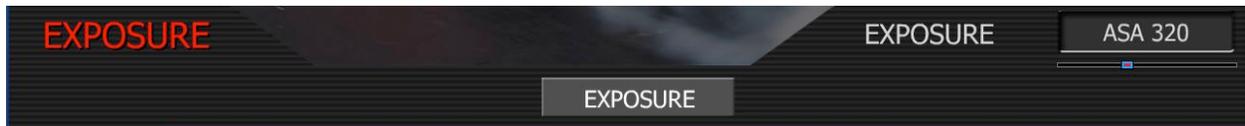
This section describes how to set sensor specific menu parameters such as Exposure, Shutter Speed, Color Temperature and Varispeed. Press the SENSOR menu key located to the bottom left of the status display or a direct access key on the left of the status display.



Note: When recording RAW, Exposure and Color Temperature values are stored as meta-data for use in REDCODE RAW compatible NLE and image processing applications.

The Exposure and Color Temperature values only modify the RED-LCD, RED-EVF, Preview HD-SDI and HDMI monitor outputs. They do not affect the recorded REDCODE RAW video data.

Exposure



Exposure Index: adjusts the camera's operating sensitivity. The default exposure index is ASA 320, adjustable in 1/3rd stop increments from ASA 100 to ASA 2000. If the exposure index is adjusted, camera metadata logs the change and the monitor path reacts accordingly.

Color Temperature



Color Temperature: adjusts the purity of white reproduction of the RGB monitoring paths at different Color Temperatures of ambient light. Factory default is 5,000 degrees Kelvin.

Preset values are available for Tungsten (3,200K) and Daylight (5,600K). The operator may also manually set any other Color Temperature in the range 1,700 to 10,000 degrees Kelvin.

The Automatic White Balance function allows the camera to calculate a Color Temperature that will render a white object as white. AWB mode analyzes the central 25% of the image visible in the monitor. To use Auto WB, place a white or gray object under the ambient light,

select the Auto WB parameter and then press the Joystick once. If AWB has been assigned, via USER KEY menu selection, you may also press User B key on the camera side panel.

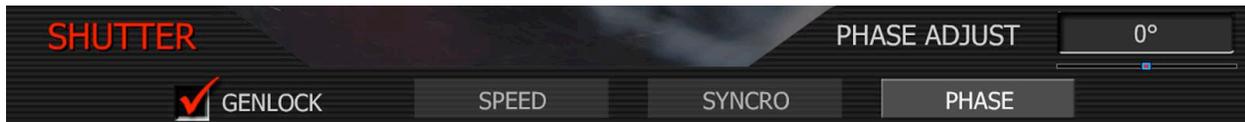
Tint



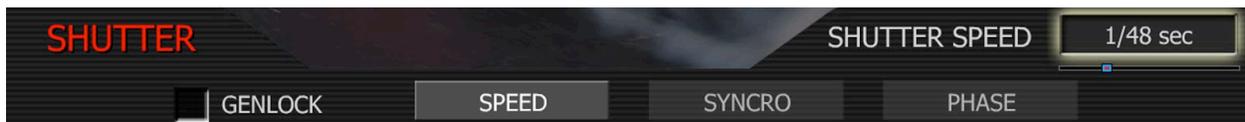
Color Temperature calculations assume a pure light source that may not be true in the specific scene the camera is imaging. To compensate for any residual color cast, the TINT parameter can adjust the RGB color balance with a compensating Magenta - Green color component.

Shutter Menu

Adjusts the exposure time of each frame captured by the Mysterium sensor. The exposure time is currently programmed via a series of preset Shutter Speeds encompassing all the common shutter angles available on a camera operating at a nominal 24 or 25 fps.



Genlock. permits Shutter Phase (scan start time) to be referenced to an external Tri-Level Sync genlock signal. For 3D and multi-camera applications this permits the precise scan timing and phase relationship of two or more cameras to be matched.



Shutter Speed

Shutter Speed values are absolute and independent of the frame rate. As Shutter Speed decreases, more light falls on the sensor, increasing exposure and motion blur on any objects moving within the frame. As the Shutter Speed increases less light falls on the sensor each frame, decreasing exposure and motion blur on any objects moving within the frame.

Speed: Exposure times presets include: 1/24, 1/25, 1/30, 1/32, 1/33, 1/40, 1/48, 1/50, 1/60, 1/96, 1/100, 1/120, 1/125, 1/192, 1/200, 1/250, 1/384, 1/400, 1/500, 1/696, 1/800, 1/1,000, 1/1,200, 1/2,000th sec.

When operating at 23.98 or 24.00fps, these equal common shutter angles of

1/32nd	270 deg	1/96	90
1/48	180	1/192	45
1/60	144	1/384	22.5

Syncro: permits any of the above described preset shutter speeds to be adjusted by +/- 250 microsecond in 5 microsecond increments, to permits fine tuning of the exposure time period*

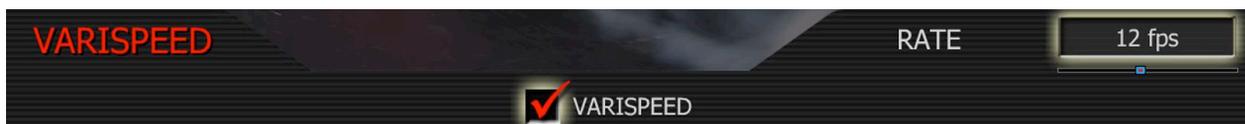
Phase: provides a programmable delay from the start of the frame. The scan may be advanced or retarded relative to the nominal start of frame time by - 45 to + 45 degrees adjustable in 5 degree increments*

Note: Syncro and Phase may be used to establish precise shutter exposure time and phase, useful when shooting objects with cyclical motion such as cars (wheels) or computer monitors.

VariSpeed

VariSpeed menus support Variable Frame Rate recording at speeds faster or slower than the Project Frame Rate. VariSpeed recordings are initiated by pressing the Record key.

When in VariSpeed, the camera retains the last exposure time selected before entering this mode unless the requested frame rate requires a shorter exposure time. This ensures a constant exposure level is maintained between capture sequence.



VariSpeed: This checkbox is used to enable the VariSpeed commands.

Rate: enables the user to choose any single frame rate. The minimum frame rate is 1 fps, maximum frame rate is 25 fps for 4K resolution recordings and 75 fps for 2K resolution.

When in VariSpeed the fps indicator turns yellow to indicate operation in an off-speed mode.



7. VIDEO MENU Controls

This section describes monitor path parameters such as viewfinder, and RGB color and gains. These parameters are accessed from the VIDEO menu access key.



Press Video to access the Video sub menu

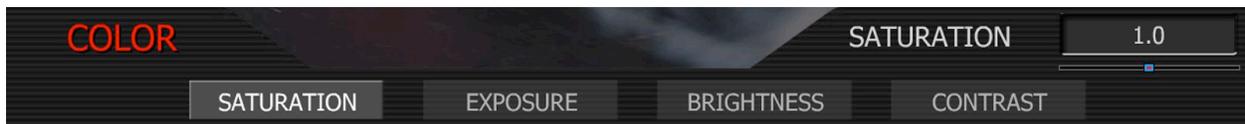
Video Menu



Note: The RGB Color and Gain values used by the monitor path are stored as metadata for use in REDCODE RAW compatible NLE and image processing applications. They can be used to visualize a specific color “look” but they do not affect the REDCODE RAW data recorded.

Color sub menu:

The Color sub-menu selects various image processing parameters that may be applied to the monitor path. They do not affect the actual REDCODE RAW data being recorded.



Saturation: adjusts color saturation. Range is 0.0 (monochrome) to + 2.0 (super color)

Exposure: adjusts image exposure. Available exposure range is ASA 100 to ASA 2000

Brightness: adjusts brightness without crushing highlights. Available range is - 10 to + 10

Contrast: adjusts the overall contrast of the image. Range is -1.0 (flat) to +1.0 (max contrast)

Gain sub-menu

The Gain sub-menu selects various image processing parameters that may be applied to the monitor path. They do not affect the actual REDCODE RAW data being recorded.



