

# S.two

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## OB-1

## User Guide



## V-10020

March 2011

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**NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device , pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.**

**Modifications made to the product, unless expressly approved by S.two Corp., could void the user's authority to operate**

OB-1 System Overview.....	7
OB-1 Features.....	9
ARRIRAW T-LINK.....	10
LUTs and OB-1 Output .....	10
ARRI Metadata.....	11
Alexa Record Remote Stop / Start .....	11
Alexa High Speed Recording .....	11
OB-1 Hardware.....	12
Connections .....	13
Power.....	15
FlashMag Magazine Connector .....	15
D Monitor Output.....	16
Record Formats .....	17
Output Formats .....	18
Operations Panel .....	19
Camera Mounts.....	20
Installing a FlashMag Magazine.....	21
LCD Status Screens.....	23
Main Menu .....	25
Format Menu.....	26
High Speed Frame Rates.....	29
Stop On Error.....	32
Recovering from Power interruption during Record. ....	33
TIMECODE .....	34
REEL.....	39
LUTs .....	41
Alexa, LUTs and OB-1 Output.....	43
INFO Page .....	44
DIAG MENU.....	45
Playback software.....	46
OB-1 Operations.....	47
Main Screen.....	47
Connections and Set Up .....	48
Camera Specific Settings.....	48
Turn On and Use.....	52
Play Modes .....	53
Maintenance.....	56
Troubleshooting .....	57
Software Updates.....	59
Updating Software.....	59
History .....	64
Appendix.....	65
Power.....	66
OB-1 Power 3PIN Fisher Pin Out.....	67
OB-1 Power 3PIN XLR Pin Out.....	68

OB-1 Power 4PinXLR Pin Out.....	69
OB-1 Power PTAP Pin Out .....	70
OB-1 Remote Connector.....	71
Trigger / Tally Connections .....	72
OB-1 REM Port GPIO Pin Out .....	73
OB-1 REM to PRESTON Pin Out.....	74
RS422 Control Cable .....	75
OB-1 External Audio Cable Pin out.....	76
OB-1 Time Code/LTC Port.....	78
Revision History .....	79
OB-1 Specification .....	80
FlashDock™ .....	83
FlashDock Workflows.....	84

## Introduction

OB-1 is an on-board recorder that utilizes revolutionary new recording technology to capture uncompressed data from digital cinematography cameras. It is mounted directly on the camera body using a supplied mounting bracket and has low enough power consumption to use camera accessory power in lieu of an additional battery or power source. The extensive feature set, combined with a splash-proof, silent, fan-less, machined aluminum housing weighing less than 3.5kg, including FlashMag storage, makes OB-1 ideal for digital film recording applications inside or outside the studio.

OB-1 uses industry-standard inputs and outputs, conforms to SMPTE 372M and 292M, and meets the requirements for recording from all current uncompressed data and HD digital film cameras. The FlashMag removable solid-state magazine utilizes a low insertion force connector rated at 100,000 insertions and incorporates proprietary multi-level RAID data protection for many years of trouble-free service.

OB-1 incorporates an LCD screen with easy-to-use horizontal menus and back-lit push buttons, user-created LUT loading, two channels of analog audio input, GPI/O's for trigger/tally, multiple timecode options, real-time de-mosaic of Bayer pattern data, real-time on-board DPX file creation, and "hot swap" of magazines. These and many additional features make OB-1 the ideal recording solution for virtually all applications.

OB-1 is also designed to be compatible, using the FlashMag Adapter, with S.two's market-leading D.MAG digital film workflow systems used worldwide in hundreds of successful projects. This manual provides additional information for those systems, as does our web site: [www.stwo-corp.com](http://www.stwo-corp.com).

This Instruction Manual will guide you through a safe and rewarding experience with your OB-1 and the entire system. S.two is committed to improving our products and documentation. Please send your comments and suggestions to:

[service@stwo-corp.com](mailto:service@stwo-corp.com).

## **OB-1 System Overview**

The OB-1 is an on-board camera mounted uncompressed solid-state recording device using flash memory based file system accessible removable digital film magazines.

OB-1 is designed specifically for all digital film capture applications and to work with any camera providing an uncompressed output.

The OB-1 all-billet machined aluminum construction means that it is very strong for years of in-service life with zero maintenance required. Its sealed assemblies mean that the OB-1 does not require any internal service or cleaning. The OB-1 is fan-less and totally silent in operation with no moving or user serviceable parts internally. All heat dissipation is via the casing.

The OB-1 can be used in any orientation, and is not susceptible to vibration, shock, gyroscopic issues or humidity or changes in humidity or heat environments.

The OB-1 has a very low power draw of under 20Watts (12VDC) and can accept power in the range of 10~36 VDC so it can be used with the on-board power feed from any camera only requiring one battery feeding both camera and recorder.

OB-1 has all the connections and facilities to provide complete on set solution for capturing of uncompromised image files for all aspects of movie making. The OB-1 supports all flavors of dual link SMPTE 372 including 60FPS444 as well as multiple camera support for 3D imaging at 422 and 444 rates. In addition the OB-1 supports RAW Bayer footage from certain camera types including (but not limited to) the ARRI D-21.

The OB-1 has full on-board monitoring feeds to support 422 HD SDi monitors or 444 dual link HD-SDI monitors. The outputs feature embedded audio and RP188 HANC data timecode. The OB-1 also has full RS422 remote control and GPI/O for remote trigger tally. In addition, the OB-1 has a USB socket for support of software upgrades, LOG downloads and reference frame grabs as well as an upload facility for user LUTs. The Ethernet socket is a service port, it is not for downloading of material or images.

OB-1 provides instant pass through of camera images to the monitor output ports as soon as power is applied. This is whether the input is 444, 422 or ARRIRAW. The OB-1 provides both 444 and 422 monitoring concurrently. The 422 output will do a high program quality colorspace conversion from 444 inputs. The 422 output is mastering quality for productions that are 422 based using 444 cameras.

OB-1 has support for internal or external timecode with jam sync capability for absolute frame synchronization. It also has two channels of unbalanced analog audio inputs for record sync audio for playback and automated dailies creation. The audio is analog and unbalanced so you can use wireless audio receivers on the camera head. The audio is line level not microphone, allowing a mini mixer for mic levels between the mics and OB-1. The OB-1 is ideal for sound sync shooting even in close up.

The OB-1 records to removable FlashMags. The image is stored as uncompressed DPX frames in scene and take folders. The FlashMag is compatible with existing S.two docking stations and workflow as well as with the new FlashDock stations. FlashMags run for 30 minutes of record time regardless of frame rate or format (single camera settings). The FlashMags feature S.two proprietary internal storage with multi-layer RAID protection for absolute image fidelity through the lifetime of the MAG which is rated for many years of continuous use.

An outline of the workflows used with the existing S.two D.MAG products can be found at the end of this manual. This is provided for background and for workflow suggestions. S.two will be providing a FlashMag Adapter that allows the mounting of OB-1 FlashMags into existing S.two workflow products such as the A.DOCK4, i.DOCK4 and F.DOCK 4 for a completely integrated workflow solution for both data, and with i.DOCK, DSR and DFR2K-AR, for a video based workflow solution.

## OB-1 Features

Record 1080 format in 444 and 422 at frame rates from 23.976 to 60.00FPS  
Record 3D in 1080 format 444 or 422 at frame rates from 23.976 to 30.00FPS  
Record ARRIRAW T-Link from 23.976 to 50FPS\*  
Record 720P format 422 from 50 to 60FPS

Record at high speeds (over 30FPS) and set playback rates to production frame rate (23, 24, 25)  
Record true P and play as PsF  
Record RAW and show real-time high quality video  
Apply user loaded LUTs to the outputs while preserving a clean output  
Full uncompressed HD-SDI monitoring to 422

Provides SMPTE DPX files (With FlashDock)  
Provides ARRI .ARI V3 files (With FlashDock)

Provides internal REC RUN Timecode with user start time  
External timecode input provided  
Jam sync to an external source with battery back up to keep sync even during power changes  
Dual channel analog wide ranging audio – unbalanced guide tracks

More than 30 minutes of recording in 444, raw and 422 at 30FPS  
Fast Start up  
Hot swap instant magazine changes  
Trigger tally interface  
HD-SDI start stop with ARRI cameras\*\*

Metadata inputs and collection

## **ARRIRAW T-LINK**

This release is ARRIRAW T-LINK certified for both D-21 and Alexa cameras recording uncompressed ARRIRAW at the absolute best quality available.

RAW has two flavors, 4 x 3 2880 x 2160 with D-21 and 16 x 9 2880 x 1620 with Alexa. The speeds are up to 48FPS with D-21 and 30FPS with Alexa (current versions). T-Link is a dual link 2 x 422 signal carrying a 12 bit transport layer with the extended resolution and color bit depth of the sensor information for use in Digital Film Acquisition.

The OB-1 will de-bayer the Raw image in real-time with no significant delay and present a high quality 1920 x 1080 422 HD-SDI video signal for monitoring on set in live, record and playback modes. The output of the OB-1 is LOG-C unless a user loaded 1D 709 Log to Video LUT has been applied.

The signal carries essential metadata describing the image and the camera settings so that Post can automatically present the data at full resolution in a variety of third party applications with ARRI V3 file support.

## **LUTs and OB-1 Output**

When in ARRIRAW and with the Alexa set as the camera, the OB-1 C and D high quality program de-Bayer viewing output shows the RAW as LOG-C images based upon the settings for Exposure Index (ASA) and White Balance (Color Temp) of the camera.

The monitor output will switch as the camera switches from base EI (160) to full EI (3200) to match the LOG-C viewfinder and preview outputs of the camera so that you can monitor the camera and recorder and see the same image.

As the EI and WB switch on the camera, the OB-1 follows automatically. No user interaction is required.

You can also add 709 video LUTs from the ARRI on line LUT generator or user loaded LUTS into the OB-1. These are built on top of the LOG-C curves from the camera. Use the 10 or 12 bit settings in the LOG generator. LUTs are saved and downloaded on the on-line site as S.two XML 1 D LUTs and can be easily loaded as before.

Access the LUT menu from the LUT button on the OB-1. Select the LUT required, hit either apply LUT, the ENTER button or the LUT button to apply the chosen LUT to the output.

Load LUTs as before from a USB stick, have the required LUTs in a folder on the root of the stick called LUTs. The LUTs should be 1D 10 or 12 bit LUTs in the S.two LUT format with the stwo.xml extension.

As the LUTs are applied to a LOG-C base from the Alexa, any 1D user generated LUT can be used if based on ARRI LOG-C and in XML format. S.two LUT format is supported in many applications.

## **ARRI Metadata**

With the Alexa, a stream of camera information and image metadata is sent via the HD-SDI interface. This data (referred to as KLV data) is recorded in its entirety by the OB-1 on the FlashMag. The data has timecode, naming and image information including EI and WB data. When the data is read by a V3 ARI compatible application such as ARRI ARC (Arri Raw Converter) the WB and EI are applied automatically producing a LOG-C or 709 image on the computer. This image should match the preview output of the camera and the OB-1 for end to end color management.

## **Alexa Record Remote Stop / Start**

In the Alexa recording menu, select SDI remote to ON. This will automatically roll a record on the OB-1 when ever the REC button is pressed on the Alexa. This only operates when the Alexa is recording to Internal SxS cards in dual system mode.

**NOTE: Using RP188 with Alexa and Stop Start from the camera when using dual system record, the TC of each recorded frame is frame accurate and identical to the internal recording system of the Alexa SxS card ProRes recordings. Note however that the SxS card starts up a few frames earlier and stops a few frames later. This is due to the start up time of the compressed files and recordings and that the camera gives a start record pulse out once the SxS cards have started to record to which the OB-1 responds immediately.**

**NOTE; Previous versions of OB-1 had a bug when Alexa was in REC RUN MODE. This Bug has been fixed in this version.**

## **Alexa High Speed Recording**

The OB-1 supports Alexa at up to 60FPS via Dual Link SMPTE 372M. OB-1 also supports variframe recording at any frame rate from the camera.

Set the Frame type (422), camera rate (60FPS), Camera Type (Alexa) and OutFPS (24FPS) in the OB-1 Format menu and also set the variframe flag to on (X). On the Alexa Recording Menu, select 422 1.5G DL, 60FPS, REC OUT Sets sensor FPS to OFF. Now the sensor Out will set the record frame rate to any desired rate including ramps.

The OB-1 will play the data back at 24FPS with 24FPS timecode (you can set the OUT FPS on the OB-1 to 23, 24, 25, 29 or 30FPS depending on your production needs).

**OB-1 Hardware**



OB-1

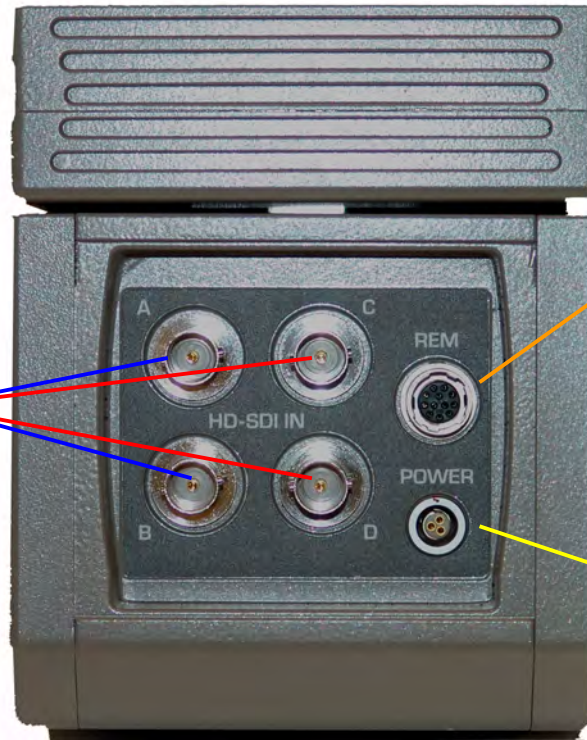
FlashMag



## Connections

### Inputs

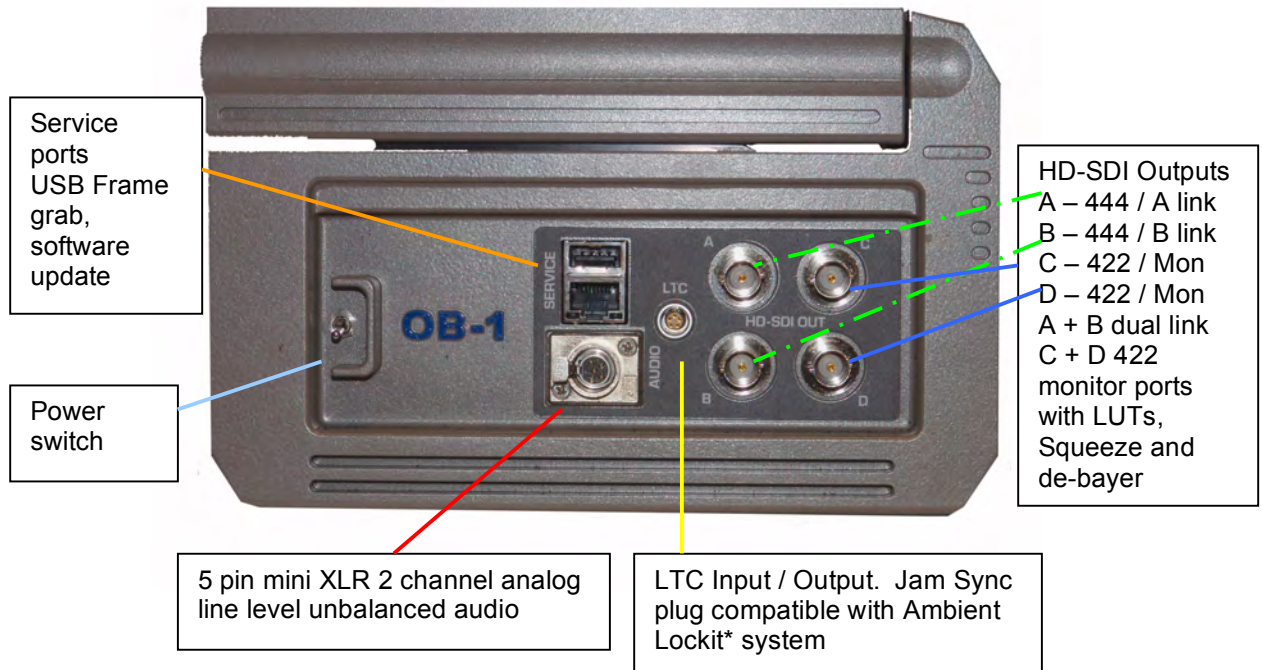
HD-SDI Inputs  
A – 444 / A link  
B – 444 / B link  
C – 422 / A link2  
D – 422 / B link2  
Each pair, A + B,  
C + D can be used as a dual link input allowing for 3D 444.



Remote port  
RS422  
GPI/O  
Trigger / Tally

Fischer 3 pin  
Power input  
10~36VDC

## OUTPUTS



## Power

The OB-1 is DC powered. It can accept a range of DC voltage from +10V DC to +36V DC.

The power draw is very low so that the OB-1 can be fed directly from a camera's on board accessory power socket. The OB-1 draws less than 20W @12VDC.

The input connector is a Fischer 3 pin male.

See Power section for wiring diagrams and pin outs and sample camera connections.

**D-21 NOTE: Use the RS 24V DC output on the D-21 to power the OB-1 rather than the 12VDC accessories supply.**

S.two provides an auto-ranging AC power converter that accepts 100-250V AC 50~60Hz. It supplies 12V DC to the OB-1.

## FlashMag Magazine Connector

The FlashMag has a low insertion force multi-pin connector. This lines up and mates with a connector on the OB-1. This plug and socket is rated for 100,000 insert cycles so will be robust for many years of use.

Make sure the connectors are clean and free of any debris. This connection carries the data, control and programming interface signals for the FlashMag as well as power.

## Image Data I/O

### Video In:

Dual Link SMPTE 372 is on the A/B input connectors on the rear connection panel. Use the A/B not the C/D, these are reserved for the second dual link interface (3D or 60FPS 444) in a future release. Use A and B for 422 50 / 60 frame SMPTE 372 also.

