# FiOPS FAQs

## What's a "FiOPS?"

Our ***Fiber Optic POV System*** is a complete micro camera and fiber-optic transmission solution. The system includes a Marshall CV500-MB-2 Camera with an Umbilical Cable, Transmitter, and Receiver. It also includes an IR Receiver and IR Transmitter (a "Remote") to access the camera menus from the truck or other remote location. The user simply adds power and one strand of single-mode ST fiber to complete the transmission path. The camera is capable of 1080i/59.94, 720p/59.94, and 1080p/60 and the native signal is HD-SDI.

## How do I set it up?

1) Mount the Camera with the included Magic Arm.
2) Connect the 30' Umbilical Cable to the Camera and plug it into the Transmitter box.
3) Power up the Transmitter. A single supply powers the Transmitter and Camera. An LED shows power.
4) Confirm it's working. Indicator lights show both power (bottom) and SDI signal at the Transmitter (top).
5) Connect your fiber (ST single-mode) to the Transmitter.
6) Power up the Receiver and connect the other end of your fiber to it. Indicator lights show both power (bottom) and SDI signal from the Camera (top).
7) Connect a 3-pin XLR audio cable to the Receiver and extend it to the video pit (or wherever your control location is). Plug the other end of the cable into the IR Receiver and power up the IR Receiver.
8) Connect the BNC output from the Receiver to the truck or a monitor and enjoy the picture!

## How do I use it?

1) Once you have established the signal path and can see a picture from the camera, you can access the menus.
2) Press the [MENU] button to bring up the display. Navigate using the [UP] or [DOWN] buttons.
3) Menus have two options – you can change a value with the [LEFT] or [RIGHT] buttons or press [MENU] to enter a sub-menu. The [ ↵ ] icon indicates that a sub-menu is available.
4) For single-camera operation, the IR Receiver should always show "001." If it does not, press [1] [CAM].
5) It is a good idea to default the camera before use by doing a "Factory Reset." This will reset any options that may have been set by a previous user and places the camera in a full automatic mode. A factory reset can be performed by navigating to [MAIN MENU] > [9. RESET] > [1. FACTORY] and pressing [MENU] to select [RESET].
6) After a factory reset, the output will look pretty good by itself. If you wish to further investigate the other functions in the menus, please see the section titled "Navigating the Menus."

## Is it waterproof?

Sadly, the Marshall camera is not waterproof. If you mount it in the elements, please protect it with the enclosed custom rain covers. For light rain, simply slide the white pipe over the camera from the rear (yes, it's a modified piece of pool hose). If you expect sideways moisture, also place the vinyl cover over the top of the pipe, with the camera lens protruding through the round hole in the front, and secure the cover with the attached Velcro strap. As with any electronics, it is your responsibility to protect it from moisture. Please don't ride the camera hard and put it up wet!

## Does it record?

No, the Marshall camera does not record. Save the GoPro cameras for those jobs.

## Does it have a microphone?

The Marshall camera does not have a microphone. If you need audio from the camera, you can deploy a microphone with an SDI embedder inline to the BNC input of the Transmitter.

# What's in the box?

All cases are marked with labels and serial numbers. The system consists of:

1) Large blue Pelican-style Case
2) Magic Arm with Super Clamp and Mount
3) 30' Umbilical Cable to connect the Camera to the Transmitter
4) Custom Rain Cover
5) CAMERA – Pelican case with the Marshall CV500-MB-2 Camera and SPARE Power Supply
6) TRANSMITTER – Pelican case with the Transmitter and Power Supply
7) RECEIVER – Pelican case with the Receiver and Power Supply
8) REMOTE CONTROL – Pelican case with the IR Receiver and IR Transmitter ("Remote")

# Navigating the Menus

Most menu options DO NOT RESET with a power cycle. Here is how to get to some common video adjustments:

**Iris Control** - The Marshall camera replicates iris control by using a variable CCD iris function.

1) Navigate to [MAIN MENU] > [2. EXPOSURE] > [4. BRIGHTNESS].
2) Use the [LEFT] or [RIGHT] button to decrease or increase the BRIGHTNESS.
3) The BRIGHTNESS control acts as a compliment to the AUTO SHUTTER function.
4) This level WILL RESET with a power cycle.