Red Gain: adjusts the gain of the RED channel only. Range is 0.0 (no Red) to +4.0

Blue Gain: adjusts the gain of the BLUE channel only. Range is 0.0 (no Blue) to +4.0

Green Gain: adjusts the gain of the GREEN channel only. Range is 0.0 (no Green) to +4.0

Viewfinder Menu

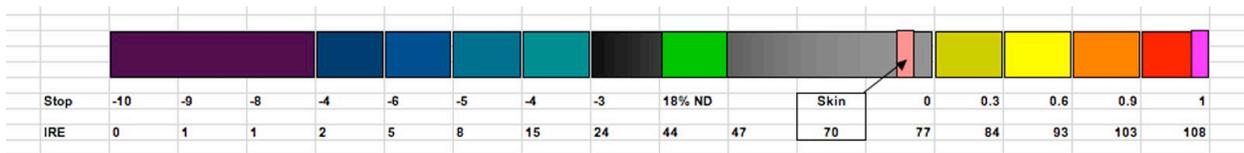


This menu permits the operator to adjust operation of the viewfinder.

Color: When checked, forces the RED-EVF and RED-LCD outputs to monochrome or a false color exposure assist. In Monochrome, the chroma component of the image is removed.

In False Color the chroma component of the image is replaced by an overlay of colored bands representing the exposure levels with the image. Bluer colors represent underexposed areas, green is 18% ND, yellow and red colors represent more exposed areas.

This chart illustrates the color mapping relative to stops of exposure and 0 - 108 IRE values.

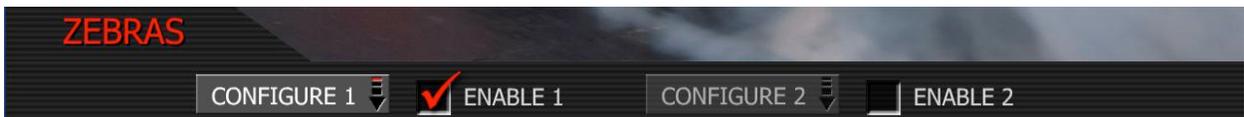


Note the green and pink bars that allow quick exposure setup for 18% ND and skin tones.

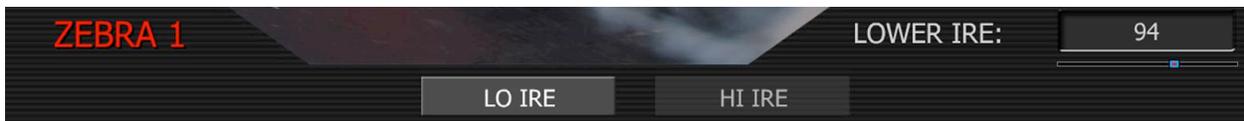


Meter: allows the operator to choose a signal analysis waveform. Selections include Exposure Waveform, RGB Parade Histogram, Focus Assist and Spot Light Meter.

Zebras: To adjust Zebras, highlight the ZEBRA label, then push the joystick.



Zebras: enables and adjusts 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.



Zebra 1 default settings are for highlight indication with LOW IRE at 90 and HI IRE at 108.

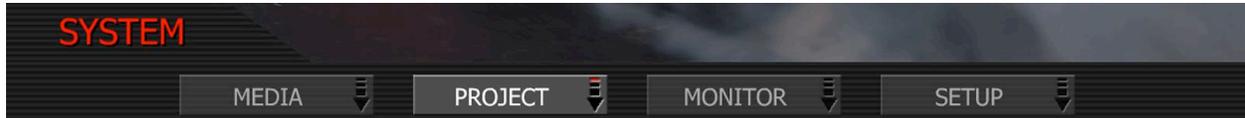
Zebra 2 default settings are for 18% gray indication with LOW IRE at 44 and HI IRE at 47.

To use Zebra 2 as a shadow exposure indicator, set Zebra 2 LOW IRE to 0 and HI IRE to 5. This corresponds to Dark and Medium Blue in the False Color Meter

Areas of the image exposed within these ranges will be indicated by crosshatched overlays. Zebra 1 crosshatch pattern is oriented NW/SE and Zebra 2 is oriented NE/SW. If the Zebra ranges overlap, Zebra 1 has display priority.

9. System Menu Controls

This section describes the various controls available to configure the camera. These parameters are accessed from the SYSTEM menu key, located below and left of the RECORD button.



Media Menu

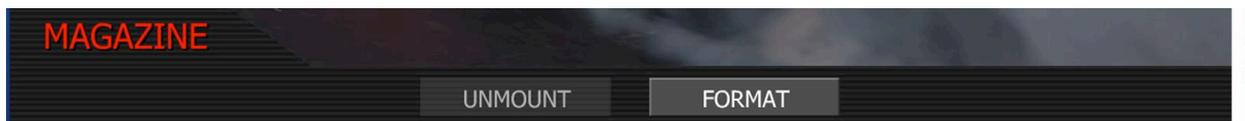
This menu provides access to media formatting and other aspects of media management.



The only active tab at this time is Magazine. Press to enter the Magazine menu.

Magazine Menu

This menu provides various media management functions including digital media formatting.

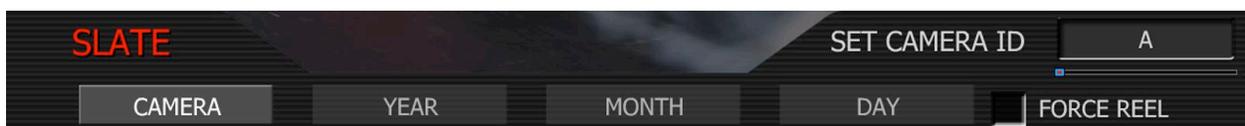


Unmount: select to un-mount digital media from the RED ONE camera in a failsafe manner. The camera operating system will ensure that all files are closed, hard disk heads (if present) are parked, log files written and CF card or RED-DRIVE magazine is properly powered down.

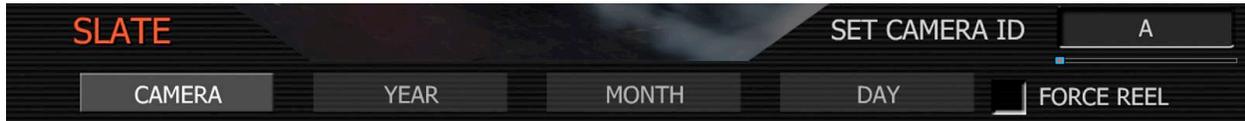
Format: select to format digital media. The camera will warn that "all data will be erased", and formatting require that a sequence of confirm commands are made before proceeding.

Project Menu

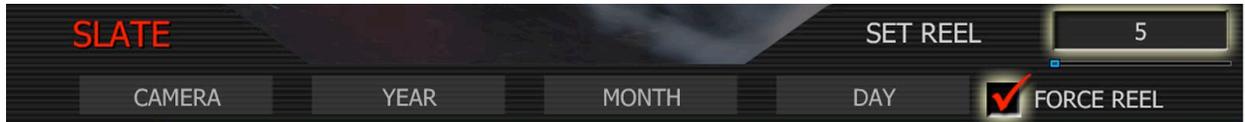
The project menu sets the operating parameters the camera uses for a given project.



Slate lets the operator identify the camera and starting reel number for the project, so clips recorded on the digital media may be easily identified in post-production.



Camera: is a single letter (A-Z), that provides a unique identifier for the camera in a multi-camera production environment. The default camera identifier is A.



Force Reel: is a number from 1 – 999. Each time a new CF card or RED-DRIVE is mounted to the RED ONE camera, this number is automatically incremented. Default is 1.

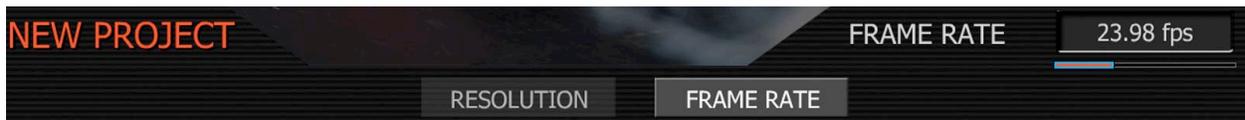
Year, Month, Day: values may be manually entered if not available from another source.