### Video Out:

Dual Link SMPTE 372 output is on the A/B output connectors on the side connection panel. These are always the same as the input format.

If using ARRIRAW the A/B output will provide ARRIRAW T-LINK outputs on the A/B in their original state.

If using 422 50/60 FPS then the A / B link is set to display the original channel at the new play speed. Selecting EXIT/CANCEL in the PLAY MANU will reset the video output for A and B to be the original SMPTE 372 captured frame rate (30~60FPS) output as originally recorded for layoff to other devices via video.

Monitor output for all formats is available on the C output.

422 Video is available on the C output, regardless of input.

Monitor output for all formats is available on the D output.

422 Video is available on the D output, regardless of input. D output has a record indicator in picture when takes are rolling.

444 Video is available for monitoring as a color space transcoded to program quality 422 YUV 709 images and can be used as a master 422 feed on the C and D outputs. A and B feed clean 444 dual link (no LUT added).

ARRIRAW recordings are displayed as 10 bit Log 422 monitoring with LUT added and squeeze when in RAW anamorphic mode.

50/60FPS material is displayed as 25/30FPS slow motion playback.

### D Monitor Output

This output follows the C output for function except that it adds an in picture flashing red indicator for record status. The indicator is a block in the lower right hand corner of the image and consists of three blocks that alternate so that no active image is covered up. In 4 x 3 RAW images the block is to the right of the main image in blanking. In anamorphic modes it is underneath the image in blanking, again to the right.

## Record Formats

Formats are selected in the RECORD menu. Formats cannot be mixed on one FlashMag. For a format change to take effect you need to create a new reel after setting the desired format.

The formats are ordered from lowest frame rate to highest, grouped by frame type.

A - 444 RGB - 23.98, 24, 25, 29.97, 30, 48, 50, 59.94, 60PsF –Normal RGB recording to DPX frames – Quad link formats (above 30FPS) only supported with ARRI D-21

B – 2 x 444 RGB 23.98, 24, 25, 29.97, 30 PsF – 2 x genlocked synced 444 cameras for 3D

C - 422 YUV - 23.98, 24, 25, 29.97, 30, 47.96, 48, 50, 59.94 and 60PsF – Full frame rate support for ARRI and Panasonic Cameras in normal, Sony F23 and F35 above 30FPS rates also supported when Sony Camera selected in the camera type box.

D - 422 X 2 - 23.98, 24, 25, 29.97, 30PsF - 2 X 422 HD cameras – 3D or multi-cam.

E - ARRIRAW 4 x 3 - 23.98, 24, 25, 29.97, 30FPS – 12 Bit recording to S.two RAW DPX or .ARI files (.ARI files supported with FlashDock)

F - ARRIRAW Anamorphic - 23.976, 24, 25 - 12 Bit recording to S.two RAW DPX or .ARI files with Anamorphic de-squeeze applied to the OB-1 preview outputs. (.ARI files supported with FlashDock)

G – 422 720P 50, 59.94 and 60 FPS

H – 444P RGB - 23.98, 24, 25, 29.97, 30P – true Progressive, not segmented.

I - C – 422P YUV - 23.98, 24, 25, 29.97, 30, 47.96, 48, 50, 59.94 and 60P

J - 2 x 422P - 23.98, 24, 25, 29.97, 30P – true Progressive, not segmented

The FlashMag provides 30 minutes of recording time for all formats except 2 x 422 or above 30FPS providing 25 minutes of record time.

External timecode is supported at all frame types running at record speed of 30FPS or less. Make sure that the code supplied matches the frame rate selected.

## Output Formats

In each group, the HD-SDI outputs have differing characteristics.

Group A - 444 RGB – HD output A = A Link, B = B Link, C and D = 422 color-space converted YUV REC 709 with LUT added capability.

Group B 2 x 444 RGB HD output A = A Link, B = B Link, C and D = 422 color-space converted YUV REC 709 with LUT added capability.

Group C - 422 – HD output = A , B , C and D = 422 monitor at selected base playback speed. Frames rates above 30FPS (dual link inputs) are displayed at the selected rate (23, 24, 25) or the A and B link can be set to play at the original capture rate for layoff.

Group D – 2 x 422 – A and B are each camera, A and B. c and D both show A link.

Group E - ARRIRAW 4 x 3 - HD output A = ARRIRAW T-LINK A, B = ARRIRAW T-LINK B, C and D = RAW de-mosaic windowed 1080 (1440 x 1080) 422 color-space converted YUV REC 709 with 12 to 10 bit LUT added.

Group F - ARRIRAW Anamorphic - A = ARRIRAW T-LINK A, B = ARRIRAW T-LINK B, C and D = RAW de-mosaic windowed 2.40:1 1080 (1920 x 820) 422 color-space converted YUV REC 709 with 12 to 10 bit LUT added.

Group G - 720P 422 YUV - HD output = A , B , C and D all show 422 with LUT added capability.

Group H - 444P RGB – True P is displayed in live / EE / REC modes, playback is at the same frame rate but is PsF not P for layoff and compatibility with monitors.

Group I – 422P – HD output = A , B , C and D = 422 monitor at selected base playback speed. Frames rates above 30FPS (dual link inputs) are displayed at the selected rate (23, 24, 25) or the A and B link can be set to play at the original capture rate for layoff. Playback is at PsF not P.

Group J - Group D – 2 x 422P – A and B are each camera, A and B. c and D both show A link. Playback is at PsF not P.

Plus some other combinations dependant on camera type and frame rate settings. See each Camera and frame rate for details.

## Operations Panel



All operation, set up and status of the OB-1 is on board using the keypad and main LCD.

Buttons are marked logically for function.

Buttons are back lit when their function is available.

Different modes are indicated by the main LCD lighted color scheme.

See each section in the operations guide for button functionality in each main operating mode.

## Camera Mounts

The OB-1 features an easy quick snap mount for cameras and other devices. OB-1 is supplied with a universal mounting plate or an optional mount for D-21 cameras. The mount is designed such that you leave the mount plate on the camera and can easily and quickly remove the OB-1 from the camera. Other mounts are in process of becoming available or can be supplied as custom parts.



Universal  
Mounting Plate



ARRI D-21  
Mounting Plate



ARRI Alexa  
Mounting Plate

The mounts have stop pins so that the OB-1 only goes on in one direction and can't fall off the other end. This is very useful when using the OB-1 vertically on the back of the camera in handheld or Steadicam modes.

There is also a plate available that mounts to Anton Bauer battery mounts, this can be used on the rear of the Alexa for superior handheld balance.

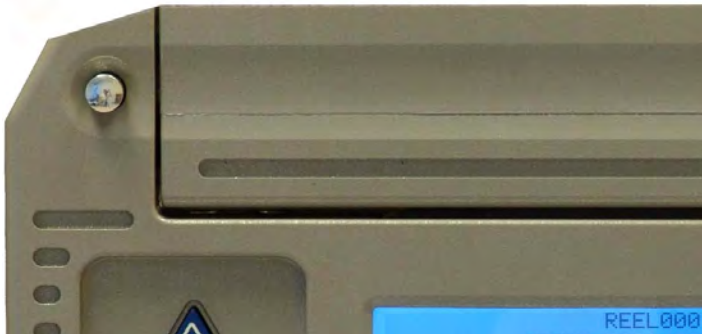
## Installing a FlashMag Magazine



The FlashMag digital film magazine system is a compact, robust cartridge that stores uncompressed moving images as data. All solid-state flash based, the FlashMag uses proprietary technology to provide years of trouble free uncompressed recording.

FlashMag - 30 minutes of uncompressed recording to flash based solid state storage.

FlashMag can be hot swapped, meaning that it can be taken off or put on without having to stop or power down the unit or mount or un-mount the file system.





The FlashMag sits on top of the OB-1, held in place by a latching capture system. To put a FlashMag on the OB-1, just position the mag over the locating blocks and push forward until the connectors mate and the latch captures. You can feel the click as it securely mates as well as see the side button on the OB-1 pop back out.

As soon as the FlashMag is inserted the OB-1 will show a message “FlashMag Loading” and then “FlashMag Scanning”. This takes a few seconds; when the Mag is mounted the OB-1 returns to its normal display.

## LCD Status Screens

Main LCD screen changes reflecting mode and status.

Screen brightness dims in record mode, which is red, so you can see that you have 'SPEED' even from across the studio. Buttons are illuminated depending on availability, so in record only the REC button is lit, push it again and the rec stops, the OB-1 goes back into live/EE mode. The ENTER/MENU button has two personalities, depending on the mode the OB-1 is in.



BLUE - LIVE / EE

From here you can access the setup menus.

Push REC to start recording

Buttons Available:

REC (starts recording)

PLAY Enters Play Screen (Green)

NEW SCENE – allows entering of new scene name and metadata

ENTER/MENU – Brings up main MENU.

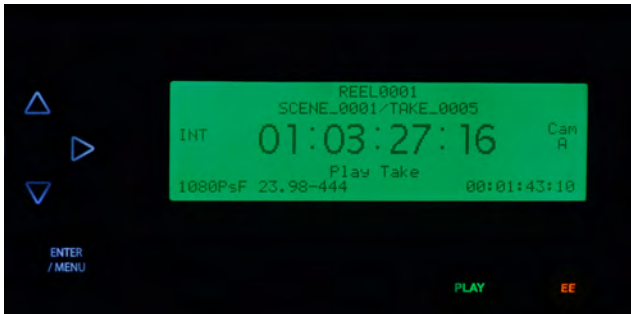


RED - RECORD

Push to Stop recording

Buttons Available:

REC - Stops Recording



#### GREEN - PLAY

The arrow buttons become jog fwd / rev and the menu button toggles between various loop and playback modes.

#### Buttons Available:

EE (returns to blue screen, live video and MENU)

ENTER – Toggles Play mode

Play Take, Play Scene, Play Reel

Loop Take, Loop Scene, Loop Reel

UP / DOWN Arrows - Start of take, last frame of take, next take.

LEFT / RIGHT Arrows - jog forward / back one frame. Hold down for fast speeds, jog, then play normal, then play fast x 5, then play fast x 10. Both forward (right arrow) and reverse (left arrow)

EXIT / CANCEL : If recording at a higher frame rate with a different playback back rate, pushing the EXIT button will reset the output video format to the A and B outputs allowing the OB-1 to play the data back at the same rate it was captured.

EXAMPLE: Rec set to 50FPS 422, OUT set to 23.98, normal play is at 23.98 from C and D giving superior slow motion, set the EXIT button and now the OB-1 is at 422 x 2 25 with the A and B port providing the dual link information as recorded so that this can be played into an external video deck for offloading.



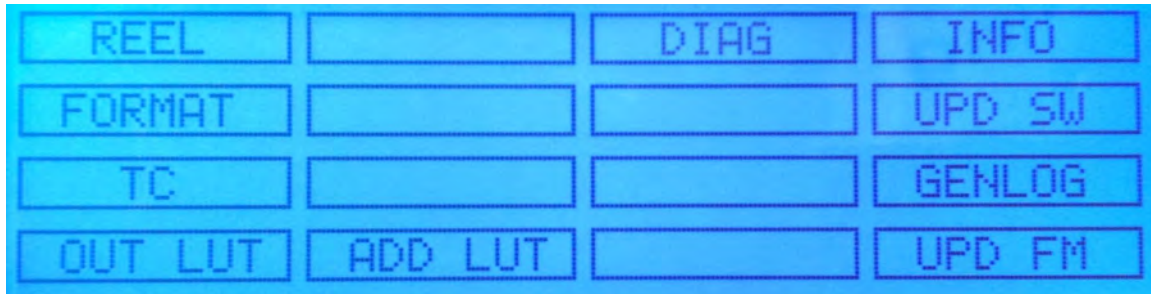
#### ORANGE / YELLOW - ERROR

Shows an input error

Buttons available: Access to set up menu.

Will flash when the input does not agree with the FlashMag format or when there is a problem with the input.

## Main Menu



The MENU button from the blue screen takes you to the main set up and control menu of the OB-1. From here you can set the video format, timecode and reel ID as well as manage updates to the OB-1 and download service logs.

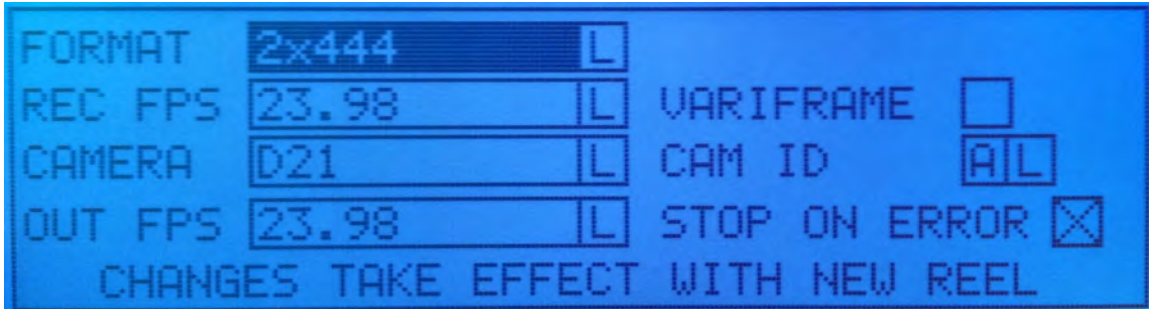
To enter a selection, use the UP / DOWN, LEFT / RIGHT ARROWS to highlight a selection and then press ENTER.

To modify any data or setting you use the UP / DOWN, LEFT / RIGHT ARROWS to highlight. Use ENTER to select then modify the selection with the UP / DOWN arrows and navigate within the areas using the LEFT RIGHT arrows.

On the main MENU screen, you highlight and press ENTER to bring up the sub-menu required.

## Format Menu

All set ups for frame type, frame rate and playback are made here.



### Frame Types – Record Formats

A – 444 - RGB - 23.98, 24, 25, 29.97, 30, 48, 50, 59.94, 60PsF –Normal RGB recording to DPX frames – Quad link formats (above 30FPS) only supported with ARRI D-21

B - 2 x 444 - RGB 23.98, 24, 25, 29.97, 30 PsF – 2 x genlocked synced 444 cameras for 3D

C – 422 - YUV - 23.98, 24, 25, 29.97, 30, 47.96, 48, 50, 59.94 and 60PsF – Full frame rate support for ARRI and Panasonic Cameras in normal, Sony F23 and F35 above 30FPS rates also supported when Sony Camera selected in the camera type box.

D - 2 x 422 - 23.98, 24, 25, 29.97, 30PsF - 2 X 422 HD cameras – 3D or multi-cam.

E - RAW STD - ARRIRAW 4 x 3 - 23.98, 24, 25, 29.97, 30FPS – 12 Bit recording to S.two RAW DPX or .ARI files (.ARI files supported with FlashDock)

F - RAW ANA - ARRIRAW Anamorphic - 23.976, 24, 25 - 12 Bit recording to S.two RAW DPX or .ARI files with Anamorphic de-squeeze applied to the OB-1 preview outputs. (.ARI files supported with FlashDock)

G - 720P - 422 720P 50, 59.94 and 60 FPS

H - 444P - RGB - 23.98, 24, 25, 29.97, 30P – true Progressive, not segmented.

I - 422P - 422P YUV - 23.98, 24, 25, 29.97, 30, 47.96, 48, 50, 59.94 and 60P

J - 2 x 422P - YUV 23.98, 24, 25, 29.97, 30P – true Progressive, not segmented - 2 X 422P HD cameras – 3D or multi-cam.

The FlashMag provides 36 minutes of recording time for all formats except 2 x 422 or above 30FPS providing 25 minutes of record time.

External timecode is supported at all frame types running at record speed of 30FPS or less. Make sure that the code supplied matches the frame rate selected.

**You select the Frame format first, 720P through Arriraw 12 bit.**

**Then select the Record Frame Rate – REC FPS – 23 ~ 60 FPS**

**Select the camera in use – CAMERA – See camera types below –**

NOTE: The CAMERA setting DOES change the internal setups of the OB-1 to work properly at all rates supported by each camera and their individual characteristics.

**Then set the Play Frame Rate OUT FPS – 24 ~ 30 FPS**

Vari-frame if selected will look for the Tagged Frame format in the incoming signal from the camera. If the OB-1 does not see these frames it will not be able to roll. The Vari-frame works with ARRI and Panasonic cameras. OUT FPS settings apply to vari-frame captured data. So you can capture at 12Fps and play at 24.

Vari-frame works at all frame rates and formats except 720P.

You can select any 1080PsF 422 frame rate for playback, so you can record at 60 and play at 23FPS.

NOTES:

The play rate is part of the Reel information set for the entire reel in the OUT FPS. The FlashMag will play at that set speed with appropriate timecode for the set OUT FPS. So that if you record 60FPS with OUT FPS set to 25 you will have data that has correct 25FPS timecode and play and motion. When you put the FlashMag in a FlashDock or an S.two Dock with FlashMag adapter, that device will see it and play it at the OUT FPS speed, not the record one. see NEW PLAYBACK OPTION below for further information.

The FlashMag only supports a single frame rate per reel, once set the whole reel is set to capture at the high rate and play at the low rate. If you are doing a shoot day where you have several high speed shots you can take the FlashMag on and off as you would normally, the FlashMag will record at the higher and play at the lower.

When using the variframe setting with a suitable camera, you will be able to mix frame rates from the camera on the same mag as long as the transport video rate over HD-SDI does not change.

### **Using ARRI Alexa Camera**

Set the CAMERA to ALEXA in the FORMAT menu. Sets the above 30FPS formats to support Alexa (different from D-21). Will also support Alexa variable frame rate when available. Also sets ARRIRAW mode to Alexa 16 x 9 format rather than D-21 4 x 3. NOTE – Although the Alexa manu at 50FPS shows the output as P not PsF it is a normal segmented format not a true P one. Set the FORMAT to 422 not 422P. Also note that the Alexa in 444 can run true P at frames rates below 30FPS where the Alexa menu says P and actually is rather than PsF.

### **Using ARRI D-21 camera**

All formats of the D-21 are supported. Use RAW-STD for normal ARRIRAW. Use RAW ANA for anamorphic lenses. ARRIRAW does not support Anamorphic at 29 and 30FPS as this is a 16 x 9 format.