**White Balance** - The default setting is ATW (Auto Tracing White Balance).

1) Navigate to [MAIN MENU] > [4. WHITE BAL].
2) Use the [LEFT] or [RIGHT] button to select the mode you want.
3) [MANUAL ↵] – Press the [MENU] button to enter the [MANUAL] sub-menu. The [LEFT] and [RIGHT] buttons are used to adjust red and blue gains individually.
4) [AWC] – Auto White – Shoot white and press [MENU] to get a "fresh white balance."

**Black Level** - The camera needs to be in CRT MODE.

1) Navigate to [MAIN MENU] > [8. ADJUST] > [2. MONITOR] and select [CRT ↵].
2) Enter the [CRT ↵] sub-menu and use [LEFT] or [RIGHT] to adjust the BLACK LEVEL.

**Gamma** - The camera needs to be in LCD MODE.

1) Navigate to [MAIN MENU] > [8. ADJUST] > [2. MONITOR] and select [LCD ↵].
2) Enter the [LCD ↵] sub-menu and use [LEFT] or [RIGHT] to adjust the GAMMA.

**Color Saturation** - Separate level control for Cb and Cr.

1) Navigate to [MAIN MENU] > [8. ADJUST] > [2. MONITOR] and select [LCD ↵] or [CRT ↵].
2) Use [LEFT] or [RIGHT] to adjust the RED GAIN and BLUE GAIN.

**Picture Flip** - You can mount the camera upside down and electronically flip the picture.

1) Navigate to [MAIN MENU] > [7. SPECIAL] > [2. DIG. EFFECT].
2) Use [LEFT] or [RIGHT] to select [ROTATE].
3) DO NOT SELECT V-FLIP! This setting will not give you the desired result.

# Navigating the Advanced Menus

Here is how to navigate to some menus that can get you into trouble!

## Output Format

You can change between the supported output formats using the following menus. It is recommended that you change these menus locally at the camera using the joystick on the camera with a monitor capable of displaying any known HD video format connected directly to the camera output – otherwise the possibility exists that you will cycle through a menu that puts the camera in a mode that some piece of gear in your signal path does not support! If you make a change that causes your monitor to blank out, simply continue cycling through options (using the [LEFT] or [RIGHT] button) until the picture comes back. If the menu disappears while you can't see the picture, you may be out of luck until you find a monitor that supports that format!

### 1080i / 59.94 – To set the camera to 1080i:

1) Navigate to [MAIN MENU] > [8. ADJUST] > [4. VIDEO OUT] and verify that [NTSC] is selected.
2) Navigate to [5. RESOLUTION]. If [---] is shown, the camera is already in 1080i mode. Otherwise, use [LEFT] or [RIGHT] to select [1080]. If the screen goes blank, you may need a monitor that supports 1080p.
3) Navigate to [6. FRAME RATE] and use [LEFT] or [RIGHT] to select [59.94I].
4) THESE SETTINGS DO NOT RESET WITH A FACTORY RESET!
5) Sadly, the CVBS output of the Marshall camera is disabled when the camera is in 1080i mode.

### 720p / 59.94 – To set the camera to 720p:

1) Navigate to [MAIN MENU] > [8. ADJUST] > [4. VIDEO OUT] and verify that [NTSC] is selected.
2) Navigate to [6. FRAME RATE] and use [LEFT] or [RIGHT] to select [A-30/25P].
3) Navigate to [5. RESOLUTION]. Use [LEFT] or [RIGHT] to select between [1080] and [720].
4) When [1080] is selected the camera will be in 1080/29.97; when [720] is selected the camera will be in 720/59.94.
5) THESE SETTINGS DO NOT RESET WITH A FACTORY RESET!