When you push record, the camera names the clip being recorded on the digital media. The format of the clip name is Camera Identifier + Reel Number + Clip Number + Year + Month + Day. For example the clip name might be –

A001_C001_070828.RDC

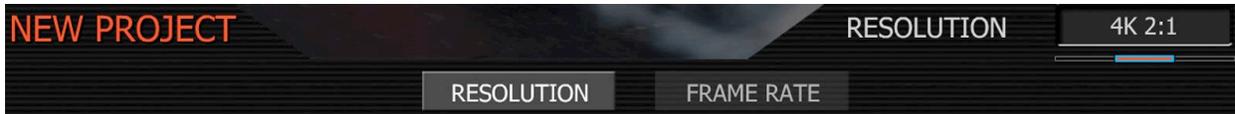
Where: A = camera A, 001 = reel 001, C001 = clip 001, 07 = 2007 and 0828 = Aug 28.

Configure: defines the operation of the camera in a project.



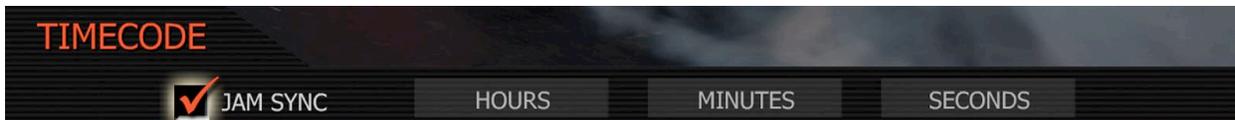
Frame Rate: Choose 23.98, 24.00, 25.00, 29.97 or 30.00 fps as the Project Frame Rate.

Note: A project can only support one Project Frame Rate as this defines the frame rate to be used for timecode and for clip playback. It is also the primary frame rate for acquisition, but variable speed (overcrank and undercrank) recordings can be made above and below this base frame rate. On playback these recordings will be displayed at the Project Frame Rate.

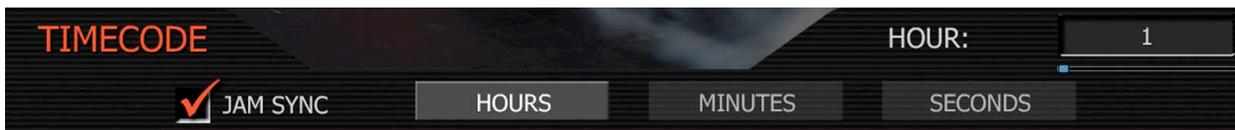


Resolution. Choose 4K, 4K 2:1 (35mm) or 2K (S16mm/B4) capture Resolution.

Timecode: select to change displayed timecode track, force Jam sync or reset camera clock.



Jam Sync: instructs the camera to replace its internal Time of Day value with external timecode read from the 5 pin LEMO connector. This value is updated at the first frame of each recording, provided a valid external timecode source is present. If the external source is not present, the camera auto-increments the timecode until the external source is re-connected.



Hours, Minutes, Seconds: permits the camera's Time of Day clock to be updated, for example when moving to a different time zone. The time of day clock does not need to be reset after each power cycle, however following an extended period of storage, the camera's data backup battery may be exhausted, which will require this value to be reset.

As each recording is made, the RED ONE camera records two independent timecode tracks.

Edge Code is a SMPTE compatible timecode track that always starts at 1.00.00.00 on the first frame of each piece of digital media. It is a sequential code that is continuous from frame to frame and also between clips. Edge Code can be considered as equivalent to RUN RECORD on a video camcorder.

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

When in VariSpeed recording mode, both timecode counters update at the same frame rate as the recording. This ensures that valid SMPTE timecode is created without count jumps that would affect clip playback or editing. If using an external timecode source with Jam Sync enabled, the clip's master time reference point is the first frame of the recorded clip.

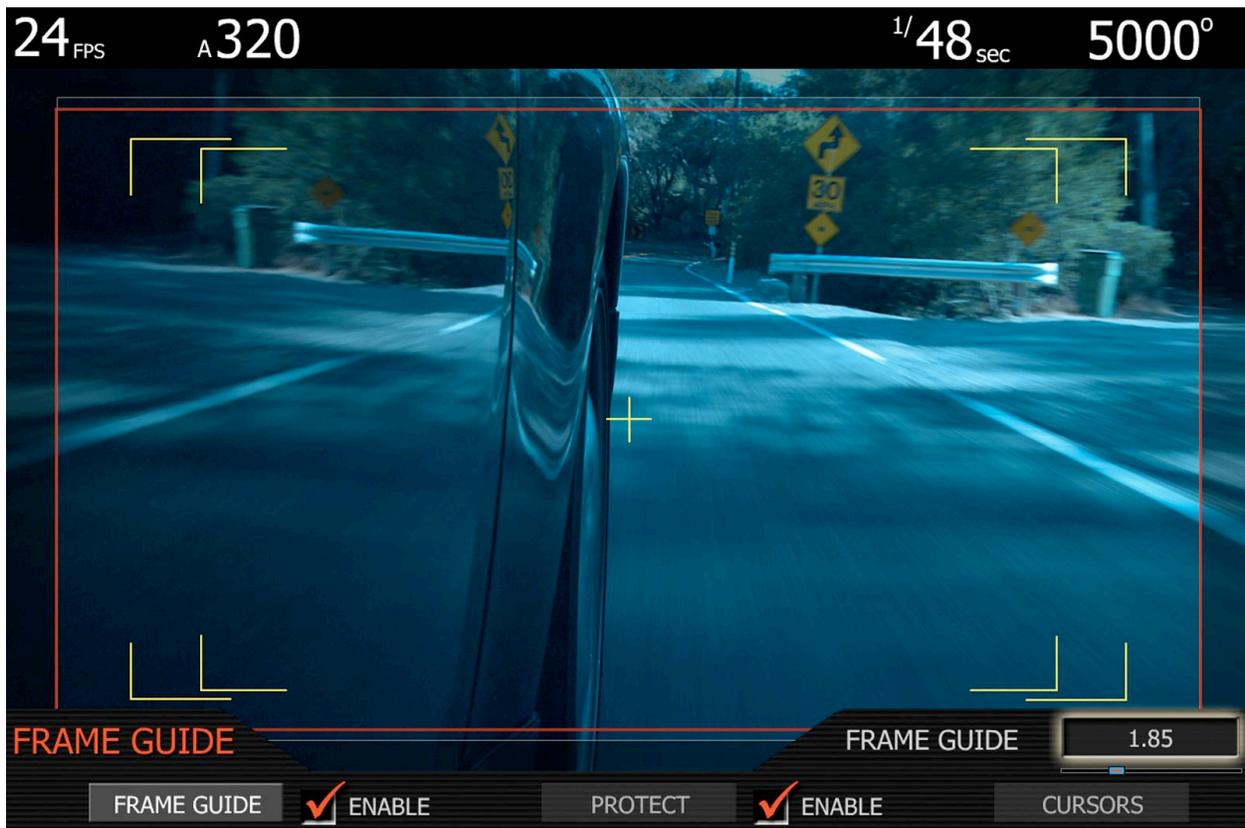
QT Proxies



When checked, the camera will create QuickTime reference movies at the completion of each clip record. These movies are placed in the same clip folder. While the reference movies are being created the camera reports "POST" in the status display and you will not be able to record until the QuickTime proxies have been created.

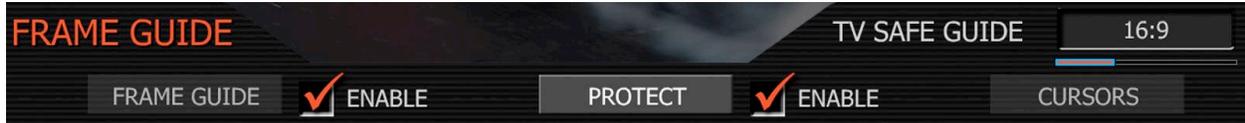
Monitor

The monitor menu provides controls for the framing guides and test patterns.