Vari-frame from 0 ~ 60FPS is supported. Set the OB-1 to the highest frame rate chosen (48 ~60 PsF) and check the vari-frame box. The OB-1 will follow the cameras frame settings even through ramps or from the camera RCU.

### **Using Sony Cameras F23 F35**

Make sure you select the F23 or F35 in the camera box. This changes how the OB-1 records the A and B links at 50, 59 and 60FPS as the cameras act differently from the ARRI and Panasonic cameras.

Variframe and ramping is not yet supported with Sony cameras.

### **Using Panasonic 3700**

This camera works the same way as the Arriflex cameras below 30FPS 1080 444 PsF. You can also run this camera at 50, 59 and 60FPS 720P. Vari-frame is support at speeds below 30FPS.

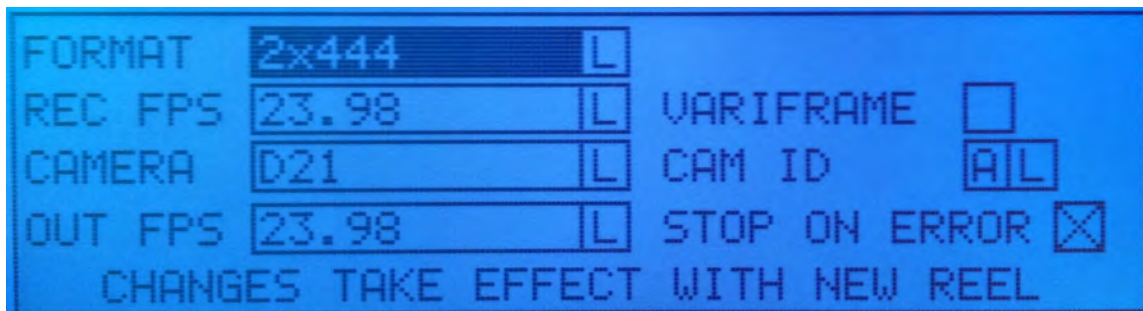
### **Other Cameras**

There are direct camera type settings for most current HD cameras. IF your camera type is not listed, select OTHER in the camera Type and the OB-1 will be at its internal default settings.

## High Speed Frame Rates

The intention of above 30FPS speeds is to have slow playback at normal frame rates. The most normal frame rates being 23.98, 24 and 25.

The OB-1 system addresses this by having a separate normal play setting in the frame metadata and reel data so that after recording playback is always set to the nominated frame rate of the production.



So the method employed is set the production (PLAY) frame rate when we create the reel, so in the FORMAT MENU we have two settings, the record or capture setting and the OUT or play setting. In most normal situations these would be the same. With a REC FPS setting above 30FPS you will need to have a valid OUT FPS setting matching it to the nominated production rate, 23, 24 or 25 (or 29 or 30 if you so wish).

The OB-1 will output the slowed down motion to the C and D ports on playback. The A and B output ports will each show each frame displayed twice and so are not used for monitoring.

Above 30FPS rates are all Dual Link using 2 x 422 HD (or quad link in the case of 444 above 30FPS), each link has half the frames, so a 60FPS signal is 2 x 422 30FPS HD-SDI. 50FPS is 2 x 422 25FPS and so on.

In Live EE and Record modes the monitor will display the capture rate (25, 29 or 30) equal to half the frame rate as it displays only one link of the dual link format. When you select play the monitor will re-sync to the chosen play speed as the OB-1 changes the HD-SDI rate to the Play speed (typically 23, 24 or 25).

When using True P (Progressive, not PsF Progressive segmented Frames), the EE and Record monitoring is set to P following the input. Playback is set to PsF for easier playback or layoff to non-Progressive devices.

## Outputs

In each group, the HD-SDI outputs have differing characteristics.

Group A - 444 RGB – HD output A = A Link, B = B Link, C and D = 422 color-space converted YUV REC 709 with LUT added capability.

Group B - High speed 422 – HD output = A , B , C and D = 422 monitor at selected base playback speed.

Group C - ARRIRAW 4 x 3 - HD output A = ARRIRAW T-LINK A, B = ARRIRAW T-LINK B, C and D = RAW de-mosaic windowed 1080 (1440 x 1080) 422 color-space converted YUV REC 709 with 12 to 10 bit LUT added.

Group D - ARRIRAW Anamorphic - A = ARRIRAW T-LINK A, B = ARRIRAW T-LINK B, C and D = RAW de-mosaic windowed 2.40:1 1080 (1920 x 820) 422 color-space converted YUV REC 709 with 12 to 10 bit LUT added.

Group E 422 YUV - HD output = A , B , C and D all show 422 with LUT added capability.

All formats support vari-frame recording

NOTE: 15-RC4 has changes to the internal storage for all 444 formats for FlashMag and FlashDock compatibility. Note that FlashMag recorded in 444 mode on OB-1 versions prior to 15-RC4 (11 ~ 15 RC3c) will not play correctly on an OB-1 with the newer software. In the same manner, 444 format FlashMag recorded with 15-RC4 will not play properly on OB-1 with earlier version software.

### **3 D - 2 x 422 – 2 x 444**

OB-1 has the ability to record multiple cameras in HD 422 at all normal recording speeds. This allows 3D capture from two synced camera heads at any of the normal operating speeds.

If using two cameras make sure that the cameras are genlocked (in sync) with each other.

The A output of the OB-1 will display input A, the B will display input B. C + D outputs will both display input A.

The OB-1 will play back above 30 frame captured images at the captured rate with A and B output being the A and B link of the SMPTE 372 image.

## **Vari-frame**

The OB-1 supports variable frame rate. The OB-1 can be set to vari-frame in any frame format or capture speed. So you can use variable frame rate with ARRIRAW for instance.

This is turned on in the RECORD menu. It is set for each reel. The Vari-Frame supports the variable 'tagged image frame' as used by ARRI and Panasonic. There is a check box in the FORMAT menu that when checked and a new reel is created then the OB-1 will follow the frame rate of the camera. Note that this is set on a per-reel basis.

Vari-Frame does not allow external LTC.

If Vari-frame is set and the camera does not produce the required flags then the OB-1 will go into record but not actually record any frames. Make sure that the camera used supports vari-frame.

When in Vari-frame record, note that the count down time left and Timecode indicators may be moving slower than the set frame rates. Watch the lower right TC move to be sure you are actually recording.

The frames record when the Tagged Frame flag is detected producing the required effect.

## **Ramping**

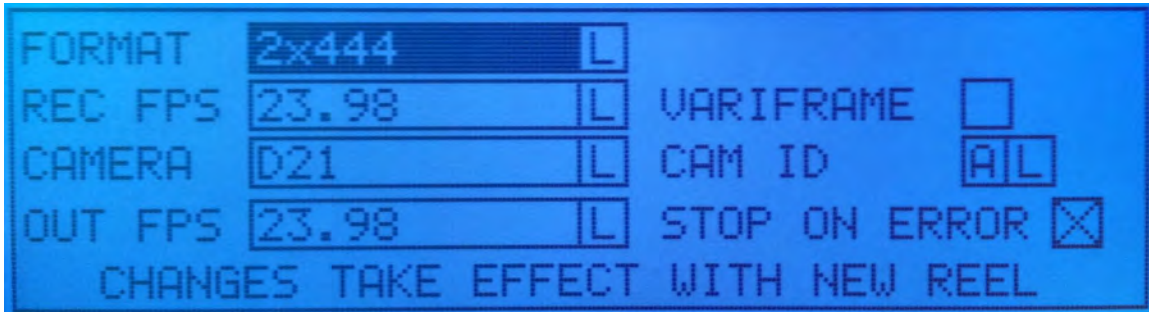
The OB-1 will follow ramping and speed changes when set from the camera.

## **CAM ID**

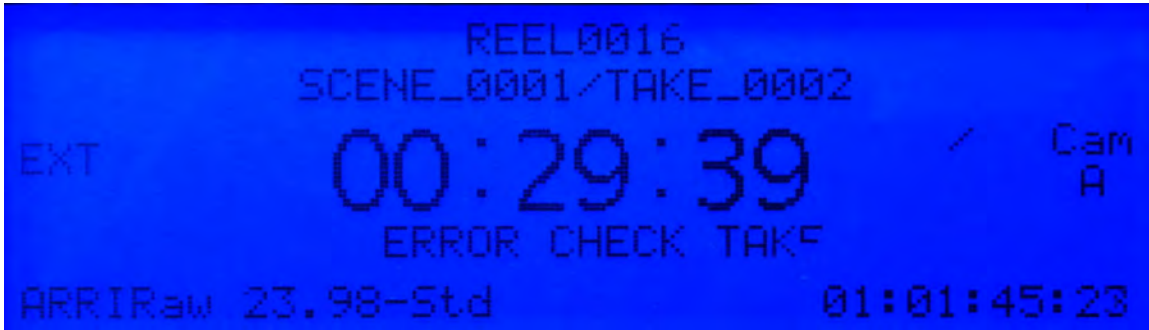
The CAM ID applies a letter to the Camera for multiple camera shoots. This is changed by using the normal up/down, left / right and Enter buttons.

The CAMID letter is placed in the metadata as well as the DPX header and in the file name for easy sorting and identifying of camera when all other metadata may be the same.

## Stop On Error



When Set, the STOP ON ERROR will immediately stop recording when any problems are detected at the video inputs on record (this could be a bad cable). If a recording stops you will see the ERROR CHECK TAKE message and an orange /yellow flashing screen if the problem still exists or purple if its OK now. You can record again on the FlashMag after an error.



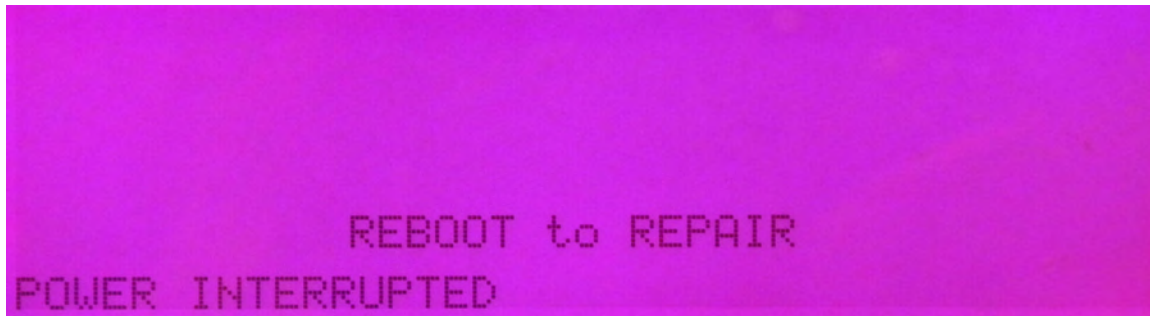
If the STOP ON ERROR is not checked, the OB-1 will keep recording even when there are errors detected on input. When you stop recording there will be an orange / yellow flashing screen if the problem still exists or a purple if its OK now.

If you check the TAKE using the PLAY screen, when you return to the main LIVE screen the color will be Blue (if no problem exists any more) or flashing orange /yellow if it does. You will not be able to record again if the input is missing. If the input is fine then you can continue recording.

## Recovering from Power interruption during Record.

The OB-1 now has an auto-recovery feature from power loss during a take. It is recommended to do this there and then on the OB-1 as this cannot be done on a FlashDock. It requires a reboot.

When power is re-applied the OB-1 will quickly scan and recover the last take to the last good frame. This now takes a few seconds. Once the OB-1 has recovered the data the OB-1 will show this screen:

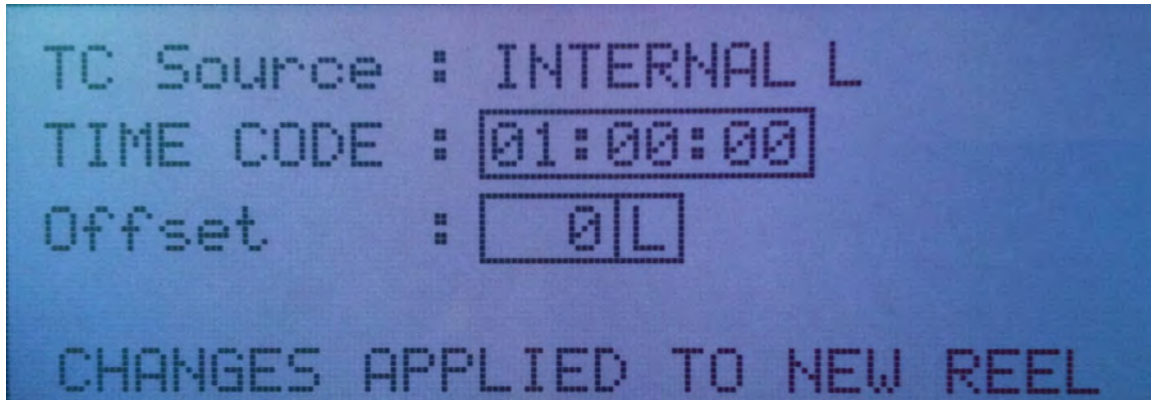


The user **MUST** power cycle the OB-1 to seal the metadata. Once you have done this then you can continue recording to the FlashMag as normal. All data recorded to the point of power loss will be recovered as a good take (even if it is the length of the mag!) and all metadata is repaired and updated.

## TIMECODE

TC Menu is where you can set the OB-1 to use either internal or external timecode. You can also set sync offsets for external code.

The OB-1 external timecode will sync to a present code input at the start of a record.



Changing the setting is achieved in the same way as in the RECORD MENU above.

No offsets is normal setting for most cameras (OB-1 compensates for itself internally).

The TC input follows the convention used by external small on-set timecode generators.

The TC connection is a 5 pin Lemo for input only.

The OB-1 outputs TC via RP188 embedded HD-SDI and RS422.

OB-1 now has a full Timecode implementation including RP188, FREERUN (TOD) and JAMSYNC modes.

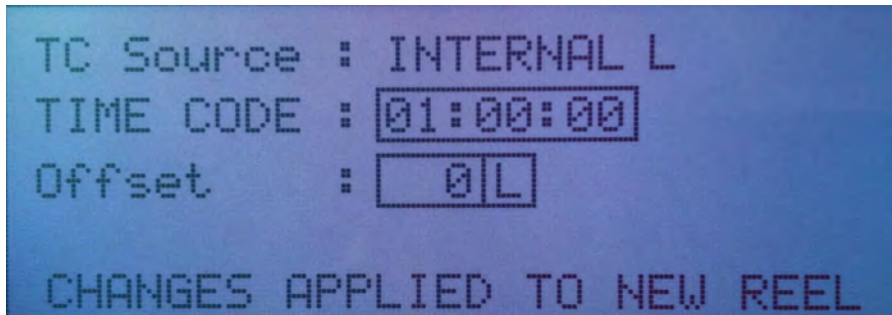
RP188 is embedded TC support, this allows the OB-1 to use TC embedded on an HD-SDI input from a camera for synchronization with the camera's internal recording solutions. **No offsets are required to be put in as the sync is absolute with the Alexa frames.**

FREERUN Allows a user to enter a timecode (such as Time Of Day – TOD) and the OB-1 will continue to count during the day even when the recorder is not recording or when powered off.

JAMSYNC can be set from external code at the required frame rate coming. The JAMSYNC should be accurate over a long period of +24hours.

**NOTE: Using RP188 with Alexa and Stop Start from the camera when using dual system record, the TC of each recorded frame is frame accurate and identical to the internal recording system of the Alexa SxS card ProRes recordings. Note however that the SxS card starts up a few frames earlier and stops a few frames later. This is due to the start up time of the compressed files and recordings and that the camera gives a start record pulse out once the SxS cards have started to record to which the OB-1 responds immediately.**

All TC modes are set in the TC menu.



## OB-1 TC Modes

**Internal** – REC RUN Mode

**External** – uses connected external analog SMPTE 12M TC

**RP188** – uses Embedded TC on HD-SDI

**JAMSYNC (FREERUN)** – Syncs to external TC that is then removed or syncs to user entered code.

### INTERNAL

You can now preset the start timecode of the OB-1 reel using the timecode menu. Enter any start tc you want. The start tc is set

Hours: minutes: seconds.

You can not set frame code starts.

This Preset works in all formats supported.

You cannot use External timecode in any above 30FPS frame rates. These must be set to Internal codes.

**You must use Internal Code when doing Vari-frame or any off-speed frame rates.**

The Initial timecode is now restricted to a value of 23:59:59. If you enter a higher value such as 29:59:59 the OB-1 will make it 23:59:59.

The offset has no effect.

### EXTERNAL

External code will use the External analog code applied to the TC input for recording. If this mode is selected and no code is present at the input then the OB-1 will not record and show an input error on the main screen.

It is important that the input code matches the recording frame rate selected FORMAT as set for the REEL. So if running 23.98 then make sure the code coming in is 23.976. If the input code does not match the frame rate then the OB-1 will not record and will show an input error.

The Offset here does work. It is strongly suggested that the user run a TC test when in prep or setup to make sure that the TC and video frame rates match and line up synchronously. Remember that there are frame delays in the cameras and that these will vary from camera to camera and sometimes frame rate to frame rate.

The easiest way to test TC is to use a smart slate or TC slate which is running from the same source of TC as the OB-1. Shoot the slate running TC and then look at the playback. The offset between the TC displayed by the slate and the OB-1 reported code will be the delay in the signal so use that as your offset. You will need to create a new reel to apply the new offset. This may

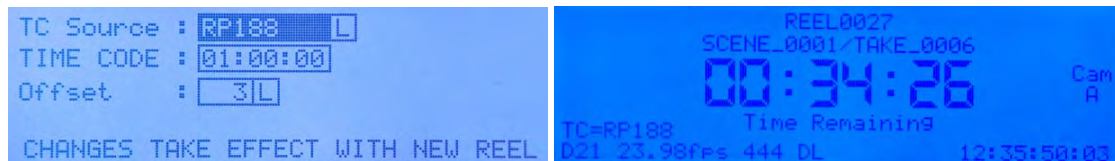
take a couple of tries. Once set for a camera at a given frame rate then this should not drift over the course of a shoot.

