The Canon 5D Mark II for video

By Berkley White

Every now and then a camera comes along that makes you rethink possibilities. Like many fellow still photographers, the 1080p video of the Canon 5D Mark II forced me to reconsider a personal interest in moving pictures. The more I played with 5D Mark II shooting video, the more I kept leaving my Nikon D3 and D3x on the boat.

The sensor size on the 5D Mark II is by far the largest of all the cameras in this chart, including the top cinema camera choice, RED. This results in a cleaner, lower noise image.

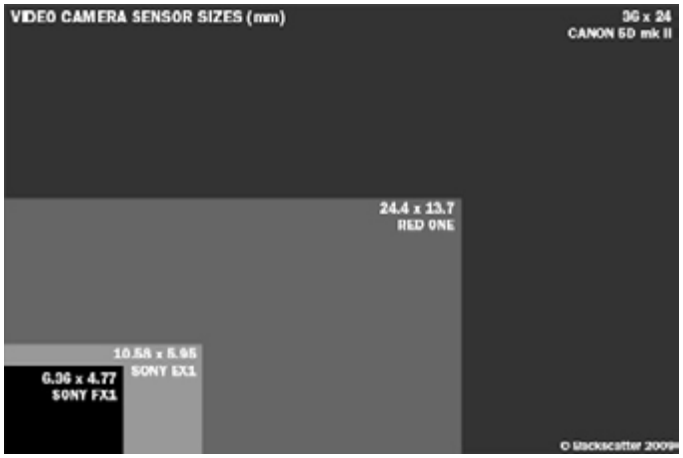
The first obvious thing is that the 5D Mark II sensor is the large. Larger sensors can gather more light, and thus can produce images with lower noise when compared to smaller sensors. While it may seem limiting to only have a frame rate choice of 30p, this is by far the most popular frame rate and will satisfy almost all users needs. The H.264 compression format is more efficient than HDV or MPEG and results in a better quality image at the same file size. This combined with a higher bit rate than the FX1 or EX1 results in less compression being applied, and therefore a higher quality image.

The 5D Mark II is unique as it is currently the only full frame DSLR capable of recording 1080p high definition video at 30 frames per second. Many video cameras can claim to shoot 1080 video, but video cameras at even twice the price don't offer 30 progressive frames per second, a smorgasbord of interchangeable lenses, or the benefits of a full frame 35mm sensor.

Topside photographers and filmmakers have

already proved this camera to be a professional level multi-tool for capturing still and motion images. However, for underwater image makers, this camera is even more valuable. With the ability to shoot top quality stills, and HD broadcast quality video, a working pro or enthusiastic amateur shooter can save thousands of dollars. By consolidating separate video and photo rigs into one unit that is much smaller and lighter than a typical Sony FX1 or EX1 system, one can save hundreds in excess baggage fees alone. We were able to pack our 5D Mark II system with both video lights and strobes into a single Pelican 1620 case. More traditional pro level systems with lights and heavy underwater optics can easily spill over into 2 cases.

Experienced still shooters interested in video will feel much more at ease with a DSLR in video mode than someone used to a traditional video camera. The concept of shutter speed, aperture, and ISO controls are more familiar to still shooters than controls such as gain on traditional video cameras.



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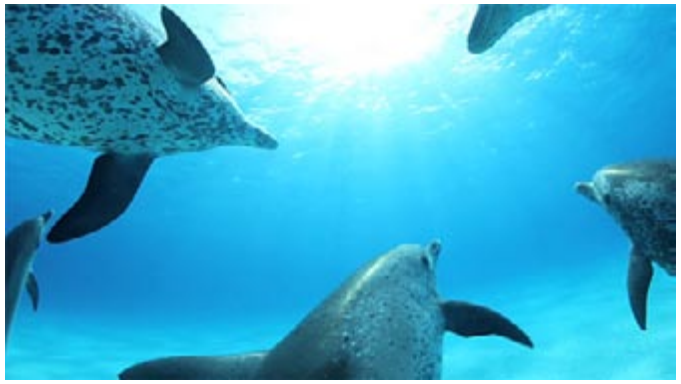


The dynamic range of the Canon 5D Mark II shines through on this frame grab. Even when overexposed, this camera delivers video with better dynamic range than any professional video camera at such a low price.

Shooting video with the 5D Mark II does not require advanced skills, but does require advanced determination. It can be point and shoot friendly

The 5D Mark II produces inky blacks and smooth blues even when shot at high ISO settings.

In video mode, your f-stop and shutterspeed values are displayed at the bottom of the LCD. To determine best exposure, shoot a test clip (or photo) and check the three channel histogram display in playback mode.

The Canon camera was in an Aquatica housing mounted onto a scooter. Photo by Tony Granata

with great results, but a studious shooter can quickly turn this camera into visual magic.

Experienced video shooters will be impressed by this cameras small size, optical selection, and will enjoy the user friendly ergonomics of a DSLR. Unlike most pro level video cameras sealed up in underwater housings, essential controls are within easy reach, within sight, and minimize your requirement to remove your hands from the housing grips.

Dynamic Range

Unfortunately for us underwater shooters, cyan (underwater blue) is the most difficult color to record in any digital format. Underwater images shot into the sun typically suffer from harsh banding. In the dolphin video frame below, I was stunned at the minimal banding and the impressive capture of light rays in such a high contrast video clip. As a still, I could have captured a tighter sunball with a higher aperture setting, but this would have turned the dolphins into a silhouette.