### Multi-Camera Operation – It is possible to control multiple cameras with one IR Receiver and IR Transmitter. This is accomplished by addressing each camera differently. Please note these values DO RESET after a FACTORY RESET! Prior to deployment, you can change the address of each camera:

1) Navigate to [MAIN MENU] > [7. SPECIAL] > [7. RS485] > [1. CAM ID].
2) Use [LEFT] or [RIGHT] to select the desired ID number. The selection will be applied when you completely exit the camera menu.
3) THESE SETTINGS DO RESET WITH A FACTORY RESET! However, because an ID change is not applied until you exit the camera menu, you can maintain remote control of a camera with an ID other than "1" after a factory reset by changing the ID number of the camera back to the desired number (the number currently shown on the IR Receiver) BEFORE YOU EXIT the camera menu.
4) Connect the Receivers together by daisy chaining the XLR connections.
5) On the Remote, select the desired camera by entering the camera's ID number followed by [CAM]. The correct camera number will show on the LED display of the IR Receiver.
6) If you daisy chain more than one camera with the same ID number, all cameras with the same ID will be controlled simultaneously.

### Wide-Angle Lenses – When using a wide-angle lens, the LSC (Lens Shading Compensation) function can be used to brighten the corners of the image.

1) Navigate to [MAIN MENU] > [8. ADJUST] > [3. LSC] and select [ON ↵].

# Troubleshooting Tips

We have tried to keep the design of this system simple and reliable with quick deployment being the prime consideration. The individual connectors are not labeled because there is really only one way to hook the system up. If you find another way, please let us know!

## Transmitter

In addition to performing electrical-to-optical conversion and transmitting the light down the fiber, the Transmitter also powers the Camera and receives the data that controls the Camera. The indicator lights show power (bottom light) and also indicate that an SDI signal from the camera is reaching the box (top light). Power is via a standard 4-pin XLR.

## Receiver

The Receiver does the optical-to-electrical conversion and also transmits the data to the Camera. The indicator lights show power (bottom light) and if an SDI signal is being received (top light). Please note that sometimes the SDI signal indicator light stays on even after a signal has disappeared – if you suspect a problem and want to be sure, you should power cycle the Receiver box to reset the indicator circuit. Power is via a standard 4-pin XLR. The data goes in on the female 3-pin XLR and loops to other Receivers using the male 3-pin XLR.

## Fiber Optic System

The fiber system consists of a Transmitter and a Receiver. The system is capable of transmitting an HD video signal plus data over 10 km. The system uses Wavelength-Division Multiplexing to get the two signals over one strand of fiber. In addition to receiving the fiber optic signal, the RECEIVER is also a DATA TRANSMITTER. This can help in troubleshooting fiber-related problems, as you can expect to receive some light at the Transmitter position when a Receiver is connected. Both Transmitter and Receiver put out a rather robust signal (approximately -2 dBm), which should let it stand out among the normal light of Rattlers.

## Remote Control

The remote control system consists of an IR Receiver and an IR Transmitter ("Remote"). The system uses the Pelco-D protocol and operates at 9600 baud. This is the normal, default setting for the Marshall camera after doing a factory reset. The IR Receiver is connected to the system's Receiver box via a length of user-provided 3-pin XLR audio cable. Cables can be daisy chained between multiple Receivers for multi-camera operation. Normal DIP switch setting is [UP-UP-DOWN-UP] on the IR Receiver. The LED display will indicate the camera you are trying to control – normally "001" for single-camera operation. We have seen on rare occasions the LED display change while using the menus – if this happens, simply enter the camera number followed by [CAM] on the Remote.