You cannot use an External code when running at frame rates above 30FPS such as 50 or 60FPS or when using vari-frame.

### RP188

RP188 comes from a camera, selecting this should make the OB-1 use the incoming code from the camera as its master TC.

**NOTE: In general, and specifically tested With Alexa, no offsets are required.**



Again, the OFFSET does work and may need checking. Here you have to check against the internal recorder of the camera to make sure that they line up so they can be synced in offline / online. If you use the same test as described above this will tell you if there are any delays in the internal recorder as well as the camera outputs.

## JAMSYNC

This allows the OB-1 to be in sync with an external TC that is not connected to the camera head or OB-1.

To Set JAMSYNC, select in the TC menu and CREATE REEL.

```
TC Source : JAM SYNC L   FREE RUN
TIME CODE : 01:00:00
Offset    : 3|L
PRESS EE FOR FREE RUN USING TIME CODE
CHANGES TAKE EFFECT WITH NEW REEL
```

Once the reel is created then go to the normal main screen of the OB-1.

Have a reference external code plugged into the OB-1 external TC input.

Make sure that this code is running at the same frame rate as the selected Format.

```
REEL0028
SCENE_0001/TAKE_0001
00:36:00          Cam
                    A
TC=JAM SYNC Time Remaining
D21 23.98fps 444 DL EE-> 12:39:40:00
```

When ready, push the EE button and hold until the word SYNC-ED comes up.

```
REEL0007
SCENE_0001/TAKE_0001
00:36:00          Cam
                    A
TC=JAM SYNC Time Remaining
D21 23.98fps 444 DL SYNC-ED 15:22:54:03
```

You can remove the external TC from then on and the OB-1 is synced to the reference TC.

```
REEL0007          Cam A
SCENE_0001/TAKE_0001
00:36:00
TC=JAM SYNC Time Remaining
D21 23.98fps 444 DL EE-> SHOW JS TC

REEL0007          Cam A
SCENE_0001/TAKE_0001
00:36:00
TC=JAM SYNC Time Remaining
D21 23.98fps 444 DL EE-> 15:23:19:17
```

The OB-1 will not display running code when in EE mode but will say "SHOW JS TC"

– Push the EE button and the OB-1 will display the current TC from its internal count for reference. If an External code is plugged back in the TC counter will start to move again and EE button will re-sync the internal TC clock.

```
RECORD
REEL0028
SCENE_0001/TAKE_0001
00:35:54          Cam
                    A
TC=JAM SYNC Time Remaining
D21 23.98fps 444 DL 12:40:43:16
```

However the real code will display as soon as the OB-1 goes into record.

JAMSYNC WILL HOLD EVEN DURING POWER UP AND DOWN, BATTERY CHANGES OR REEL CHANGES OR CREATE REELS UNTIL YOU RE-SYNC IT.

The Sync should stay constant for at least 24hours but it is good practice to re-sync a couple of times per day, generally sync in the morning at the start of the day and after lunch. This is due to potential drift in any TC generator.

### **FREERUN**

Select JAMSYNC in the TC menu.

```
TC Source : JAM SYNC L   FREE RUN
TIME CODE : 01:00:00
Offset    : 3
PRESS EE FOR FREE RUN USING TIME CODE
CHANGES TAKE EFFECT WITH NEW REEL
```

Set an initial TC in the INTIAL TC box (such as time of day, use a time that is in the future by a few minutes as you have to CREATE REEL and then set it to run).

### **CREATE REEL**

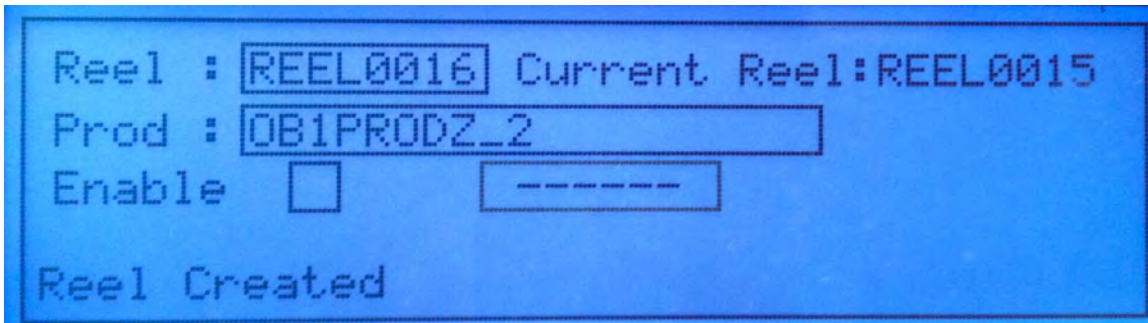
Go to the main screen, at the point when the TC number you entered is to start press the EE button and it will set the internal clock to freerun as if it were synced to code. This will now run even during power up and down, Reel changes or New Reel creation.

The clock should be constant for a period of weeks but it is good practice to check or re-enter the code everyday.

## REEL

The REEL Menu will clean a FlashMag and make it ready to record. You can set a new reel and production names here. To make any changes in recording format or names you have to do a new reel.

OB-1 will automatically increase Reel Numbers using metadata from the last REEL created and auto-increment them for you. It displays the Current Reel name and fills in what it assumes to be the next Reel name.



To change REEL ID:

Use the arrow to highlight the REEL NAME box

Hit the ENTER button to make it active, indicated by the wording in the box going into white out of black (reversed) text

Use the left right arrow to flash the letter that you want to change

Use the up / down arrow and the letter will cycle through 0~9 and A~B.

Use the left / right arrow to flash the next letter that you want to change

Hit the ENTER button again to set

Use the same method to change the production name.

Once you have changed either Reel Name or Production Name you can Create a new reel.

Use the up /down arrow to highlight the ENABLE check Box – The screen will change to ORANGE color as a reminder that you are about to Erase the current FlashMag.

Hit the ENTER button to make the check mark.

Use the RIGHT ARROW to highlight the CREATE Button.

Hit ENTER to start a REEL Creation.

The Screen will go back to the normal Blue.

This will show a progress status in percentage done at the bottom of the menu. When done it will state NEW REEL CREATED.

Use the EXIT button to close the MENU and EXIT again to exit the MAIN MENU and return to the operating LIVE (BLUE) SCREEN.

#### Create Reel

If a reel did not Create properly, it will display the message cannot load, FlashMag was not created correctly! Re-Power the OB-1. Create the reel again, if it continues to not create correctly then contact S.two support for FlashMag service.

## LUTs

The LUTs in this version are 1D and fully compatible with S.two LUTs as used in all versions of the DFR. You can use the same LUTs as well as create and add your own. LUTs can be set at either 10 or 12 bit LUT data.

LUTs are downloaded to the OB-1 via the USB stick, you can add or delete single or all LUTs. LUTs need to be named correctly following S.two normal practice where the extension is lutname.stwo.xml. Some older LUTs used on DFR may not have the .stwo in front of the .xml extension, if so then you can edit the LUT name to add the .stwo in front of the .xml.

The LUTs operate on all OB-1 formats including ARRIRAW. LUTs can be made in programs such as Iridas Speedgrade On Set or Assimilate Scratch.

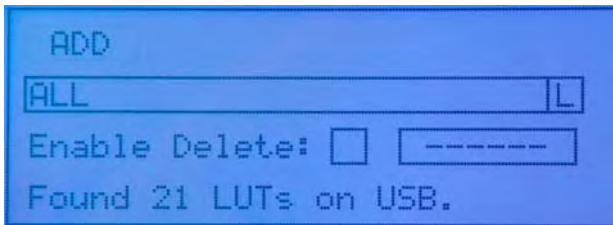
To use the LUT feature, create a LUTs folder on your USB stick – NOTE the folder has to be named LUTs – the OB-1 application will search the stick for this folder when it is mounted. You can have any number of LUTs there and load any number into the OB-1, they can all be loaded in one go or you can pick the LUTs one by one using the list browser in the OB-1 to select and add the LUT.

Once LUTs are loaded into the OB-1 then you can select and apply any to the current picture, the LUTs operate in LIVE EE as well as playback. You can also delete LUTs from the internal list, again either all of them or singly using the Ob-1 listing.

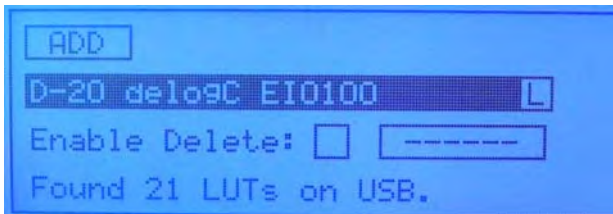
Use the ADD LUT to load the LUTs into the OB-1. Use the OUT LUT to select and apply a LUT once loaded into the OB-1

The LUT button on the main panel will take you directly to the OUT LUT menu.

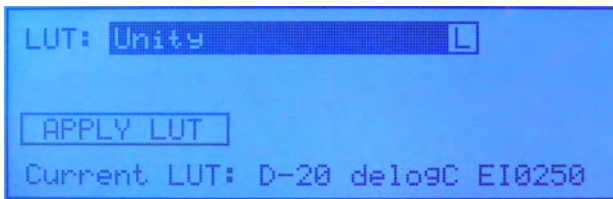
Insert the USB stick with a LUTs folder and touch the ADD LUT menu.



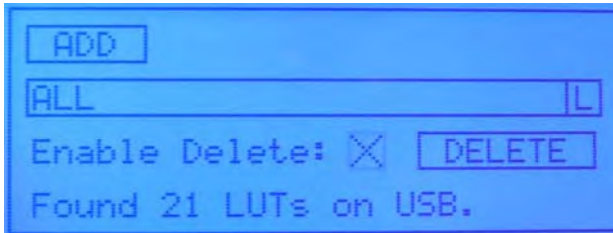
The ADD LUT menu will show the USB mounting and then how many LUTs it finds on the USB stick in the LUTs folder. If you select all then just hit ENTER on the menu to ADD all the LUTs to the OB-1's internal LUT memory.



If you just want to add a single LUT, arrow down to the ALL listing box, hit ENTER to highlight and use the up down arrow to select the required LUT and then cancel un-highlight and then up to the ADD button and hit Enter to ADD that one selected LUT.



OUT LUT - Select LUT button when in EE/LIVE mode to go directly to the menu to apply a LUT. The LUT list shows the LUT selections, use the UP / DOWN arrows to select and then either touch APPLY LUT or touch the LUT button twice, once to apply, once to exit . As soon as you exit the menu the LUT will be applied to the C and D monitoring outputs. Unity represents no LUT applied.



You can Delete LUTs loaded into the OB-1 in the ADD LUT menu, either by selecting ALL or just one LUT, enable Delete using the box and then DELETE. This does not delete LUTs in the USB, only those in the OB-1 memory.

### **Alexa, LUTs and OB-1 Output**

When in ARRIRAW and with the Alexa set as the camera, the OB-1 C and D high quality program de-Bayer viewing output shows the RAW as LOG-C images based upon the settings for Exposure Index (ASA) and White Balance (Color Temp) of the camera.

The monitor output will switch as the camera switches from base EI (160) to full EI (3200) to match the LOG-C viewfinder and preview outputs of the camera so that you can monitor the camera and recorder and see the same image.

As the EI and WB switch on the camera, the OB-1 follows automatically. No user interaction is required.

You can also add 709 video LUTs from the ARRI on line LUT generator or user loaded LUTS into the OB-1. These are built on top of the LOG-C curves from the camera. Use the 10 or 12 bit settings in the LOG generator. LUTs are saved and downloaded on the on-line site as S.two XML 1 D LUTs and can be easily loaded as before.

Access the LUT menu from the LUT button on the OB-1. Select the LUT required, hit either apply LUT, the ENTER button or the LUT button to apply the chosen LUT to the output.

Load LUTs as before from a USB stick, have the required LUTs in a folder on the root of the stick called LUTs. The LUTs should be 1D 10 or 12 bit LUTs in the S.two LUT format with the stwo.xml extension.

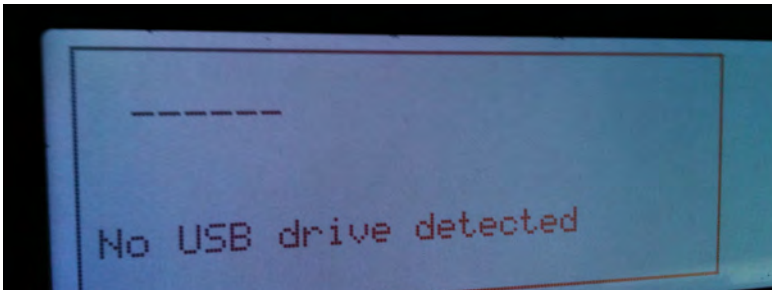
As the LUTs are applied to a LOG-C base from the Alexa, any 1D user generated LUT can be used if based on ARRI LOG-C and in XML format. S.two LUT format is supported in many applications.

## INFO Page

The INFO page in the MENU now has additional information. Your S.two Service representative may ask you for information that is displayed on this page. The page shows current revision of OB-1 software. To check the revision level of FlashMag you can look at the UPD FM menu where it is displayed.

```
OB1 SW Ver: 100018_0
FMag: Detected
OB1 FPGA Ver: 200AB091
INTPOSR Rev: 1
```

## UPD SW



The UPD SW is the update software menu. From here you can apply software updates to the OB-1. Software updates are performed using a standard USB KEY memory stick. The

OB-1 will check if a valid USB drive is inserted with valid OB-1 software on it. If not it will show No USB drive detected. If it is it will show a valid USB with new software version number and ask if you want to proceed.

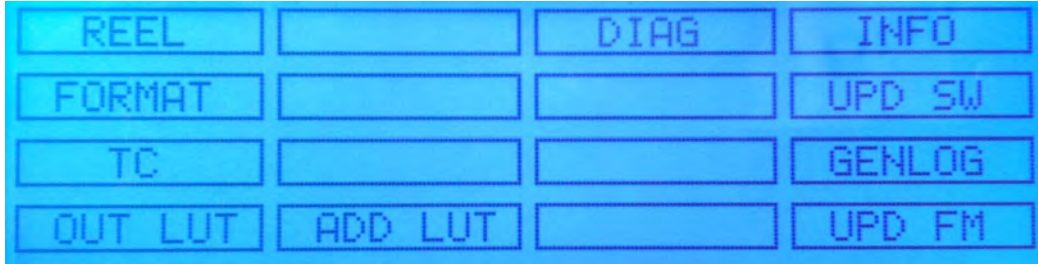
See updating software section below

## GENLOG

The GENLOG is an error and report log menu that can generate and download a log for S.two service to look at. As with the UPD SW menu it requires a USB key to be inserted.

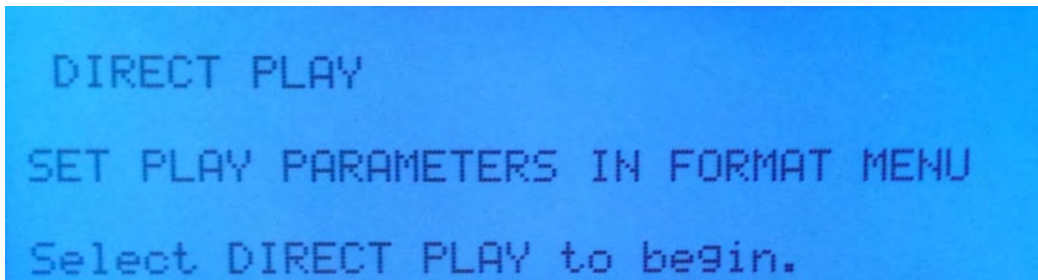
## DIAG MENU

New Menu selection



Select DIAG using the arrows as normal.

When you enter the new menu it shows:



If for any reason the mounted FlashMag does not play you can try the direct play in the DIAG menu. To set the play back format, go to the FORMAT menu and set the format that the FlashMag was recorded at and then go to DIAG and Direct Play and hit enter, the FlashMag will start to play out the A and B ports in original format.

Use the ENTER Button to select DIRECT PLAY MODE. This will bring up a still frame from the first recorded frame on the DMAG. A subsequent push of the ENTER Button will start a playback. The FlashMag will play from the start of the first recording all the way to the end of the FlashMag through all recorded takes. It will not stop at the end of the valid recording. Hitting EXIT will stop playback.

### NOTE

**IF YOU HAVE A FLASHMAG THAT REQUIRES USE OF THE DIAG MENU TO PLAYBACK THEN IT IS POSSIBLE THAT THE FLASHMAG HAS AN ERROR. TRY TO CREATE A NEW REEL AND SEE OF THE MAG WILL RECORD ALL THE WAY THROUGH WITHOUT ANY ERRORS.**

**IF IT DOES THEN ITS OK, IF NOT THEN CONTACT S.TWO FOR SERVICE.**

### Playback software.

From Version 1012 onwards, the application invokes parity playback where the Flash may have encountered a media error during recording. It also allows the OB-1 to play through if there are any issues with errors in metadata.



The software adds a new DIAG menu. This is to be used when the FlashMag will not playback ordinarily. The parity playback should play without having to invoke the DIAG menu.

If you get a FlashMag data error when loading the FlashMag then you can access the DIAG menu by using the ENTER/MENU button. Playback stops when the exit button is pushed.

## OB-1 Operations

The OB-1 is simple to use. All set ups are done on a per Mag basis. Once a Mag is set up it can be easily erased and reused without having to re-enter metadata.

As soon as the OB-1 has power applied and is turned on, it will output live video while starting up (23 444 only at present), which allows shots to be framed immediately even while the system is not ready to record.

OB-1 will indicate its status using the screen color code and report it to the user. Most of the operation can be divided into two sections, set up and using. The OB-1 set up sets the metadata and naming, the recording format and timecode. Once set up, all you have to do is record.

### Main Screen



The main in the center indicates record time left. This is more useful to camera operators than TC numbers which may not be relevant. The actual TC is shown in the lower right hand of the screen. The actual record TC is shown as the main number in playback modes.

## **Connections and Set Up**

Attach power, using 12V or 24V DC from the camera, external battery, or AC adapter.