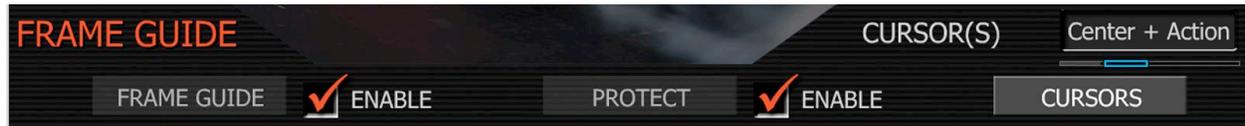


Frame Guide: This sub-menu provides a selection of film frame guides and television safe action and safe title guides. Frame guide elections are recorded in metadata.

Frame Guide: select one of these aspect ratios 2.40:1, 1.85:1, 16:9 and 4:3 for the frame guides. The color can be set to White, Black, Blue, Yellow or Red for maximum visibility over the scene you are shooting.



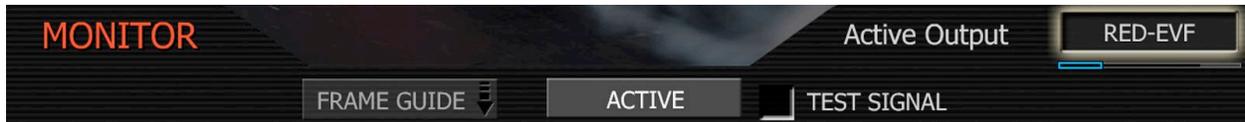
Protect: displays a television safe area with 16:9, 14:9 or 4:3 aspect ratio. The color of the safe area indicator can be set to White, Black, Blue, Yellow or Red for maximum visibility over the scene you are shooting.



Cursors: enables combination displays of Safe Action, Safe Title and Image Center cursors.

Active

This sub-menu selects the primary monitoring output of the camera.



Output choices include RED-EVF, RED_LCD, PREVIEW and HDMI. The PREVIEW mode places 720p video on both the Preview HD-SDI and HDMI outputs. To use a computer monitor as an external viewfinder, select HDMI. This will place 1280 x 848 progressive scan video equal to the RED-EVF view on the HDMI output. Then use a HDMI to DVI cable to connect the monitor.

Test Signal

This sub-menu permits the video monitor path outputs to be replaced with a video test pattern. To enable/disable a test signal checked the box. Test signals available include: SMPTE Color Bars, Luminance Ramp, Chrominance Ramp, Chip Chart, Black and Gray Field.

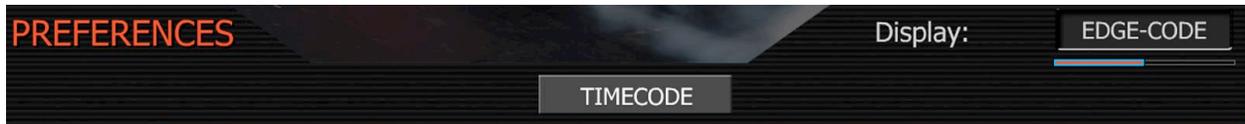
Note: The test signal output cannot be recorded; it is provided to help align the zebras and external video recorders or monitors connected to the camera via the HD-SDI or HDMI ports.

Setup

This menu permits a variety of system maintenance tasks to be accomplished.



Preferences: permits the user to define system preferences.



Timecode: lets the operator select whether Edge Code or Time Code is displayed in the status displays, is used for the QuickTime proxies and output as SMPTE timecode.

If Edge Code is selected, the letter "E" precedes the value shown in the status display. If Time Code is selected, the letter "T," precedes the value shown in the status display.

Maintenance

This sub-menu defines how the cooling fan behaves, and enables software updates.



Fan Sub Menu: specifies how the cooling fan operates.



The camera's fan speed can be changed depending on the ambient air temperature and humidity. The default setting is QUIET mode.

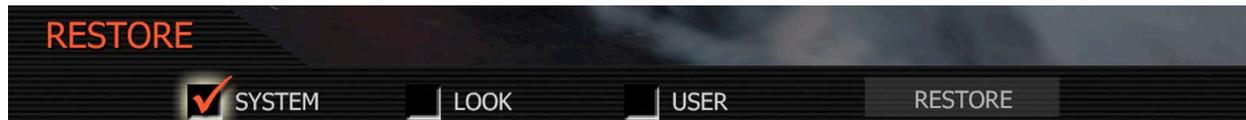
Hot: This setting is most useful when the ambient temperature is 86°F/32°C to 104°F/40C. In this mode, the fan will run at its maximum speed. Other camera cooling precautions may be necessary, such as shading the camera from sunlight and application of a cold gel pack.

Standard: This setting is most useful when the ambient temperature is 72°F/22°C to 86F/32C. In this mode, the fan will run at half its maximum speed.

Quiet: This setting is most useful when the ambient temperature does not exceed 72°F/25°C. In this mode the fan will run at one quarter its maximum speed.

Silent: This setting is most useful when the ambient temperature does not exceed 60°F/15°C. In this mode the fan will run at its minimum speed.

Restore: permits key camera configuration and setup data to be reset to factory default values. Press RESTORE menu then check SYSTEM. LOOK or USER, then press the RESTORE key to confirm. Restore LOOK will clear all parameters in the VIDEO menu to the default values.



Update SW: initiates a camera software update.

Additional details of the upgrade procedure are provided in the Upgrading Camera Firmware section of this manual.

KEYMAP: this menu permits selected menus or functions to be mapped to camera keys. At this time only side record enable is available.

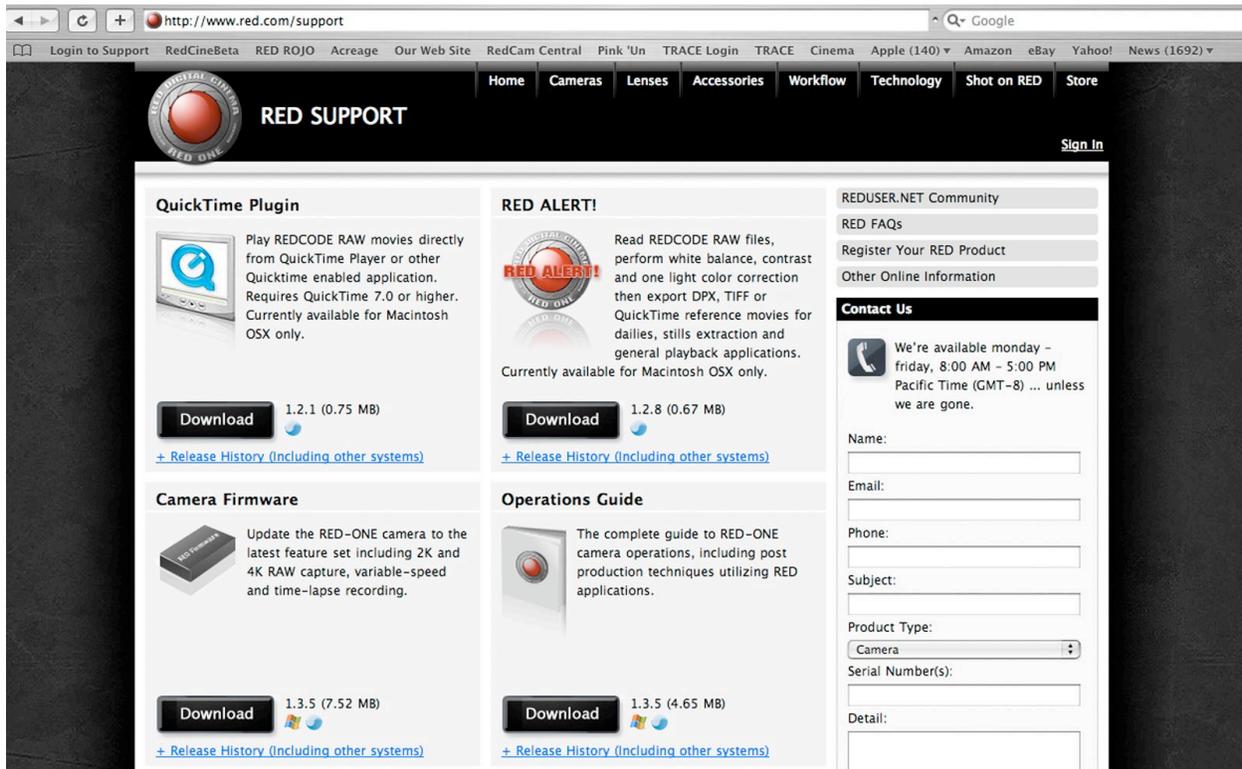


Side Record: When checked, assigns the red colored USER A button to Record Start / Stop. If this box is unchecked, this key is disabled.