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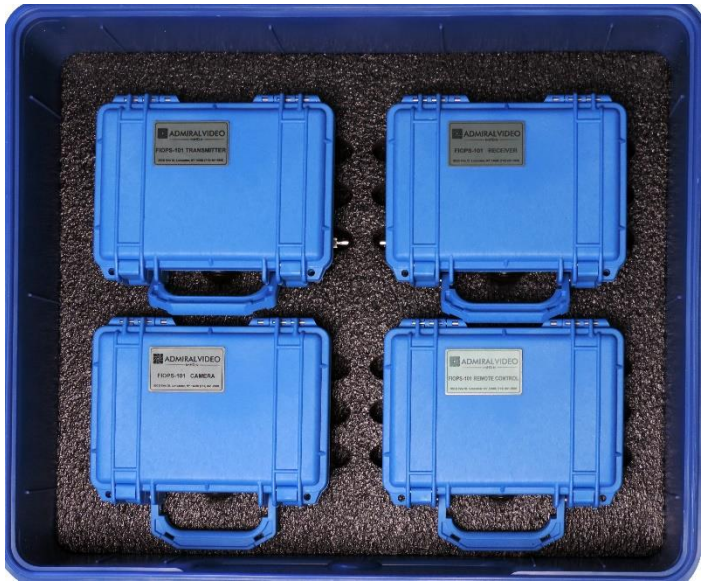
# Menu Structure

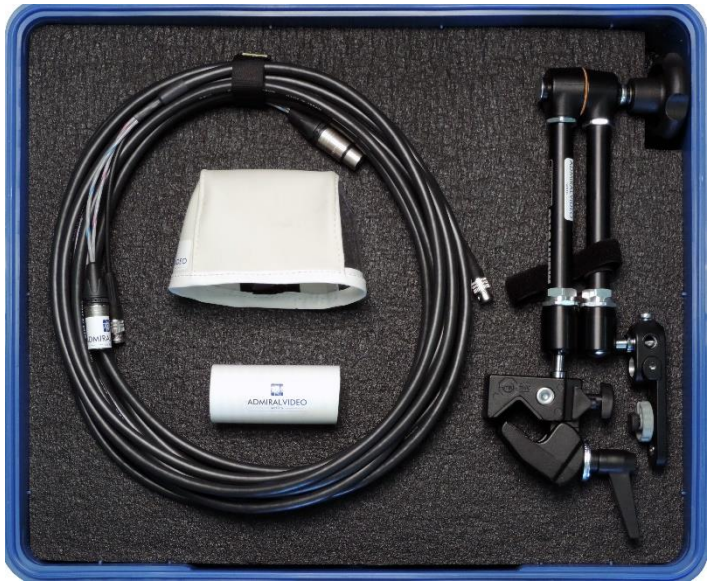
Following is a list of all menu options for the Marshall CV500-MB-2 camera:

| SETUP | SUB A MENU | SUB B MENU | DESCRIPTION |
|---|---|---|---|
| LENS | DC | OUTDOOR, INDOOR | DC Auto Iris Varifocal Lens. |
| | MANUAL | | Manual Lens (Fixed focal or fixed IRIS lens) |
| | P-IRIS | AUTO, MANUAL | Precise IRIS: to select best quality or best depth of field |
| EXPOSURE | SHUTTER | AUTO | Shutter speed is automatically adjusted. |
| | | 1/30sec ~ 1/50,000sec, x2~x30 | Shutter speed is manually selected. |
| | | FLK | Select this when you experience picture flicks when there is a clash with the installed lighting frequency. |
| | AGC | LOW, MIDDLE, HIGH | Set the level of AGC that controls the amplification/gain process automatically. |
| | SENSE-UP | AUTO | Sense-up level is automatically adjusted between x2 ~ X30. |
| | | OFF | Sense-up function is disabled. |
| | BRIGHTNESS | 1 ~ 100 | Brightness level is manually selected. |
| | D-WDR | OFF, ON | Digital Wide Dynamic Range (ACCE) level is activated/disabled. |
| | DEFOG | OFF, ON | Defog function that enhances visibility in fog, smoke, lowlight, dust is is activated/disabled. |
| BACKLIGHT | BLC | GAIN | Manually select BLC GAIN level from LOW, MIDDLE, HIGH. |
| | | AREA | Select area that BLC function is activated. |
| | HSBLC | AREA | Select area that HSBLC function is activated. |
| | | DISPLAY | Adjust the size and position of HSBLC area. |
| | | LEVEL | Set the level of HSBLC function. |
| | | MODE | Select ALL DAY or NIGHT when HSBLC function is activated. |
| | | BLACK MASK | Enable/disable the black mask function. |
| | WDR | GAIN | Manually select WDR GAIN level from LOW, MIDDLE, HIGH. |
| | | WDR OFFSET | Counterbalances and compensates of WDR |
| | OFF | | Backlight function is disabled. |
| WHITE BALANCE | ATW | | White balance is automatically adjusted. |
| | AWC-SET | | To get optimal White balance, move the lens to white paper then press the set button. |
| | INDOOR | | Select Outdoor to optimize WB for indoor. |
| | OUTDOOR | | Select Outdoor to optimize WB for outdoor. |
| | MANUAL | BLUE, RED | White Balance levels of BLUE and RED are manually selected. |
| DAY & NIGHT | AUTO | DELAY | Select the interval time from the day mode to the night mode. |
| | | D-->N (AGC) | Select AGC level to change the day mode to the night mode. |
| | | N-->D (AGC) | Select AGC level to change the night mode to the day mode. |
| | COLOR | | DAY & NIGHT function is fixed at the day mode (Color). |
| | B/W | BURST | Determines whether to transmit the burst signal or not . |
| | | IR SMART | Activate IR SMART function that decreases screen saturation of objects within a short range. |
| | | IR LED | IR LED is manually turned OFF/ON. |
| | | IR PWM | IR LED level is manually adjusted. |
| | EXT | | This function is Disabled. |
| NR | 2DNR | | Reducing noise in the brightness of the image. |
| | 3DNR | SMART NR | Activates & Deactivates 3DNR Automatically depends with environment. |
| | | LEVEL | Set the level of 3DNR function. |
| | | START . AGC | Set the start level of 3DNR function. |
| | | END. AGC | Set the end level of 3DNR function. |
| SPECIAL | CAM TITLE | | If you enter a title, the title will appear on the monitor. |
| | D-EFFECT | FREEZE | You can stop the image or reactivate it. |
| | | MIRROR | You can adjust or rotate the picture vertically and or horizontally. |
| | | D-ZOOM | This function is Disabled. |
| | | SMART D-ZOOM | This function is Disabled. |
| | | NEG.IMAGE | You can flip the color on screen with a negative image. |
| | MOTION | SELECT | You can select up to 4 motion detection areas. |
| | | DISPLAY | Adjust the size and position of the selected area. |
| | | SENSIVITY | Adjust the sensitivity of the motion detection. |
| | | MOTION VIEW | Activate/Deactivate notification image when motions are detected. |
| | | DEFAULT | Set the etting value as default. |
| | PRIVACY | SELECT | You can select up to 8 PRIVACY areas. |
| | | DISPLAY | Adjust the size and position of the selected area. |
| | | COLOR | Determine area color. You can select 16 different colors. |
| | | TRANS. | Adjust the transparancy of the color. |
| | | DEFAULT | Set the PRIVACY setting value as default. |
| | LANGUAGE | | You can select the menu language according to your requirements. |
| | DEFECT | LIVE DPC | Auto Dead pixel correction. |
| | | STATIC DPC | Manual Dead pixel correction |
| | | STATIC DPC - START | Start Dead pixel correction |
| | | STATIC DPC - LEVEL | Level of Manual Dead pixel correction |
| | | STATIC DPC - SENS-UP | Display Sens-Up Value |
| | | STATIC DPC - AGC | Set the level of AGC. |
| | RS485 | | This function is Disabled. |
| | VERSION | | Display the firmware version. |
| ADJUST | SHARPNESS | | Set the level of the sharpness. |
| | MONITOR | LCD | Select this menu item when using an LCD monitor. |
| | | CRT | Select this menu item when using an CRT monitor. |
| | LSC | | Lens shading compensation. Select ON to activate the brightness compensation on the corner of lens. |
| | NTSC/PAL | | Select video type from NTSC or PAL. |
| RESET | | | Reset the camera settings to the factory defaults. |
| EXIT | | | Exit the setup. |