Once you have the connections made and power applied, turn it on. The main screen shows S.TWO OB-1 logo and the output video displays live images from the camera immediately.

Set up is done on the Reel basis. You can set up a FlashMag on one OB-1 and the production data follows the Reel so you can preset FlashMags before using them on set.

New Reel also includes changes from internal to external LTC.

Any changes to TC or record format require creating a new reel. You cannot mix formats on one FlashMag.

## **Camera Specific Settings**

The OB-1 follows the camera type as set in the FORMAT Menu not only to provide metadata but also to set some camera specific functions. The most notable of these is when using the OB-1 at higher than 30 frame per second rates with either the ARRI or Sony Cameras. This is because Sony and ARRI have different approaches to how to do dual link 422 higher speeds.

So make sure you set the Camera Type when creating your REELS. Sony F35 and F23 behave the same way at higher than 30FPS.

CAM Types

ALEXA

ARRI D-21

Panasonic 3700

OTHER

Sony F23

Sony F35

Sony HDC1500

Thomson / Technicolor VIPER

Others will be added when new feature sets need to be supported.

## **ARRI ALEXA**

444 Use the PsF settings, the OB-1 also supports P Variable frame rate is available from 1 ~ 30FPS

422 Use the P settings at above 30FPS. Note that this is a dual link format so the A and B need to be both connected. Variable frame rate is available from 1 ~ 60FPS

RAW – See section below Variable frame rate is available from 1 ~ 30FPS

P vs PsF Although the Alexa manu at 50FPS shows the output as P not PsF it is a normal segmented format not a true P one. Set the FORMAT to 422 not 422P. Also note that the Alexa in 444 can run true P at frames rates below 30FPS where the Alexa menu says P and actually is rather than PsF.

**Sync with ARRI DTE recordings: OB-1 has full absolute sync with DTE including metadata syncing.**

## **ARRI D-21**

### **444 or ARRIRAW**

D-21 - Use the two A B outputs from one PIM (cables top and bottom)

OB-1 A B inputs.

OB-1 C output for 422 REC709 YUV monitoring.

OB-1 D Output with record indicator in image for 422 REC709 YUV monitoring.

In 444 modes the OB-1 will color space convert dual link RGB for you to allow the use of single link HD monitors.

In ARRIRAW modes the OB-1 will de-Bayer the RAW video into a LOG C HD SDI Single link real time image with minimum delay.

You can apply LUTs to either image.

### **D-21 422 High Speed and variframe**

This differs slightly from the 444 connections as we have to move one of the HD cables at the D-21 end.

Use the A output from PIM one to the OB-1 A input

Use the A output from PIM two to the OB-1 B input

The two BNC from the camera will now be side by side (horizontal) instead of one on top of the other (vertical) as they are in RAW or 444 mode.

Set the REEL on the OB-1 to match the frame rate of the camera.

### **D-21 444 Quad Link - 444 over 30FPS**

This is the same as 422 over 30FPS except the connections

Set up is as two 444 streams.

A B from PIM one goes to OB-1 A B inputs

A B from PIM two goes to OB-1 C D inputs

Set 444 48, 50 or 60 FPS on OB-1 FORMAT, set variframe if required.

Set play to match production frame speed, 23, 24 or 25FPS.

Set camera to match as above.

NOTE: The camera has two main settings for speed, the video rate and the shutter rate, the video rate is constant, the shutter rate and captured frame rate within can vary.

If you want to use off-speed or variable frame rates then set the variframe flag to on in the FORMAT menu on the OB-1 along with the maximum frame rate (50 or 60FPS) and the desired production frame rate (normally 24 or 25FPS), then set the video rate on the camera to the highest required speed, normally 50 or 60FPS. Then you can choose any frame rate within that from the shutter speed of the camera. The OB-1 will only record the frames marked from the shutter so if you want 48FPS then that is what you will end up with.

Example:

Set the OB-1 to 422 60FPS with 24FPS play rate, check the variframe box

Set the D-21 to 422 60FPS

Set the D-21 shutter (using the RCU or other remote) to 48.00FPS

Start the Shutter RUN

REC on OB-1

Stop rec

Playback will automatically switch to 24FPS and show the slow motion at half captured speed with correct 24FPS timecode.

NOTE: D-21 now has an available update that supplies both quad link 444 and remote REC STOP START from the camera.

### **Sony F35 / F23**

#### **444**

Use the Sony supplied breakout box.

Connect the A and B out to the OB-1 A and B inputs.

Set frame rate (23, 24, 25, 29, 30FPS) on camera and OB-1 in format menu.

#### **422 50FPS (F35) 60FPS (F23)**

Connect the A and B out to the OB-1 A and B inputs.

Set frame rate (50FPS) on camera.

OB-1 frame rate and play out (23, 24, 25FPS) PLUS CAM TYPE (F35) in FORMAT menu.

NOTE:

1. Variframe is not supported with this camera yet.
2. You can record at one rate and play at another, for instance 30FPS record and play at 24FPS.
3. REC Stop Start from camera head expected shortly.
4. F23 operation is the same except that it can also support 59.94 and 60FPS.
5. When using Panavision Genesis camera use Sony settings
6. You **must** set the camera type in the format menu as this tells the OB-1 what to expect when using higher frame rates as there is a difference between Sony and ARRI/Panasonic on how data is sent through dual link 422.

## Turn On and Use

The On is a toggle switch on the output side of the OB-1. Up is ON and Down is OFF. The OB-1 displays S.two Logo as it boots. Boot time is around 30secs or so.

As soon as the boot has finished, the main screen comes up, if it's blue then you're ready to go, if it's orange then you have a cable or format issue to look at.

Attach LTC input if using external code. The OB-1 has no problem with gaps in TC and does not need pre-roll or run up space. It starts and stops instantly. If using external code then the rolling input TC is shown in the bottom right corner of the main screen. If set to EXT TC and there is no TC connected the OB-1 will flash the input error message.

The OB-1 has intelligence throughout its operations. It will sense input formats and flag when there is a mismatch from the REEL settings.

**IF IN DOUBT - READ THE SCREEN!**

If there is a problem, the OB-1 main screen will display a flashing yellow / orange color and flash the tally light (if connected) and list the input format that it is expecting or if a cable is missing or bad.

To record, hit RECORD. The OB-1 screen turns red so you can see it's recording from across the set and lights the tally (if connected). The screen brightness is dimmed so there is little chance of light leakage to the front of camera. While the OB-1 is in record the main number indication shows a countdown of remaining record time. The lower right hand shows incoming sync TC if in external code mode, the left hand of the screen shows if the TC is set to INT (internal TC) or EXT (external TC).

When recording the GPO lamp (if connected) will light and the D monitoring output has a moving red rectangle in the lower right screen as an indication that the OB-1 is recording. In ARRIRAW 4 x 3 modes this indication is outside of the main image area. In Arriraw anamorphic mode then the rec is below the main image area to the right hand side. In normal 16 x 9 recording modes then it is in the lower right but the movement means that no image is permanently obscured.

To stop recording, hit the RECORD button again.

### Summary

1. Make connections
2. Power up
3. Record
4. Stop Recording

## Play Modes

The OB-1 supports a variety of differing play modes for on set and offload uses. The Play screen is green, the color coding makes it easier to see what mode you are in from a distance.



When you hit PLAY following a recording, the OB-1 screen will go Green and the output will show the play video (A - B link will show 444 or RAW, the C will show 422 709 color space converted or de-bayered material).

The OB-1 will default to show the last take recorded. When you go to the PLAY menu from LIVE then the OB-1 will show the first frame of the last recorded take. The default PLAY MODE is PLAY TAKE. The OB-1 will play from the first frame of the take to and stop at the last frame of the take. Hit Play again to stop playback (STILL).

Use the UP / DOWN ARROW to access different takes.

If the OB-1 play mode is set to Play Take then it will only access that take.

If set to play Scene it will only access takes in that Scene.

If set to Play Reel then it can access any Take on the FlashMag.

To play out the whole Reel have the Play Mode set to Play Reel.

The UP/DOWN arrow will access the first and last frame of each take when used. So you will see the first frame of a take and the subsequent push will show the last frame of the same Take.

The next push will show the first frame of the next take.

USE the LEFT / RIGHT ARROW to JOG FORWARD and REVERSE one Frame.

Holding the left or right arrow down will access the fast forward or reverse play functions.

Touch the arrow once and you will jog forward (right arrow) one frame or reverse (left arrow) one frame.

Hold the arrow down and you will play forward (right arrow) normal speed or reverse (left arrow) normal speed.

Continue to hold the arrow down and the OB-1 will play at 5x normal speed (forward or reverse, right /left arrows).

Continue to hold the arrow down and the OB-1 will play at 10x normal speed (forward or reverse, right /left arrows).

To toggle play modes use the ENTER / MENU button.

The Play menus have greatly enhanced playback speed selection plus a display echoing the play status in the top left hand corner of the Play Display.



When you first go into the play function from EE then the OB-1 will automatically park at the first frame of the last recorded take. To Play this take then hit PLAY button. The OB-1 will Play at normal play forward speed.



The OB-1 now also has vari-speed functions turned on. You can access this via the NEW SCENE button. Hit NEW SCENE from Play and the OB-1 will play at 2x speed indicated as PLAY 2.0 in the status, Hit it again and it will go to 4.0 or again and it will go to 0.1 for 1 tenth speed play out, then again to 0.2, then 0.3, 0.4, then .05, then back to 1.0 play.

Use the LEFT and RIGHT arrows to jog single frames using a single touch, RIGHT ARROW jogs forward one frame, LEFT ARROW jogs backward one frame.

Invoke Fast Forward (FFWD) or Rewind by holding the LEFT or RIGHT ARROW down. RIGHT Hold down moves the OB-1 forward at 1.0 speed, continue holding and it then moves to 5x speed, continue holding and it moves to 10x speed. The LEFT ARROW does the same for reverse play at 1.0, then REWIND at 5x, then REWIND at 10X.



### **Play out at captured frame rate mode**

There is a new feature for Playback which allows dual link high-speed and off-speed material to be played out at the original camera speed via the A and B ports.

This is useful for capturing 50FPS data for 23.98 delivery where you may want to make a video tape copy of the 50FPS as 50FPS for use in VFX.

To use, select PLAY on the OB-1. Check playback as normal, all functions are as before.

To invoke the mode, press the CANCEL/EXIT button, you will notice the frame rate change on the monitor, connect the A and B links to the other device and playback back. The OB-1 will follow the normal loop and Play Take, Scene and Reel settings. The mode is cancelled when you go back to EE.

NOTE the timecode is set to the OUTFPS on the data so it cannot be used to make copies downstream.

Example:        RECFPS = 50.00

                  OUT FPS = 23.98

                  Normal play and TC is at 23.98 on the C and D outputs.

                  Select EXIT and the A and B are now set to dual link 2 x 422 25PsF

                  VITC and control TC is still at to 23.98

### **Play Modes**

PLAY TAKE – Plays chosen take from beginning to end and stops

LOOP TAKE – Plays chosen take continuously from beginning to end

PLAY SCENE – Plays all the takes in a scene from beginning to end and stops

LOOP SCENE - Plays all the takes in a Scene continuously from beginning to end

PLAY REEL – Plays the whole reel from beginning of first take to end of last take.

LOOP REEL – Plays the whole reel continuously from beginning of first take to end of last take.

## **Maintenance**

The OB-1 and FlashMag are essentially maintenance free.

**There are no user serviceable parts inside either device.**

**Opening the OB-1 or FlashMag will invalidate the Warranty.**

**Opening the OB-1 or FlashMag could damage sensitive components and violate the thermal characteristics of the fanless OB-1.**

If you see problems with the OB-1 please contact S.two service.

We will always ask for the log file so please include that with your request. The Log file can be downloaded from the OB-1 by sticking in a USB memory key and hitting ENTER in the GENLOG box in the GENLOG menu under the main menu.

With most issues the user will come across are easily identified from the main OB-1 screen. If its orange, you either do not have input video connected cleanly, or no external timecode when you are set to timecode or you have the Reel set to record a different format than the camera is supplying.

If the FlashMag shows that it has 000 record time left, then the mag will need offloading and a new reel created after the material has been copied. This may happen if the OB- experiences a large glitch in the input HD-SDI. This glitch may be coming from the source itself. If you experience a lot of these then it is recommended to reset your camera and check the video cables used to connect the OB-1 to the camera. This may also happen if there are repeated power hits.

## Troubleshooting

Or what do I do if I get an error.

1. **Losing power in the middle of a record.** The OB-1 now has an auto-recovery mode. If you are rolling a take when you lose battery power, as soon as power is restored the OB-1 will attempt to recover the last take to the point of power loss. As the OB-1 boots you will see the message 'SCANNING', after a few seconds ( could be up to a minute, depending on the length of take), the OB-1 will come back to its normal operating screen. At this point you MUST reboot again to seal the take info., When the OB-1 reboots you can continue recording on the FlashMag.
2. **Input error.** The main OB-1 screen is flashing orange/blue. First check the format setting of the OB-1, does it agree with the signal coming from the camera. If it does, check the camera is really doing what it says it is. Then check the cables coming from the camera. The cables should be 1 metre in length or longer. Check the cables by plugging them directly into the on board HD-SDI monitor and checking the signal. Check also that you do not have the OB-1 set for EXTERNAL TC input, the OB-1 will flash the input error if the TC is Not connected – check the lower right hand corner of the main screen to see if the input tc is rolling, make siure the input TC is the same frame rate as the format set on the OB-1. If this still fails to solve the issue, check the BNC A and B input of the OB-1 for damage. BNC can wear so check the middle pin on both the input cables and the OB-1 chassis. You can re-format the FlashMag making sure you have the correct setting.
3. **High Speed playback is 'jumpy' or strobos.** Make sure that you have the correct camera type set in the FORMAT menu. Each camera does high speed in different ways. There are three main types, true P, not in general use at this point, PsF, used by the ARRI D-21, and SMPTE 372 used by Sony F35 and ARRI Alexa cameras (although they are slightly different). Make sure you select the correct camera type in the FORMAT MANU as this CAM setting changes how the OB-1 is looking for the frames or fields to come in and the frame flagging and metadata. If you have D-21 selected for 50FPS 422 and you are running an Alexa, then the frames will be jumpy and will strobe, and vice versa.
4. **TC is offset or not in sync.** Run a TC sync check, you should do this is this is the first time used in a setup to check the delays from the TC master. Easiest way is to use a

smart slate with running TC on it, shoot this and have it and the OB-1 using the same TC. Record a few seconds, then playback. Check the indicated TC on the Image and see what the OB-1 TC reports on the main (green) screen. Apply offsets as indicated. The frame difference between the image and the OB-1 is your offset. If you cannot read the TC clearly in the Image then you may want to consider applying sync to the camera head so that it is in sync with the TC. If using multiple cameras then you really ought to consider doing this as it is the only way to guarantee that different cameras are on the same frame and updating together.

5. ***I Lost power during a record and now can't get the mag to record.*** See section above – In short, when power is lost, the OB-1 when power is supplied back needs to recover the dat and seal it in before it can continue to make new takes. So as soon as power comes back up, re-power the OB-1 again. After that you can continue recording.
6. ***OB-1 stops a great deal when I supply power from the camera head.*** – This is usually due to the camera head power output being set to a low voltage or varying the voltage while running. On the D-21 and Alexa use the 24V DC RS outputs not the 12V DC accessories as the 12V Dc varies with input power.

## Software Updates

### Updating Software

The OB-1 adds features and enhancements reprograms hardware and adds capabilities via external software updates.

The updates are made by the user via the USB socket found on the output side of the OB-1. When updates are available S.two will alert your local dealer or service provider and announce on the web site under service.

#### Notes on USB Keys

Use a standard USB key formatted to work on normal windows. Any that you buy should be OK. The only thing to watch for is that the USB key does not have an auto-install folder or if it does you can delete it.

Also make sure that you only have one S.two install or update file on it. If there is an older one on there then please delete that one before putting another later S.two OB-1 update file.

The USB key also needs to have empty space on it as the OB-1 uses it as unpacking space. At least 32mb is required.

Some updates will mandate the re-formatting of the FlashMags for compatibility reasons. The OB-1 software update contains multiple update files for all parts of the OB-1 and FlashMag. Where the update contains FlashMag compatibility updates requiring re-formatting of all FlashMags this will be flagged in the update release document sent with the update availability notice.

Use this release note for new features, for reference of OB-1 operation please see the manual available at:

[http://www.stwo-corp.com/manual/OB\\_1/ob1\\_users\\_guide\\_1\\_7.pdf](http://www.stwo-corp.com/manual/OB_1/ob1_users_guide_1_7.pdf)

The software is available at:

[http://www.stwo-corp.com/update/ob\\_1\\_software/Newest\\_Updates/install\\_ob1\\_10020\\_00.sh.zip](http://www.stwo-corp.com/update/ob_1_software/Newest_Updates/install_ob1_10020_00.sh.zip)

**Please make sure you read the all of this release note BEFORE applying an update.**

**ANY ISSUES PLEASE CONTACT S.TWO SERVICE AT +1 775 853 9999 OR VIA EMAIL AT [SERVICE@STWO-CORP.COM](mailto:SERVICE@STWO-CORP.COM) OR [INFO@STWO-CORP.COM](mailto:INFO@STWO-CORP.COM)**

**To update:**

**First – Make Sure you have solid power before embarking on any updates. It is preferred to use the AC power supplied with the OB-1 rather than battery sources.**

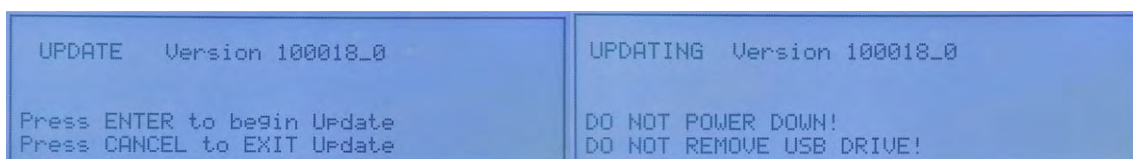
Download the install package from S.two. Unzip the package to your USB drive.