9. Upgrading Camera Firmware

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

Log onto www.red.com/support for a complete listing of firmware revisions available for the camera, complementary post production software, and operational manuals.



The screenshot shows the RED SUPPORT website interface. The main navigation bar includes links for Home, Cameras, Lenses, Accessories, Workflow, Technology, Shot on RED, and Store. The page is divided into several sections:

- QuickTime Plugin:** A download button for version 1.2.1 (0.75 MB) with a link to '+ Release History (Including other systems)'.
- RED ALERT!:** A download button for version 1.2.8 (0.67 MB) with a link to '+ Release History (Including other systems)'.
- Camera Firmware:** A download button for version 1.3.5 (7.52 MB) with a link to '+ Release History (Including other systems)'.
- Operations Guide:** A download button for version 1.3.5 (4.65 MB) with a link to '+ Release History (Including other systems)'.
- Contact Us:** A form with fields for Name, Email, Phone, Subject, Product Type (set to 'Camera'), Serial Number(s), and Detail.

Upgrade Procedure

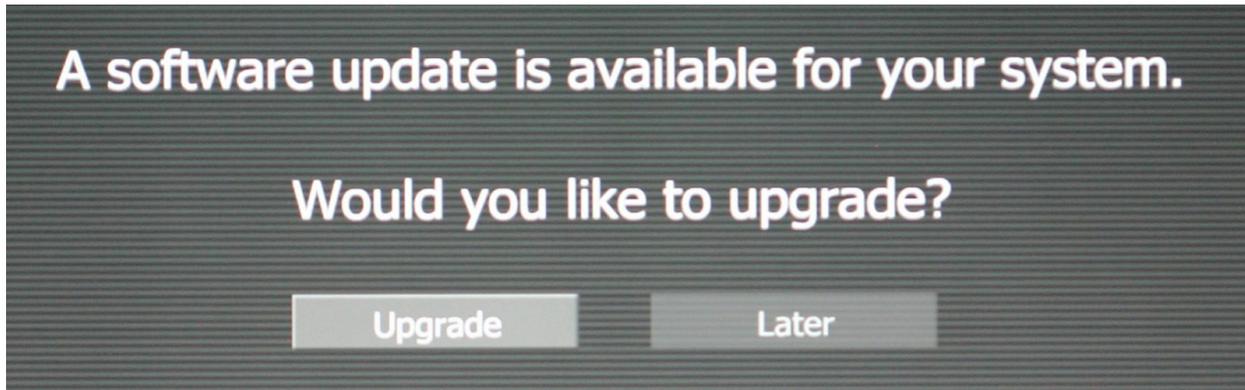
Firmware and software identified by a build and version number. A higher number reflects a later release. A releases archive is also available under "Release History"

To download, click on the desired release's link at www.red.com/support. Before the download starts you will be prompted to enter your account and password or the camera's P.I.N. This information helps us build a service history for each camera.

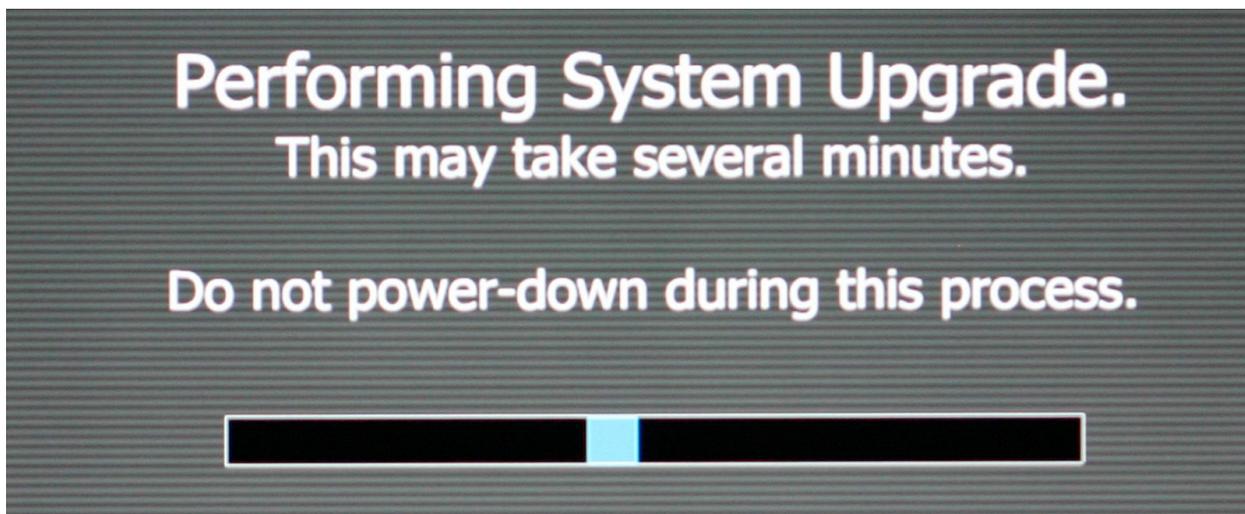
Once the firmware is downloaded, you will see a new folder on your desktop. Open that folder and verify you see a read me file (containing installation instructions), and a folder called Upgrade. Now take a CF card that has been formatted by the camera, and use your computer to copy the folder called Upgrade onto that CF card

Finally, unmount the CF card from the computer (i.e. drag to the trash can) and insert the CF card into the CF card slot in the camera. To initiate the upgrade, turn off the camera, wait approximately five seconds, and then turn on the camera again.

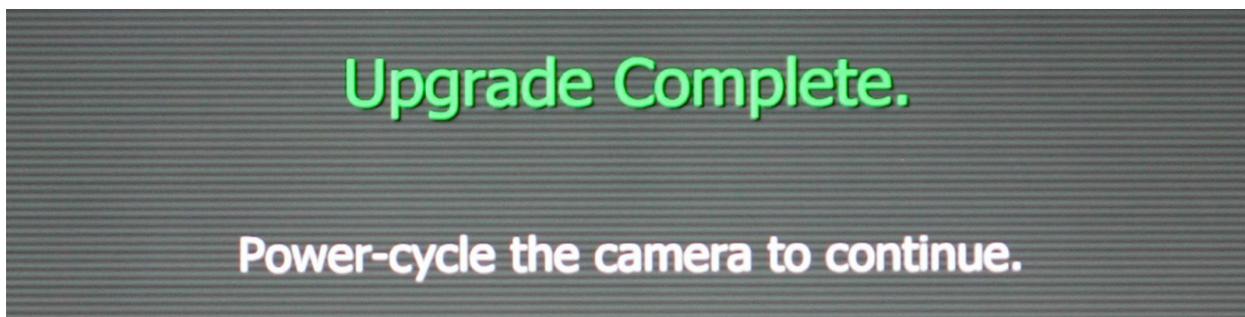
If there is valid upgrade firmware on the CF card, all monitor outputs will report back -



Press the joystick to confirm the upgrade, all monitor outputs will report back -



The blue highlight bar will animate to indicate an upgrade is in progress. After about 5 minutes, the upgrade will have completed. All monitor outputs will report back -



Power cycle the camera to return to normal operation. At the end of the camera power up process, the camera will display the firmware Build and Version numbers.