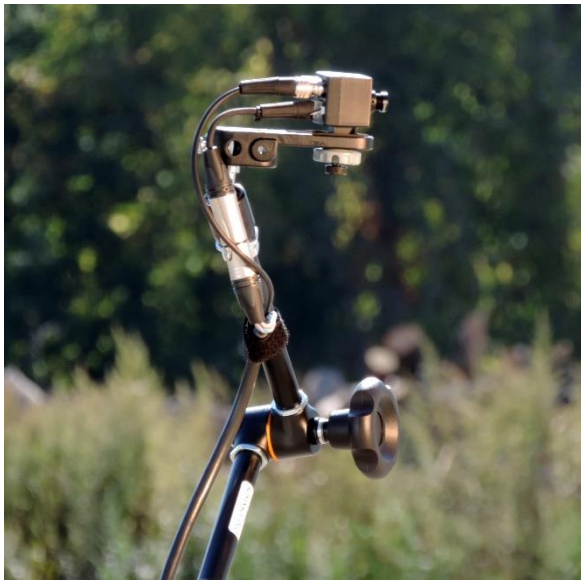
# Packing the Case and Using the Rain Covers



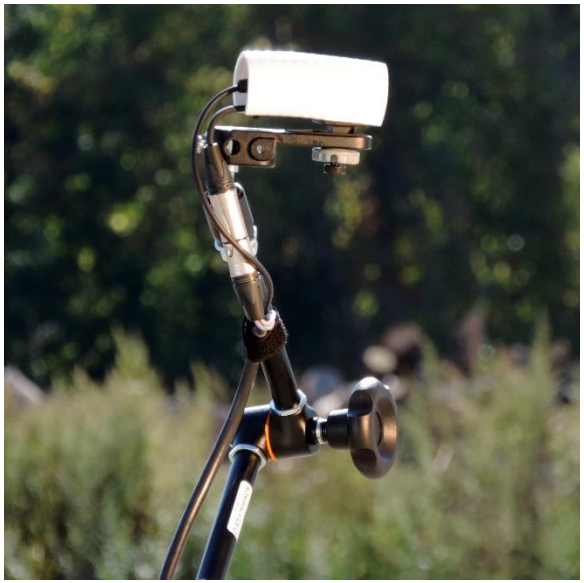

The four Pelican cases fit in the bottom layer.



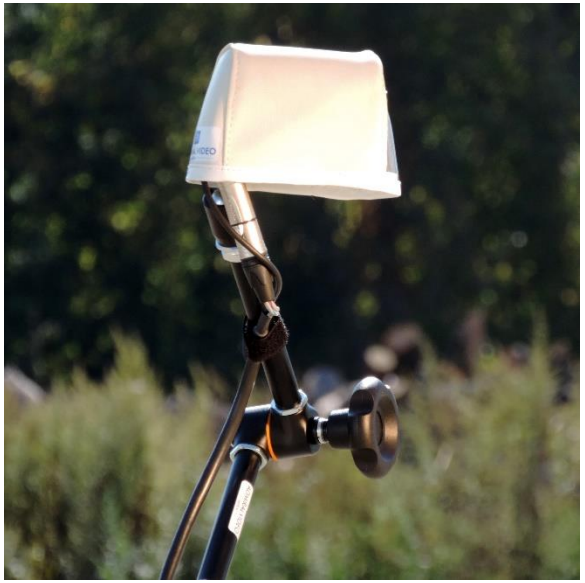

The foam divider and remaining parts are placed on top.



Use the Velcro strap on the Magic Arm to strain-relieve the Umbilical.



The white pipe slides over the camera to protect it from light rain.



The vinyl rain cover is placed over the top of the pipe and secured with the attached strap.

# System Diagram