Copy the intact file to the USB stick

Plug the USB stick into the OB-1

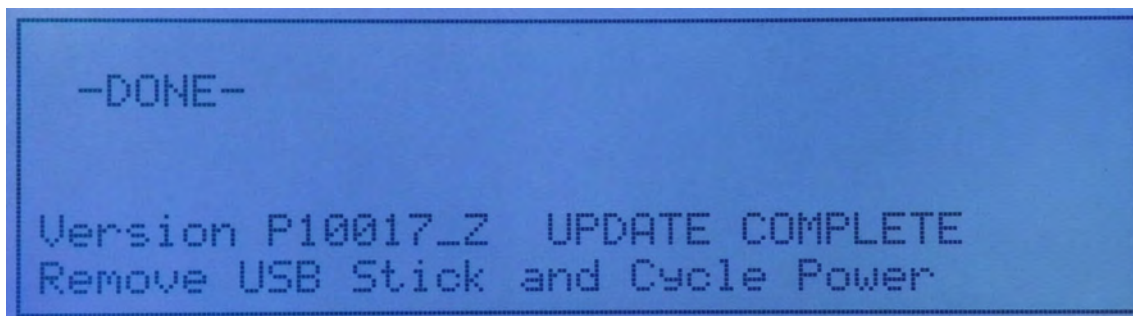
Go to the UPD SW menu from the Main MENU.

If the USB stick is valid the OB-1 will read the next install version number automatically and ask if you want to install the new update.



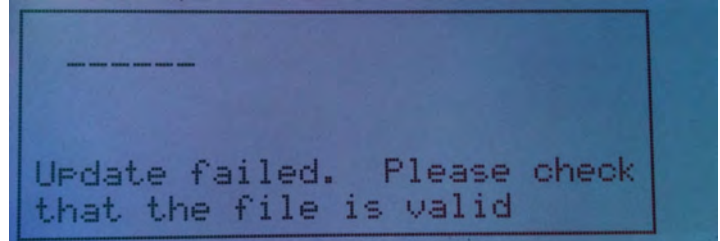
Select Apply by hitting the ENTER button and the screen will show the update applying.

As soon as the update process begins, make sure that the OB-1 is not turned off, or power is not disconnected or otherwise disturbed. The Update takes several minutes.



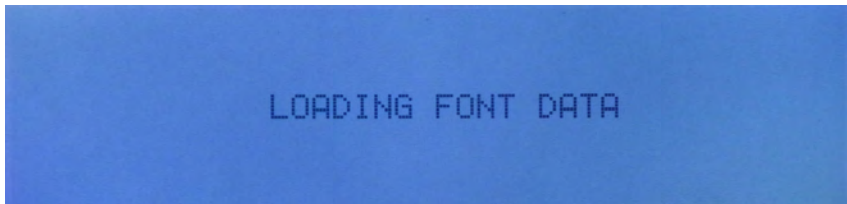
When the Update cycle is done, the OB-1 will tell its DONE and the message and will remind you to remove the USB Stick and power cycle the OB-1 so that the new software takes effect. The OB-1 will not allow you to enter any menu until you have rebooted after an update.

If you have a problem with the USB or you have inadvertently unpacked the install files then the OB-1 will display an update failed message. If you get this message, check the USB memory stick for any install folders and delete them and check that the S.two install file is the same size as the download file that is on-line.



**NOTES:**

When you first boot up after installing the new software, you will see a 'LOADING FONT DATA' message, wait until this is done, do not power down during this message.



It will be there for about 30 seconds or so. This message and the slower boot time is only for the first boot up after an update.

The update will erase the internal LUTs folder, make sure you have this backed up on a USB stick so you can upload them again.

There is a back up config file now stored on the OB-1. If this is invoked, The OB-1 will not remember its last settings so you will have to enter them again.

If you run into a power issue during updating, contact S.two support.

## UPDATING FLASHMAG FIRMWARE

Use the menu item in the main menu called UPD FM to update FlashMag firmware.



This allows the updating of the FlashMag internal programming.

### Before you start.

Offload the contents of the FlashMag. Download the new FlashMag program

[http://www.stwo-corp.com/update/ob\\_1\\_software/Newest\\_Updates/fm\\_update\\_01.0B.06.sh.zip](http://www.stwo-corp.com/update/ob_1_software/Newest_Updates/fm_update_01.0B.06.sh.zip)

And load onto a USB stick. Unzip the file on the stick and make sure that it is in the root directory. **Move the OB-1 update file and the zip from the root to a sub-directory so that only the fm\_update\_01.0B.06.sh is in the root of the USB.**

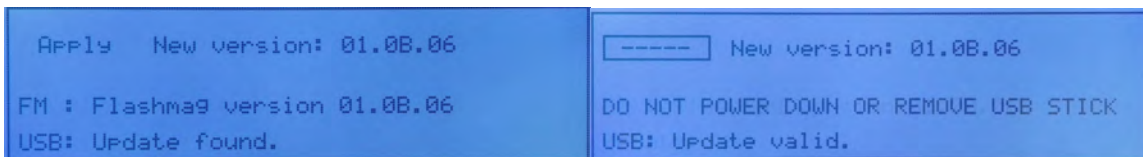
Load a FlashMag onto the OB-1 and plug in the USB stick with the software on it.



You will see this message if there is no USB drive detected

You will see this message if the software is not in the root of the USB drive or is still zipped.

If you have the software correctly loaded on the USB drive you will see this message:



Hit the ENTER button to start applying the update. While applying you will get messages.

Hit the ENTER button and the OB-1 will start applying the update – Take note that the software does the three steps which it will do automatically.

It will show first 1/3, then 2/3 then 3/3. MAKE SURE ALL THREE STEPS WERE REPORTED. If it did step 1/3 then skipped 2/3 and 3/3 then apply the update again.

```
----- New version: 01.0B.06  
  
DO NOT POWER DOWN OR REMOVE USB STICK  
Update: Applying update 3/3...
```

```
----- New version: 01.0B.06  
  
Flashma9 updated successfully!  
Please restart the unit!
```

REBOOT the OB-1 To see the change you must CREATE REEL and record again.

NOTES:

**DO NOT POWER DOWN WHILE UPDATING.**

## History

### Hardware

- REV B – Male Fischer socket – Pin 3 is hot (+V)  
Audio prep  
Remote Control Prep
- REV C - Male Fischer socket – Pin 2 is hot (+V)  
Additional internal changes  
C output revision for glitches in output Video
- REV D - Revised internal power management for FlashMag mount and un-mount
- REV E - Revised internal channels for high speed Quad link recording. All OB-1 will have this hardware update applied for free if returned to factory for service or if Quad Link is required.
- REC F - Revision to OB main Board for potential sparkle on output ONLY – visible on some CRT monitors

**NOTE: All Rev B OB-1 are required to be returned to factory for REV E updates.**

**Interposer = 0 in info page on OB-1 indicates REV D level hardware.  
Return to factory for updating is recommended.**

### Compatibility:

**FlashMags created any software level below 01015-RC13 will not play on OB-110016.**

**FlashMags created on V.10015-RC13 will not play on OB-1 running any previous release.**

### Known Bugs

If in the main menu when inserting a USB stick it may make the menu unresponsive. If you find this then remove the USB stick until you are in the update menus. Or reboot the OB-1.

The USB may take some time to register in after inserting into the OB-1 USB port. If it does not appear after a minute or so, reboot the OB-1.

If you cannot complete a FlashMag firmware update please contact S.two service. There is a chance that the FlashMag can be damaged if the update is interrupted or the file is corrupted. The FlashMag may have to be returned to S.two for service. FlashMags are turned around in S.two service facility same day.

### CONTACT:

**S.two service and support at:**

[info@stwo-corp.com](mailto:info@stwo-corp.com)

[service@stwo-corp.com](mailto:service@stwo-corp.com)

[support@stwo-corp.com](mailto:support@stwo-corp.com)

or at +1 775 853 9999

## ***Appendix***

*Connectors*

*Wiring Diagrams*

*Specifications*

*Revisions*

*FlashDock description*

## Power

OB-1 has an intelligent DC power supply. It allows any DC voltage from +10V to +36V.

The OB-1 is intended to be supplied either 12V nominal (14.4 actual) or 24 V nominal ( 28.8 actual) voltages and is quite happy accepting either, making it easily mounted on all major camera types or allowing it to be used with any kind of battery or DC supply.

Power draw at 12V DC is less than 21Watts. Actual figures will be in the specification sheet of the provisional manual.

OB-1 is supplied with a small in line universal AC power supply rated to accept any normal AC input from 100~250VAC 50/60Hz without the need to switch. It has a captive cable DC output with the OB-1 Fischer connector. This supply outputs 12V DC.

D-21 NOTE: Use the RS 24V DC output on the D-21 to power the OB-1 rather than the 12VDC accessories supply.

The OB-1 Features a 3 pin Fischer male connector for DC power input requiring a female 3 pin on the cable as the mate for DC in.

Fischer part numbers are:

3-pin Connector PN# SC-102-Z052-130+

Cable clamp PN# 102.248+A Cable Dia 4.3mm to 4.7mm

Recommended Cable Belden 20 AWG PN# 8205

Wiring is:

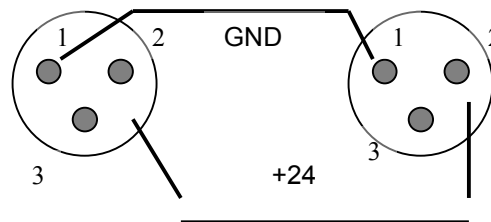
pin1 ground  
pin2 +V  
pin3 NC

Please contact S.two for any further information or clarification if required.

Sample wiring for connection to the RS 24V DC output from an ARRI D-21.

OB1 D21 OB-1 female Fischer, Camera end- Male Fischer

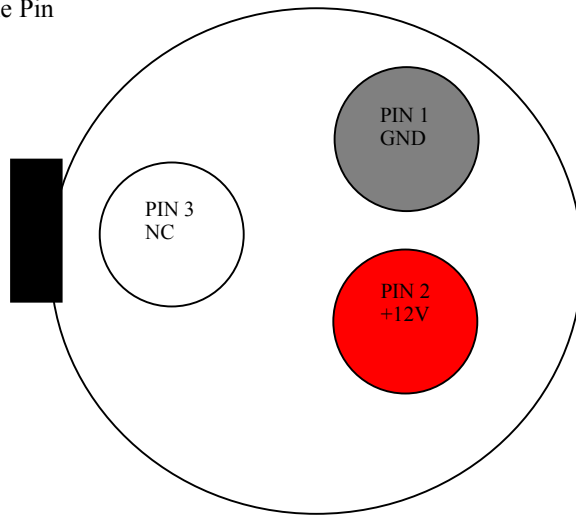
Pin 1 -----Ground----- Pin 1  
Pin 2 -----+24----- Pin 2  
Pin 3 Pin 3 N/C



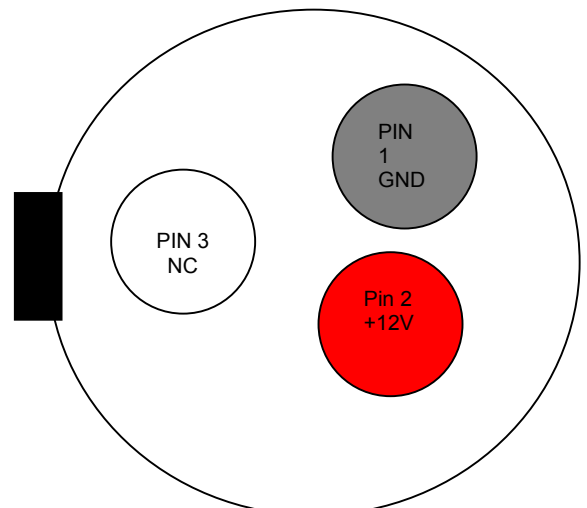
## OB-1 Power 3PIN Fisher Pin Out

<b>Manufacturer:</b> 3 Pin Fisher Female <b>Manufacturer Part #:</b> SC-102-Z052-130+ (F) <b>Cable Clamp Part #:</b> 102.248+A Cable Dia 4.3mm to 4.7mm		<b>Manufacturer:</b> 3 Pin Fisher Male <b>Manufacturer Part #:</b> SC-102-A052-130+ (M) <b>Cable Clamp Part #:</b> 102.248+A Cable Dia 4.3mm to 4.7mm	
<u>Fisher Pin:</u>	<u>Description:</u>	<u>Fisher Pin:</u>	<u>Description:</u>
1	Ground	1	Ground
2	+12V	2	+V (10-36VDC)
Preferably 20guage wire See OB-1 manual page 32			

Fisher Female Pin  
Back of Plug



Fisher Male Pin  
Back of Plug



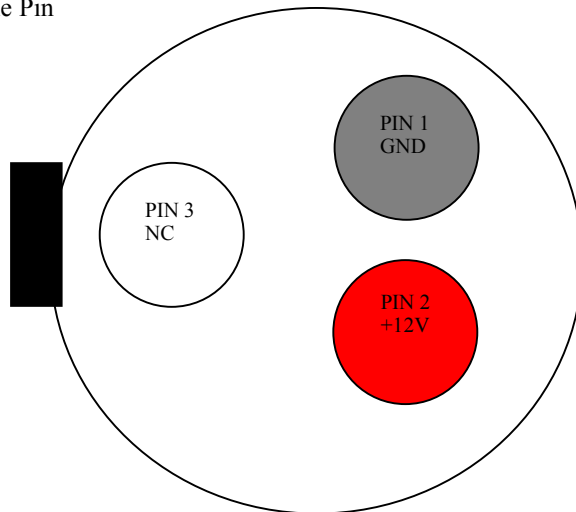
**WARNING:** Any signals going to the pins other than the ones mentioned above may harm the OB-1

\* ONLY USE THE PINS MENTIONED ABOVE\*

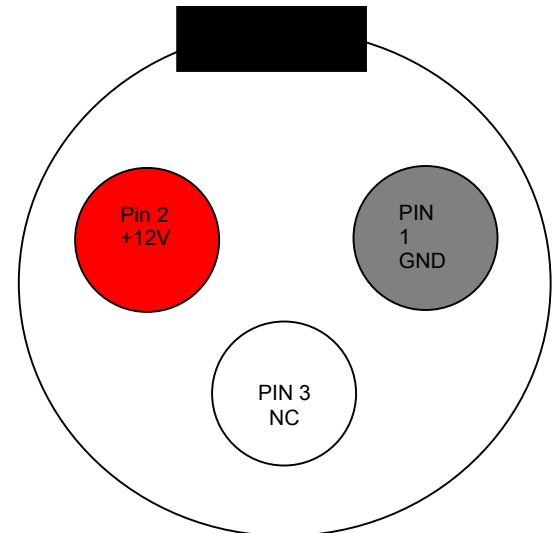
## OB-1 Power 3PIN XLR Pin Out

<b>Manufacturer:</b> 3 Pin Fisher Female <b>Manufacturer Part#:</b> SC-102-Z052-130+ (F) <b>Cable Clamp PN#:</b> 102.248+A Cable Dia 4.3mm to 4.7mm		<b>Manufacturer:</b> 3 Pin XLR Male <b>Manufacturer Part #:</b> NC3MX	
<u>Fisher Pin:</u>	<u>Description:</u>	<u>Fisher Pin:</u>	<u>Description:</u>
1	Ground	1	Ground
<b>2</b>	<b>+12V</b>	<b>2</b>	<b>+V (10-36VDC) Arri Power</b>
Preferably 20guage wire See OB-1 manual page 32		This wiring for ARRI and most others <b>NOTE Panavision uses Pin 1 as the +hot lead</b>	

Fisher Female Pin  
Back of Plug



XLR Male Pin  
Back of Plug



**WARNING:** Any signals going to the pins other than the ones mentioned above may harm the OB-1

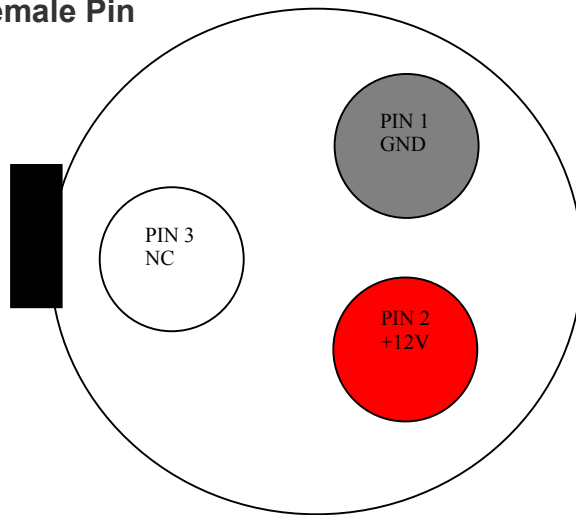
\* ONLY USE THE PINS MENTIONED ABOVE\*

## OB-1 Power 4PinXLR Pin Out

<b>Manufacturer:</b> 3 Pin Fisher Female <b>Manufacturer Part #:</b> SC-102-Z052-130+ (F) <b>Cable Clamp Part #:</b> 102.248+A Cable Dia 4.3mm to 4.7mm		<b>Manufacturer:</b> 4 Pin Neutrik XLR Male <b>Manufacturer Part #:</b> Neutrik NC4MX XLR Male Nickel 4-Pin	
<b>Fisher Pin:</b> 1 <b>2</b>	<b>Description:</b> Ground <b>+12V</b>	<b>XLR Pin:</b> 1 4	<b>Description:</b> Ground <b>+12V – 30V</b>
Preferably 20guage wire See OB-1 manual page 32			