10. Managing Digital Media

The RED-ONE camera currently supports two types of media - compact flash and hard disk.

Compact Flash (CF) media requires an optional RED-FLASH (CF) module mounted to the left side of the camera body. Hard disk media is housed in a RED-DRIVE magazine mounted to the rear of the camera body and connected via a custom 16 pin interface cable.

Compact Flash (CF) - will be available in a variety of capacities, but at this time is fixed at 8GB. Depending on resolution and frame rate, each 8GB Compact Flash card will provide approximately 4.5 minutes of 4K 2:1 24fp RAW recording, or 18 minutes of 2K 24fps RAW.

RED-DRIVE Media - will be available in a variety of capacities, but at this time is fixed at 320GB. Depending on resolution and frame rate, each 320GB RED-DRIVE will provide approximately 180 minutes of 4K 2:1 24fp RAW recording, or 720 minutes of 2K 24fps RAW.

During a recording the rear status screen, RED-EVF and RED-LCD monitors will display the % remaining media capacity. At 5% remaining the capacity the media status box in the EVF or LCD will turn yellow, at 3% it will turn red. At 2% remaining the camera will cease recording. This reserves a small amount of capacity for ancillary files to be written to the digital media.

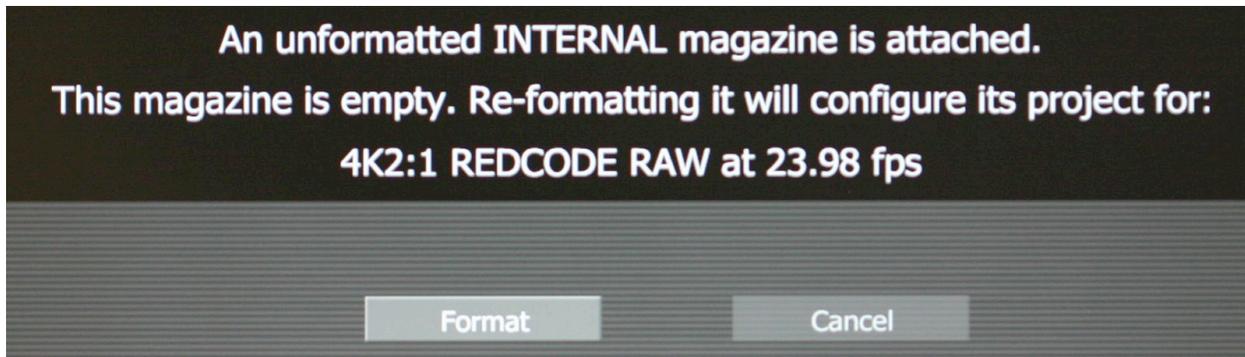
Media Formatting

Media must be formatted prior to using it for recording. At this time formatting must be done on the camera. Media may be pre-formatted (erased) on a Macintosh OS X or Windows XP personal computer, allowing the camera to add the necessary project format data.

Formatting on-camera

i) Formatting a new Compact Flash card or RED-DRIVE magazine.

Insert the CF card with the manufacturer's label facing outward (away from camera body). Press the CF firmly into the CF slot, but without excessive pressure. Or attach the RED-DRIVE magazine to the e-SATA port via the 16 pin e-SATA cable provided. The camera will recognize unformatted media and prompt with a message such as this -

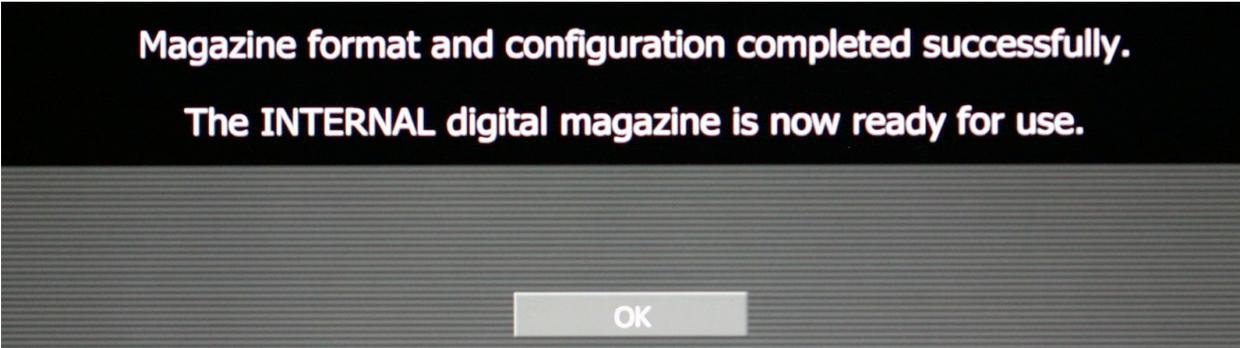


Press the Joystick to confirm, or select Cancel to return to the main camera status display.

If the format operation is confirmed, the camera responds with the following message -

Formatting INTERNAL /EXTERNAL digital magazine

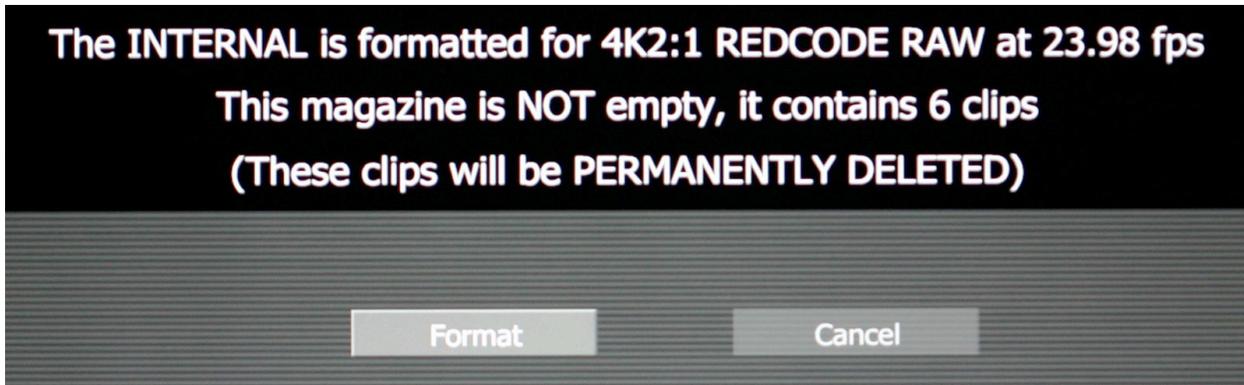
Once completed the following screen will appear.



Press the Joystick one last time to acknowledge the format process is complete and the camera will then clear the system menus from the monitor screens. Formatting an 8GB CF card takes about 10 seconds, formatting a 320GB RED-DRIVE magazine takes about 60 seconds.

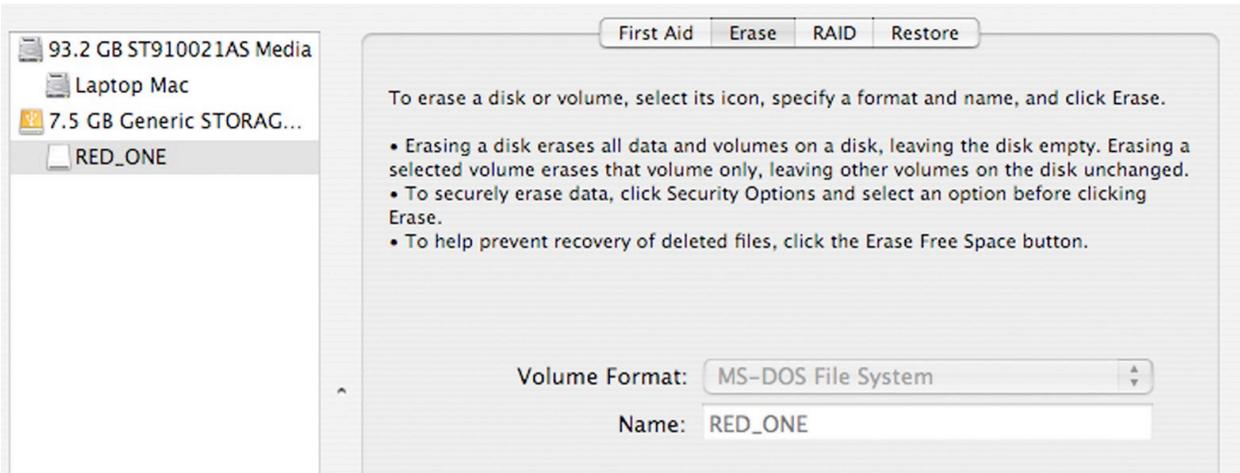
Reformatting previously used media

Re-formatting a previously used CF card or RED-DRIVE magazine follows a similar procedure, except that the camera provides the following modified warning.