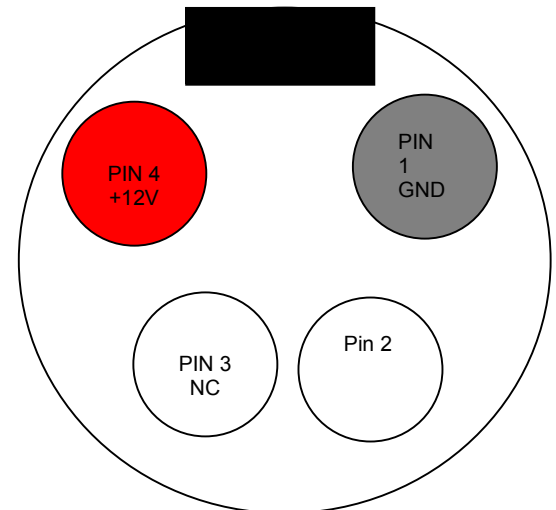
### Fisher Female Pin

Back of Plug



### XLR Male Pin

Back of Plug



**WARNING:** Any signals going to the pins other than the ones mentioned above may harm the OB-1

\* ONLY USE THE PINS MENTIONED ABOVE\*

## OB-1 Power PTAP Pin Out

**Manufacturer:** 3 Pin Fisher Female  
**Manufacturer Part #:** SC-102-Z052-130+ (F)  
**Cable Clamp Part#:** 102.248+A Cable Dia 4.3mm to 4.7mm

<u>Fisher Pin:</u>	<u>Description:</u>
1	Ground
2	RS422 RX IN +

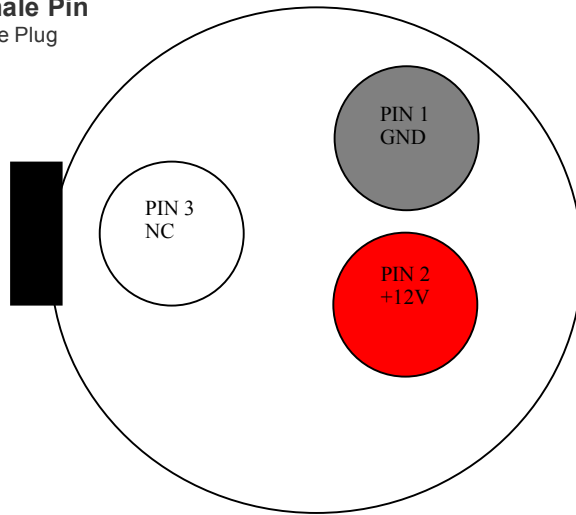
Preferably 20guage wire  
 See OB-1 manual page 32

**Manufacturer:** 2Pin P-Tap Male  
**Manufacturer Part #:** PN#:

<u>P-Tap Pin:</u>	<u>Description:</u>
1	Ground
2	+V (10-36VDC)

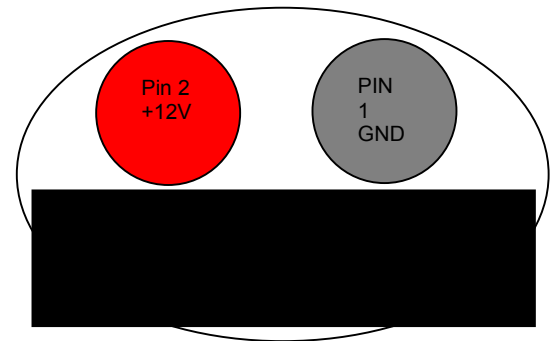
### Fisher Female Pin

Back of Female Plug



### Ptap Male Pin

Back of Plug

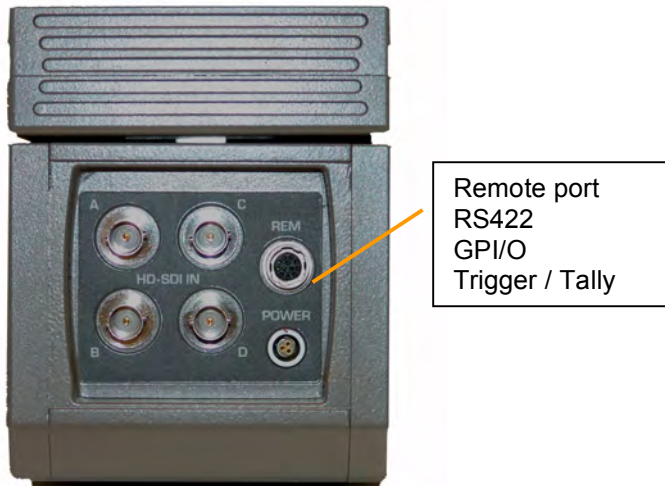


**WARNING:** Any signals going to the pins other than the ones mentioned above may harm the  
 OB-1

\* ONLY USE THE PINS MENTIONED ABOVE\*

## OB-1 Remote Connector

The OB-1 remote connector is a multi-pin Hirose that combines several functions. It has RS422 and GPI/O trigger / tally.



The mating Hirose connector to the OB-1 remote socket is:

**HR-10A-10P-12P73**

### Trigger / Tally Connections

The GPI / GPO (trigger / tally) is run via the REMOTE socket on the rear connector panel of the OB-1. The mating Hirose connector to the OB-1 remote socket is:

#### HR-10A-10P-12P73

The voltage swing on both the output for Tally and input for Trigger is +3.3V (NOT 5V!) so use parts accordingly.

#### GPO - TALLY

The tally output will light a remotely wired LED when the OB-1 is in record.

The light will indicate when the OB-1 is in record. In addition the light will flash when the OB-1 senses an input error. The light will stay on for the duration of the record. It will turn on regardless of whether the record is started from the OB-1 record button or from an external trigger.

The tally is powered from the OB-1 itself so does not require any additional circuitry or external power. If it is necessary to run the tally very long distances (greater than 30ft) please contact S.two service department.

Pin 10 of the Hirose connector to cable to anode side of LED.

Pin 4 of the Hirose Cathode side of a 3.3V LED via 220 ohm resistor.

#### GPI – Trigger

The trigger is a remote record stop start function for the OB-1. It will start a record when the OB-1 is in the normal EE screen. It will not start a record if the OB-1 is in PLAY mode or in a menu or set up mode.

The trigger uses a momentary switch, not a latch. It works on a pulse to start, and a pulse to stop. Again, this is a 3.3V circuit not a 5V one.

Pin 6 (POSITIVE) of the Hirose connector.

Pin 5 (GND) of the Hirose connector.

#### HIROSE (OB-1) END

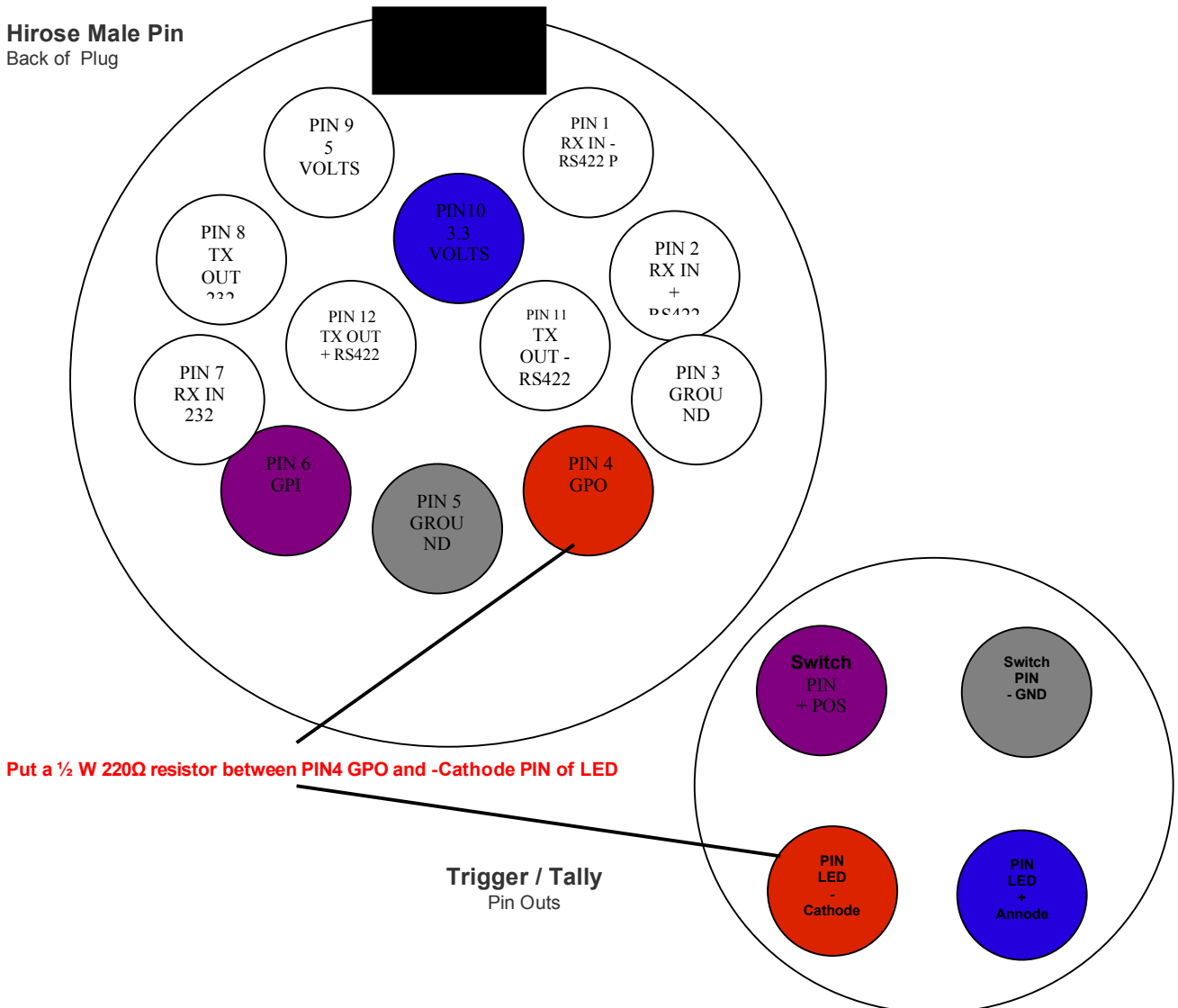
<b>PIN 4</b>	-----220Ω resistor-----	<b>cathode side 3.3V LED</b>
<b>PIN 5</b>	-----GND -----	<b>- side of momentary switch</b>
<b>PIN 6</b>	-----POS -----	<b>+ side of momentary switch</b>
<b>PIN 10</b>	-----	<b>anode side of 3.3V LED</b>

FOR REFERENCE WE HAVE PROVIDED DIAGRAMS FOR PRESTON LENS REMOTE SYSTEM AS THIS CAN ALSO BE USED TO TRIGGER THE OB-1

## OB-1 REM Port GPIO Pin Out

<b>Manufacturer:</b> 12 Pin Hirose Plug Male <b>Manufacturer Part #:</b> HR10A-10P-12P (73)		<b>Manufacturer:</b> 3.3V 20mA LED and Momentary Switch <b>Manufacturer Part #:</b> custom built	
<b>Hirose Pin:</b> 4 5 6 10	<b>Description:</b> GPO GROUND GPI 3.3 Volts	<b>Remote Pin:</b> LED Switch Switch LED	<b>Description:</b> - Cathode Ground GPI + Annode
Page 39 of OB-1 manual			

### Hirose Male Pin Back of Plug

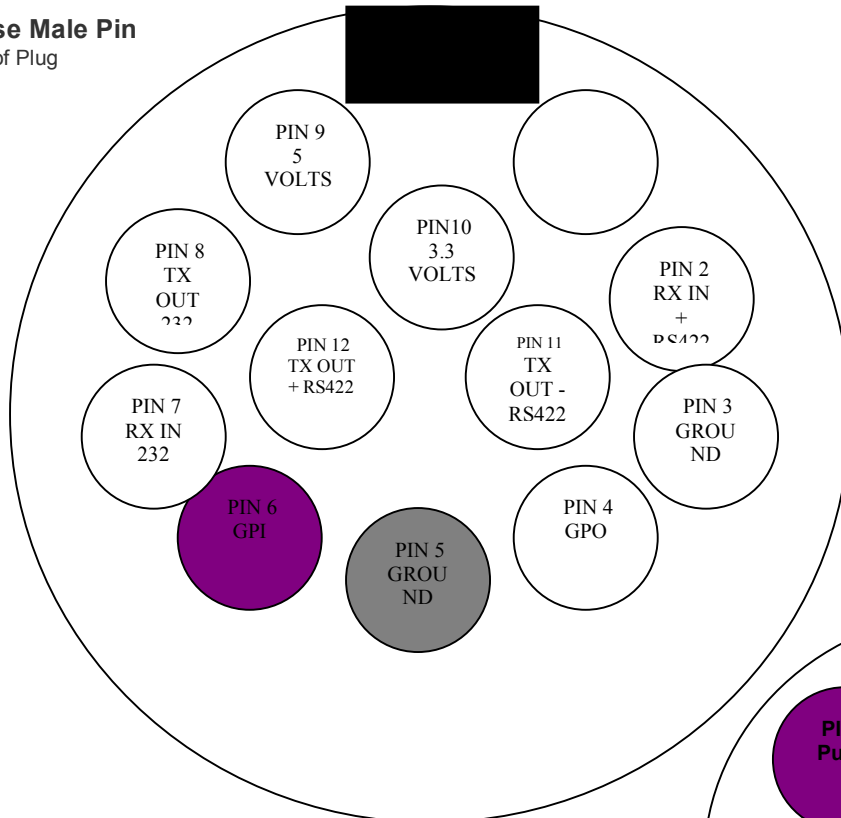


**WARNING:** Any signals going to the pins other than the ones mentioned above may harm the OB-1  
 ONLY USE THE PINS MENTIONED ABOVE\*

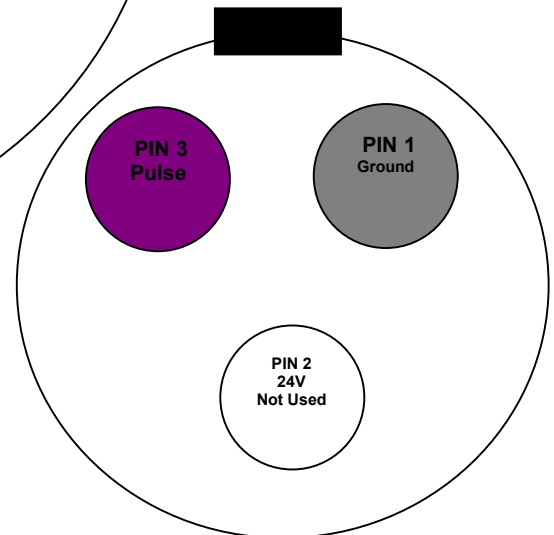
## OB-1 REM to PRESTON Pin Out

<b>Manufacturer:</b> 12 Pin Hirose Plug Male <b>Manufacturer Part #:</b> HR10A-10P-12P (73)		<b>Manufacturer:</b> 3 Pin Fisher Plug Male <b>Manufacturer Part #:</b> SC-102-A052-130+ (M) <b>Cable Clamp Part #:</b> 102.248+A Cable Dia 4.3mm to 4.7mm	
<u>Hirose Pin:</u> 5 6	<u>Description:</u> GROUND GPI	<u>Fisher Pin:</u> 1 3	<u>Description:</u> Ground Pulse
See OB-1 manual page ??			

### Hirose Male Pin Back of Plug



### Fisher Male Pin Back of Plug



**WARNING:** Any signals going to the pins other than the ones mentioned above may harm the OB-1

\* ONLY USE THE PINS MENTIONED ABOVE\*

## RS422 Control Cable

The OB-1 has basic RS422 remote support. This is based upon a Sony type protocol.

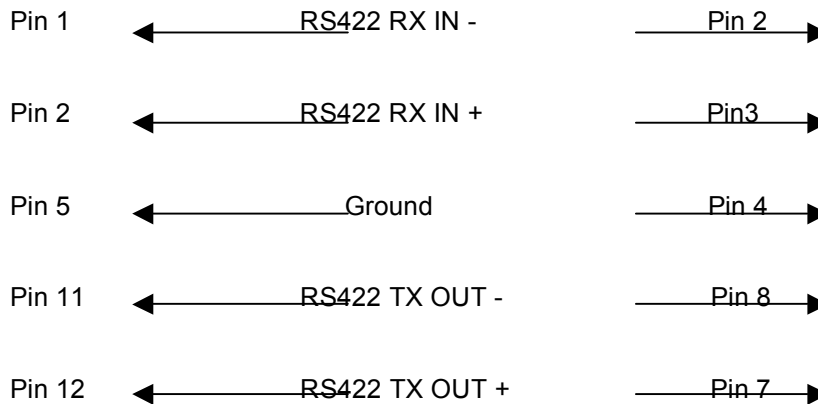
The mating Hirose connector to the OB-1 remote socket is:

### HR-10A-10P-12P73

Pin out Instructions for the OB-1 RS422 Breakout Cable.

Male Hirose Connector

Female DB9 Connector



#### Notes:

Use a shielded 5 conductor cable with outer ground braid or wire.

Assemble cable per pin outs above.

Use outer ground braid/wire to ground the shell of both the Hirose and DB9 connectors.

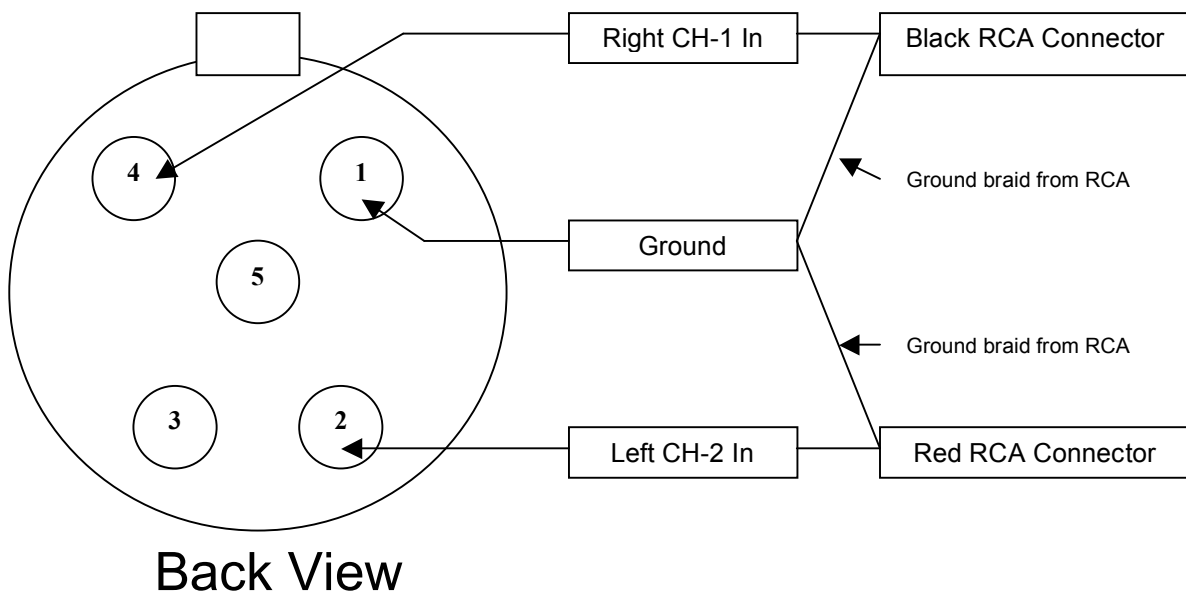
You can combine the RS422 with GPI/O in a single cable or have each on independent plugs and cables.

### OB-1 External Audio Cable Pin out

The audio input of the OB-1 is an unbalanced stereo pair on a mini XLR. It is designed to work with any of the wireless production sound dept. transmitters including basic headphone sets. This is to maintain the un-tethered nature of the OB-1 on board recorder. Although there is no record level controls of the audio input the OB-1 features a very wide ranging threshold and superior Analog to digital conversion meaning that any unbalanced level is Ok including line level or headphone level.

Mini XLR Connector 5P Plug Male

Manufacturer: Switchcraft  
Manufacturer Part #: TA5MX



Cable Assembly Notes:

**XLR Pin 4** = AUDIO RIGHT IN (Black RCA Connector).

**XLR Pin 1** = GROUND, connect the ground braid from both RCA connectors together and solder to XLR connector pin 1.

**XLR Pin 2** = AUDIO LEFT IN (Red RCA Connector).

Instead of RCA plugs you could use a 3.5mm stereo mini jack, or if using the phono plugs use a normal stereo to 3.5mm headphone converter

## OB-1 Time Code/LTC Port

OB-1 Time Code/LTC Connector Mate Info.  
5 Pin Lemo B-Series Plug  
Manufacturer: Lemo  
Manufacturer Part #: FGG0B05CLAZ

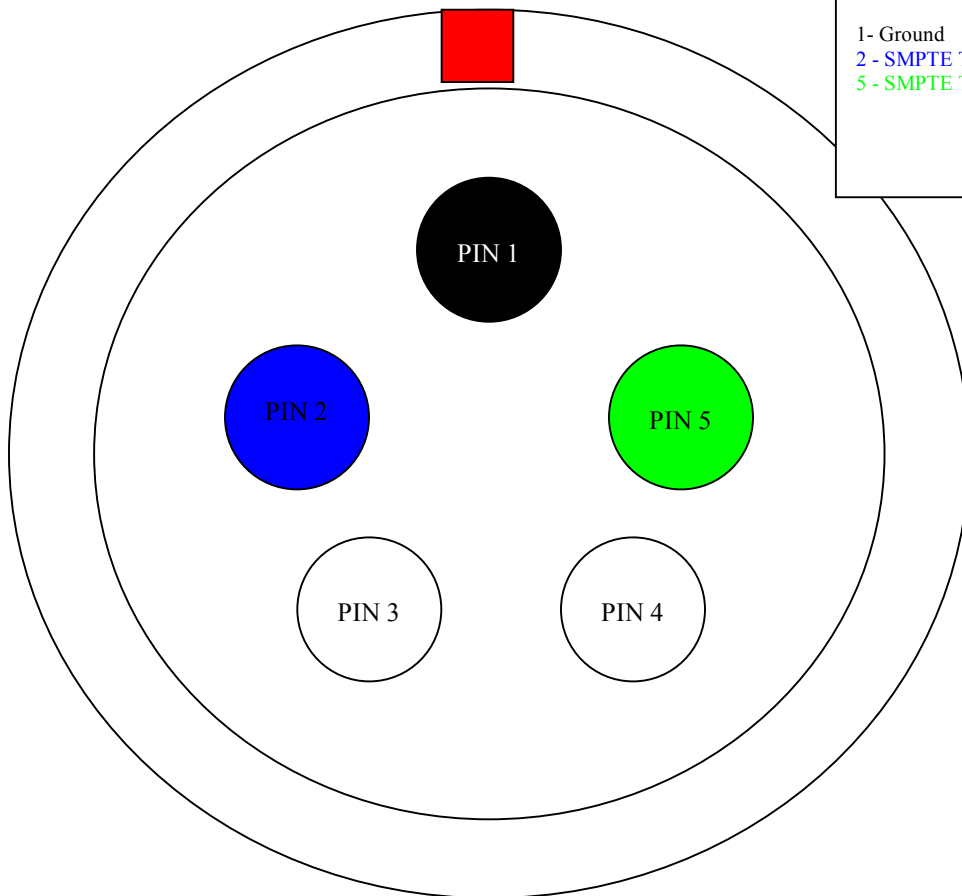
### Lemo Pin Out:

- 1- Ground
- 2 - SMPTE Time Code In
- 3 - ASCII In/Out
- 4 - Tuning Out
- 5 - SMPTE Time Code Out

### We use the Following 3 Pins:

- 1- Ground
- 2 - SMPTE Time Code In
- 5 - SMPTE Time Code Out

OB-1 Time Code/LTC Port  
Front View



## Revision History

### Hardware

- REV B – Male Fischer socket – Pin 3 is hot (+V)  
Audio prep  
Remote Control Prep
- REV C - Male Fischer socket – Pin 2 is hot (+V)  
Additional internal changes  
C output revision for glitches in output Video
- REV D - Revised internal power management for FlashMag mount and un-mount

**NOTE: All Rev B OB-1 are required to be returned to factory for REV D updates.**

### Compatibility:

**FlashMags created any software level below 01015-RC13 will not play on OB-1 10016.**

**FlashMags created on V.10015-RC13 will not play on OB-1 running any previous release.**

### Known Bugs

If in the main menu when inserting a USB stick it may make the menu unresponsive. If you find this then remove the USB stick until you are in the update menus. Or reboot the OB-1.

The USB may take some time to register in after inserting into the OB-1 USB port. If it does not appear after a minute or so, reboot the OB-1.

If you cannot complete a FlashMag firmware update please contact S.two service. There is a chance that the FlashMag can be damaged if the update is interrupted or the file is corrupted. The FlashMag may have to be returned to S.two for service. FlashMags are turned around in S.two service facility same day.

### CONTACT:

**S.two service and support at:**

[info@stwo-corp.com](mailto:info@stwo-corp.com)

[service@stwo-corp.com](mailto:service@stwo-corp.com)

[support@stwo-corp.com](mailto:support@stwo-corp.com)

**or at +1 775 853 9999**

## OB-1 Specification

OB-1 is a small **uncompressed** on board recorder for Digital Cinematography image capture.

OB-1 records to **removable solid state** flash memory based FlashMag™ magazines.

OB-1 is **small, light and silent** in operation with no moving parts.

OB-1 is ideal for uncompressed capture of any HD image or RAW or **3D acquisition**.

OB-1 **supports all current HD formats** from 720P through 2 x 1080P 444 and 2 x 3K RAW (ARRIRAW T-LINK).

OB-1 has a **low power draw** making it ideal to mount on camera and use camera supplied power.

OB-1 is **purpose designed** for film making with complete inputs, outputs and monitoring points.

OB-1 has built in industry standard user loaded Look Up Tables (**LUT**) for monitoring outputs.

OB-1 has support for **multiple frame rates** and variable frame rates for multiple camera types.

OB-1 is **simple to use and robust** in operation – requires no training for professional film crews to use.

OB-1 has a **Built in LCD** menu display with easy to see color coded status messaging.

OB-1 records **industry standard DPX** files for easy workflows and maximum compatibility.

OB-1 has **many workflow options** for moving data through film processes including on location, in studio and for post and conform.

OB-1 is the **industry leader** having already been used on numerous feature motion pictures as well as leading prime time drama television shows.

## Specification

### INPUTS:

4 x HD–SDI 1.5 / 3Gbit SMPTE 292M, 372M - 75Ω HD rated BNC.

Analog LTC Timecode SMPTE 12M - LEMO 5 pin (Ambient compatible).

Analog stereo audio – unbalanced wide ranging ALC – Mini 5 pin XLR.

General Purpose Interface – Trigger – Hirose 11P.

### OUTPUTS

4 x HD–SDI 1.5 / 3Gbit SMPTE 292M, 372M - 75Ω HD rated BNC – assignable.

RP188 embedded TC.

Embedded Audio in HD Stream.

Tally condition indicator overlay on D Monitor output.

## **CONTROL**

RS422 serial VTR control - Hirose 11P.

GPI/O trigger / tally – Hirose 11P.

Start Stop over HD-SDI.

## **SERVICE**

USB 2.0 Port – Updates, LUT loading.

Ethernet Port RJ-45 – S.two service.

## **PHYSICAL**

With FlashMag mounted.

5" (H) x 8" (L) x 4.25" (W).

Under 7lbs (Less than 3kg).

## **POWER**

Fischer 3 pin 10 ~ 30V DC.

Power consumption.

With FlashMag, in record,

Less than 19W @ 12V DC.

## **SUPPORTED RECORD FORMATS**

Dual link HD-SDI 444 / 4444 1080PsF / I,

23, 24, 25, 29, 30, 50, 59, 60FPS.

ARRIRAW T-Link (With full de-Bayer preview outputs and playback),

23, 24, 25, 48, 50FPS. (.ARI and S,two Raw DPX file formats).

ARRI M-SCOPE.

422 Single Link,

23, 24, 25, 29, 30FPS.

422 Dual Link.

48, 50, 59, 60FPS.

720P – 50 60FPS.

**2 x 422 3D / Multi Cam.**

**23, 24, 25, 29, 30FPS.**

**2 x 444 3D / Multi Cam.**

**23, 24, 25, 29, 30FPS.**

Assignable LUT to output 1D & 3D\* XML and CDL\*.

Full Anamorphic camera / lens monitoring.

### **SUPPLIED ACCESSORIES**

Fully fitted Custom Flight Case.

S.two Power supply 100~250V AC 50~60Hz 12 V DC output.

S.two Manual.

### **OPTIONAL ACCESSORIES**

D-21 Mounting Bracket.

ALEXA Mounting Bracket.

Universal Mounting Bracket.

Sony F23 / F35 Mount adapter (Use with Universal Bracket).

FlashMags.

### **FlashMag**

Solid State S.two Memory.

Multi – level RAID protection.

S.two Bus High Speed connector – 100,000+ insert cycles.

30 Minutes of Record time - varies by format – range 21 (2 x 444) ~ 30 Minutes.

Hot Swap instant load unload for fast on set mag changes.

## **FlashDock™**

Location AC/DC FlashMag Docking Station.

Built in color monitor for menu and image data review.

E-SATA Connection.

2 x Gigabit Ethernet.

Dual link HD-SDI SMPTE 292M/372M Real time Playback.

RS422 Control – Automated Batch Capture with FCP and AVID.

Optional Dual uncompressed LTO archive.

FlashDock is the new location multi-purpose docking station for OB-1 recorded FlashMags. It supports FlashMags recorded using OB-1.

FlashDock can read and play FlashMag to its HD-SDI video ports as either single link 422 HD or dual link 444 HD (dependent on record format). It also features full RS422 control so it can be controlled as a video deck from remote controls or editor interfaces or from offline edit systems such as Final Cut Pro or Avid. FlashDock also provides Final Cut XML and Avid ALE files for batch capture of the whole FlashMag with metadata transfer.

FlashDock provides file access to recorded images on the FlashMag as individual DPX files organized into Scene and Take folders. These frames can be accessed and transferred via the Gigabit Ethernet network connections using SAMBA mounts or an SFTP program.

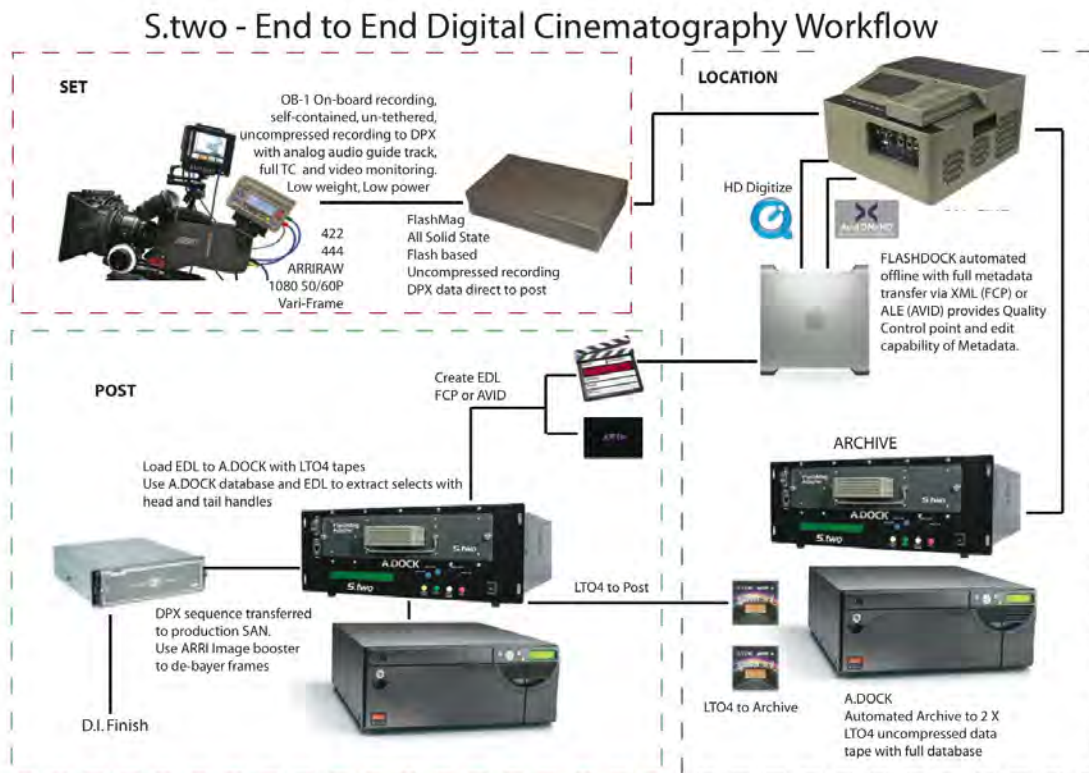
FlashDock also features an external e-SATA port which also allows fast file transfer of FlashMag DPX frames to the externally mounted hard drive.

FlashDock is designed for the rigors of location-based post utility featuring a robust and rugged chassis reflecting S.two Corp.'s unparalleled on set and location experience. It has both universal 100~250V 50/60Hz AC and 24V DC power inputs so it can be used anywhere.

Using the FlashDock could not be easier, it has a touch screen onboard monitor that allows any user to walk up and start operating straight away with easy to use, intuitive menu driven commands for all aspects of utility.

FlashDock also supports archiving to uncompressed data tape using the optional S.two FlashDock expansion chassis. This can mount one or two LTO4 HH drives. The FlashDock provides both power and connections (SAS) for the chassis which screws securely to the FlashDock base making it an all in one design.

## FlashDock Workflows



The FlashDock supports multiple workflow solutions depending on the requirements of any particular production.

S.two has established a main workflow which the new FlashDock fits into, providing similar functionality to S.two's widely adopted i.DOCK. Being a multi-purpose device however the FlashDock has multiple workflow possibilities. Figure 1 shows how FlashDock fits into the existing S.two end to end workflow as used in many successful feature films.

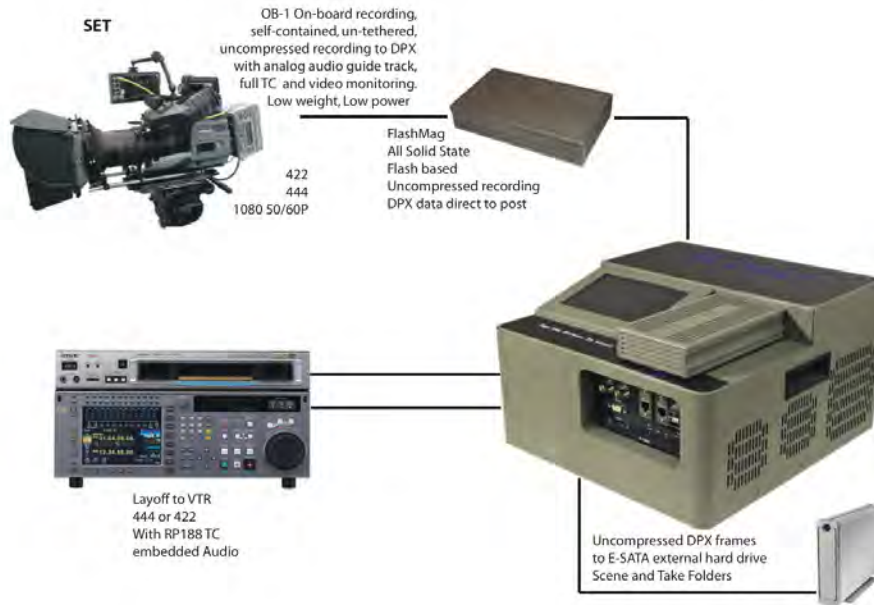
**OB-1 Complete workflow with ALEXA Shoot Uncompressed ARRIRAW with Dual Media.**

OB-1 DIRECT MOUNT ON ALEXA.  
 Supports all ALEXA features including 60FPS and ARRIRAW. RAW recording features high quality real-time viewing and playback on camera.  
 Full sync with Alexa for Timecode and remote Stop Start from camera allow true syncing of data.  
 Full metadata engine for production information exchange



FlashDock creating offline materials using the auto-batch capture feature and the optional expansion chassis for creating uncompressed LTO data tapes for use in post.

## S.two - Video Hybrid Workflow - Sony F35 / F23



FlashDock in a hybrid workflow, using a videotape for post layoff but also with an e-SATA external drive. This allows uncompressed DPX files to be used for VFX and a compressed tape flow for normal post. This flow is fast and ideal for short form projects such as commercials and music video as well as for fast turn around high demand projects such as TV shows which may demand a videotape master.