Erasing media on a Macintosh personal computer

On a Macintosh computer connect the CF card via a CF card reader, or RED-DRIVE via a FireWire 400 cable. Open the Disk Utility application, then select the CF card or RED-DRIVE.



Select the Erase tab and choose MS-DOS File System as the Volume Format. Add a Name if you wish, but this is optional. Before proceeding, double check that this is the CF card or RED-DRIVE that you wish to erase, and then click on the Erase key. When the pop up window appears click on the Erase button

When the media is erased, drag its icon to the trashcan and physically disconnect it. When mounting erased media on the camera it will be treated as unformatted media and follow the same formatting rules as described above.

After erasing the disk, you may wish to verify that the media has been properly erased. To do this, reselect the media, and click on the First Aid tab. Then click on the Verify Disk button. The status window should conclude with the phrase "Volume passed verification"

Removing Media.

It is recommended that media is un-mounted prior to physical removal from the camera. Un-mounting ensures that power is removed from the digital media and open files are closed.

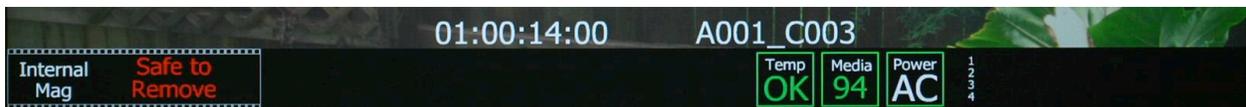
Physical removal of the CF card or disconnecting the RED-DRIVE without first un-mounting it will not damage the media, but can increase the risk of file corruption, especially if data is being recorded. In addition, auxiliary metadata files cannot be written to the digital media.



To UNMOUNT the digital media follow this sequence.

- Press and hold the UNDO key and then press the EXIT key.

When the status indicator displays "Safe to Remove" and " X " as media status, it is safe to remove the CF card and/or disconnect the RED-DRIVE magazine.



The modest extra step of un-mounting the digital media helps recorded clips mount instantly in postproduction. Failing to unmount before removing the digital media will not damage the recorded clips themselves, but it can increase the risk of corrupting the clip file index.

Appendix A: Post Production.

RED workflow is quite easy to understand, especially if you have experience with photographic RAW image processing, or shoot film followed by telecine transfer to a non-linear video editor.

RAW data has a wide dynamic range and color space, so you can freely change the white point (white balance) of the footage, adjust exposure and alter highlight and shadow tonality when in post-production. This flexibility allows the camera operator to focus on composition.

The camera records unprocessed sensor data using REDCODE RAW compression to a CF card, or RED-DRIVE digital magazine. Data is then transferred from the digital media to a Macintosh OSX workstation configured with RED ALERT! or REDCINE software, or a Windows XP workstation configured with REDCINE, via FireWire or USB-2. If you are using CF media, copy the clips onto the workstation's hard drive. If you are recording to a RED-DRIVE, it can be directly mounted as an external drive using FireWire if desired. This eliminates the media copy step.

In film processing terms, RED ALERT! and REDCINE act as an integrated 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, 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.

RED ALERT! can generate QuickTime reference movies suitable for use in dailies applications, and export a sequence of 2K or 4K resolution RGB image files as TIFF or DPX files for DI use.

REDCINE 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 codecs 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 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.

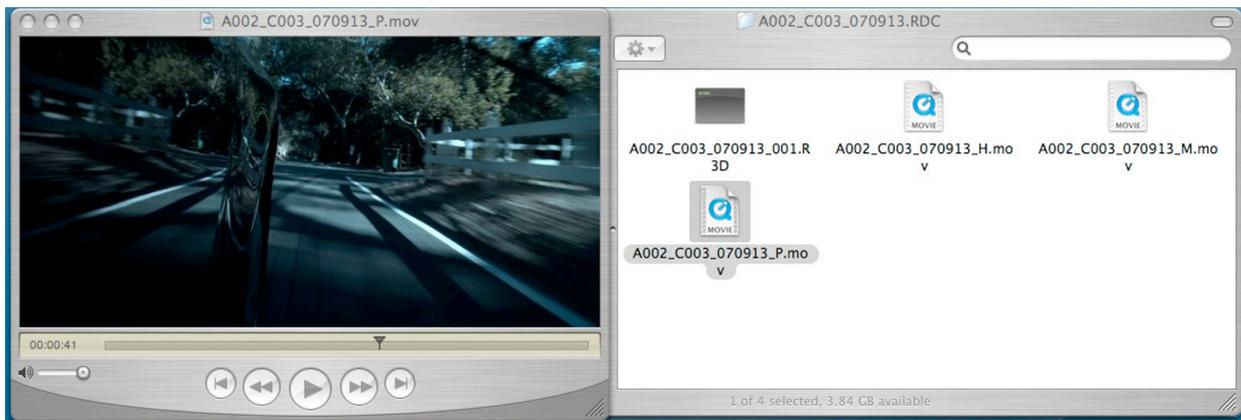
Color grading may be performed during editing or after the final conform. The graded show is then output to delivery media: film, a DCDM (digital cinema distribution master), or HD master.

Software Tools

RED Digital Cinema provides a variety of software tools to aid postproduction. For proper color rendition using a Macintosh OSX computer, your monitors 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.

REDCODE RAW QuickTime Component

The REDCODE RAW QuickTime component permits REDCODE RAW footage to be displayed on Macintosh OSX or Windows XP personal computers with QuickTime Player V7.0 or higher.



QuickTime player

The render performance of computers will vary based on CPU speed, number of cores and disk speed. Therefore the RED ONE camera and RED ALERT! generate QuickTime reference movies at _H high 2048 x 1152, _M medium 1024 x 576, and _P proxy 512 x 288 resolutions for 4K and 4K 2:1 RAW recordings, and _H high 1024 x 576, _M medium 512 x 288 and _P proxy 256 x 144 resolutions for 2K RAW recordings.

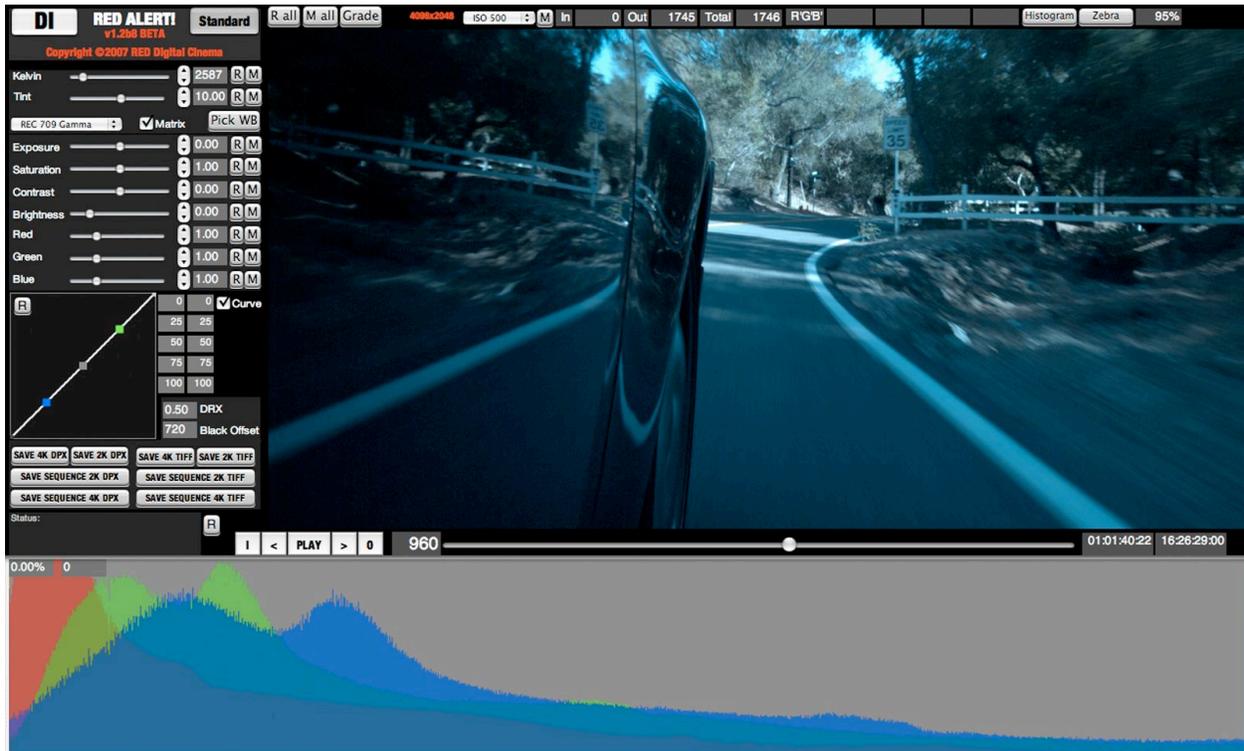
Choose the resolution that is most appropriate to your requirement for resolution or playback frame rate on your specific computer.

If the footage is to be transferred to a distant location, export the footage as a standalone movie using MPEG-4 or another low bit rate codec. The QuickTime movie proxies work by partially decoding the wavelet data, which means that the original 4K or 2K REDCODE RAW data must be available on a local drive that is accessible to your computer.

RED ALERT!

The RED ALERT application performs white balance and one light color correction and exports 4K and 2K resolution 10 bit DPX and 16 bit TIFF files. RED ALERT also creates color corrected QuickTime reference movies for playback in other applications, such as QuickTime Player, that use the REDCODE RAW QuickTime component described above.

The upper panel in the display provides details about the levels in the selected clip. Exposure and White Balance may be altered, R G and B digital values may be sampled from the image, and a Zebra selected – in this case set at 95%



A histogram may also be selected which will appear in a window below the main display area. This provides an interactive view of the exposure distribution for each of the R G B channels.

The one light panel permits adjustment of Color Temperature values including Saturation, Contrast, Brightness, Red Gain, Green Gain and Blue Gain. These parameters match those available in the RED-ONE camera. The range and resolution of these parameters may be greater than those available from the camera UI, this reflects a need for a greater range of control in post-production than is required for image capture monitoring.



RED ALERT! can read recorded camera metadata for each parameter. Values may be changed by dragging the slider, or by entering a numeric value in the box. Clicking on the R will reset the value to the default setting. Clicking on M will restore the stored metadata value. Clicking on R ALL or M ALL will affect all of the parameters. Clicking on GRADE will revert all the values back to those used in your color grade.

Presets are available to establish a consistent “look” across multiple clips, or alternative color treatments may be made to the same clip. In future, looks may be shared with the camera.



The image may be displayed using REC 709, linear or a variety of log color space. If Matrix is unchecked and display is Linear, the data that is drawn on screen represents the native linear sensor response of Mysterium™ without any color processing or gamma correction applied. For most television applications, select REC 709. For special effects select Linear or for D.I, a Log.



The timeline controls permit the user to play selected clips and mark an IN and an OUT points, between which the TIFF or DPX file sequence will be extracted. When creating any QuickTime reference movies the entire clip will be referenced, as trimming will be performed downstream. If a single frame is to be exported, press Save 4K or 2K DPX, or 4K or 2K TIFF. If a sequence of frames is desired, press Save Sequence 4K or 2K DPX, or 4K or 2K TIFF.



Appendix B: Power and Timecode I/O.

D.C Power Input

The power input connector accepts a DC voltage between +11.5 and +17V DC. When used with a RED-BRICK 140 battery, the camera also receives battery status information. The power input is protected against reverse-polarity connection, ESD, under voltage, and over current.

Mating connector LEMO FGG.2B.306.CLAD62Z (straight)



View into camera Power Input connector

Pin	Signal	Description
1	+VBATT	Power input, +11.5 to +17VDC
2		
3	-VBATT	Power return
4		
5	SCL_BATT	Battery pack I2C bus clock
6	SDA_BATT	Battery pack I2C bus bi-directional data

Note: It is very important that both of the +VBATT and -VBATT pins are wired up. DO NOT fabricate any power cables with just one each of the +VBATT and -VBATT pins wired up, as this can damage the camera power supply assembly.

Auxiliary Power Outputs

The camera provides two auxiliary power output connectors on its back panel. Each supplies un-regulated +11.5 - +17V battery pass-through power. Maximum sustained current draw is 1 Amp per output. Outputs are over-current protected, and switched by camera firmware.

Mating connector LEMO FGG.0B.304.CLAD42Z (straight)



View into camera Auxiliary Power Output connector

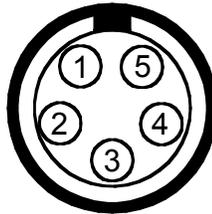
Pin	Signal	Description
1	-VOUT	Auxiliary power return (Ground)
2	-	-
3	-	-
4	+VOUT	Auxiliary power output,

Note: Pins 2 and 3 are reserved for future use as camera GPI and GPO connections.

Timecode In/Out

This connector supports SMPTE Timecode input and output. Pins 2 and 3 may be used together to receive a balance SMPTE 12M serial time code input, or pin 2 may be used by itself (leave pin 3 open) to receive a single-ended SMPTE 12M serial time code input.

Mating connector: LEMO FGG.0B.305.CLAD42Z (straight)



View into camera Timecode connector

Pin:	Signal	Description	Direction
1	Ground	Camera ground	-
2	TIMECODE_IN_P	Serial timecode input, positive	in
3	TIMECODE_IN_N	Serial timecode input, negative	in
4	-	-	-
5	-	-	-

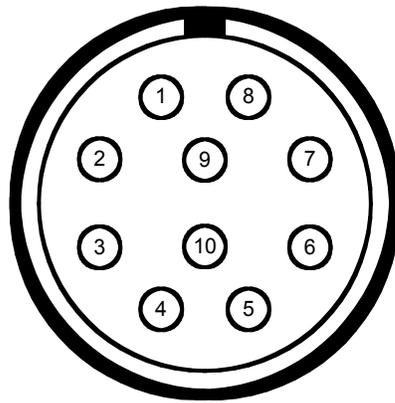
Note: Pin 5 is reserved for future use for single-ended SMPTE 12M serial time code signal out.

Lens / RS232

This connector provides 500mA regulated +12V to power motorized 2/3" B4 mount lenses. The two inputs labeled SW1 and SW2 are GPI switches that activate record start / stop and last clip playback respectively. They may be triggered by a B4 lens, or by a lens motor controller such as Preston MDR-2 (with appropriate interconnect / adaptor cables)

Note: DO NOT attempt to power a cinema lens motor from this connector. Depending on your current requirement, power from the Aux Power Outputs or the D-Tap connector on the V-Plate.

Mating connector: LEMO FHG.1B.310.CLAD62Z (right angle)



View into camera Lens / RS232 connector

Pin:	Signal	Description	Direction
1	GND	Ground	-
2	-	-	-
3	+12V	Regulated 12V output, 500mA max.	out
4	-	-	-
5	SW2	"Record Clip" switch closure	in
6	-	-	-
7	SW1	"Playback Clip" switch closure	in
8	-	-	-
9	-	-	-
10	-	-	-

Note: pins 2 and 8 are reserved for future use as RS232 transmit and receive signals.