As a motion sequence locked at one exposure, I'm thrilled to get such a dynamic range.

The 5D Mark II's treatment of cyan (blue) color near the sun is very forgiving for both stills and video. Nikon bodies tend to hold a tighter sunball, but can frequently suffer from an intense cyan band near the sun. The Canon 5D Mark II produces a larger and more mushy sunball, but it is less prone to banding and produces a very pleasing image.

High ISO Advantages

In underwater photography, we select cameras with larger sensors to decrease noise at high ISO settings. Noise typically shows up in the shadows and is further enhanced in out of focus areas. I shot most test video at ISO 400-800 in the movie above and struggled to see noise in any clip.

As with any digital camera, the high ISO files are fragile and quickly fall apart with any color correction. I only applied color correction to the eagle ray clip in the movie as I shot it slightly hot and it looked washed out without a little help. I left this shot in the movie as I think it shows a little banding in the background due to color correction applied to an ISO 640 shot.

The moral of the story is shoot up to ISO 800, but use caution with exposure settings over ISO 400.

Manual exposure

Traditional video cameras are difficult to control in manual exposure. Many force you to use touch screen controls or completely lack the ability to independently control ISO (gain), shutter speed, and aperture.

In video mode, your f-stop and shutterspeed values are displayed at the bottom of the LCD. To determine best exposure, shoot a test clip (or photo) and check the three channel histogram display in playback mode.

With the latest firmware update, the Canon 5D Mark II offers all these controls and maps very well to ergonomics of an underwater housing. Essential exposure controls can be easily performed with one hand while the second hand is stabilizing the shot.

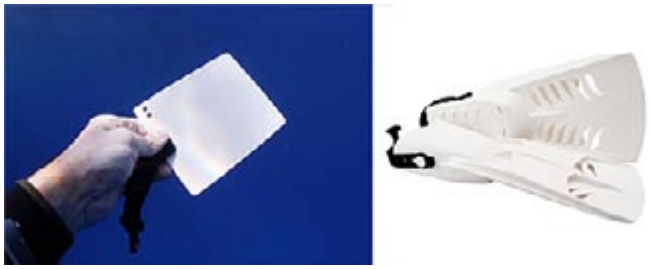
All clips in the movie above were shot in manual exposure. I did waste a day shooting auto exposure video with the 5D Mark II, but as with most video cameras, auto exposure modes tend to over expose the scene and produce flat images.

You can certainly get great video in auto exposure, but the 5D Mark II sensor is so forgiving, you will be quickly rewarded after your first day of shooting manual. I shot a few still shots as test exposures in photo mode and used the three channel histogram as a guide. You don't need to jump from video mode to photo mode for exposure detail. A simple press of the shutter release will always show you a test image with histogram feedback if you set the review window to display the three channel histogram.

Manual White Balance—Faster and More Flexible

Experienced underwater video shooters know that manual white balance is essential. Larger professional video cameras usually have a button dedicated to manual white balance while compact video cameras bury this feature in touch screen menus. The Canon 5D Mark II white balance requires taking a still shot and multiple button presses, but all buttons are easy to reach and can be performed more quickly than touch screen type controls.

Traditional video cameras frequently are not able to capture manual white balance at underwater



To set a manual white balance you must point the camera at a white object such as a dive slate. Some professionals are swimming the new white APS MantaRay Fins and thus always have a white object on hand... um, on foot.

depths below 40 feet. In my tests, the 5D Mark II had no difficulties with manual white balance at my maximum depths of 80 feet. On a side note, I pointed my camera on a white dive slate to set a manual white balance for this video. The Backscatter crew recently discovered the white lighting color of APS MantaRay Fins. Many pro shooters are swimming these fins as they make an easy hands-free target for a manual white balance.

Small Depth of Field

In addition to low noise at high ISO settings, full frame sensors also have less depth of field than the smaller sensors found in traditional video cameras. This might seem like a bad thing, but it's actually the main reason why so many topside shooters are drawn to this camera. A thin depth of field will produce an out of focus background and thus help attract attention on a sharply focused subject. This technique is used beautifully in motion pictures, and is best achieved with lenses of 50mm or longer when setting the lens to a wide aperture.

Underwater color correction filters are essential for underwater video and can be mounted on the front of a traditional video camera or on the front or back of DSLR wide angle lenses.

With a larger sensor, underwater video shooters can now enjoy out of focus backgrounds previously limited to still photography.

Full frame sensors offer narrow depth of field making it easier to blur distracting backgrounds and draw focus to the subject.

Professional Lens Selection

For the last 15 years, only a few professional video cameras have offered interchangeable lenses, and very few of them had underwater housings available due to the very high cost. All compact video cameras have been limited to a built-in zoom lens with a filter thread to attach adapter lenses.

The SLR format offers a huge selection of lenses that can be transferred from camera to camera and can be outfitted in underwater camera housings much easier and less expensively. SLR optics are also supported by many more manufacturers and have received much more critical analysis in the topside and underwater shooting communities.

The most popular lenses for underwater use include the Canon 17-40mm, Canon 16-35mm II, Canon 100mm, and Canon 15mm Fishseye.

The main attraction for me is the 5D Mark II's ability to shoot the underwater optical wonder known as the fisheye lens. Full frame fisheye lenses offer 180 degrees of coverage and are in the silver bullet class of lenses for underwater imaging. No existing video camera shoots this essential angle of coverage for underwater productions. My favorite lens would be a tack sharp zoom from 160 to 90 degrees on a full frame sensor. The best match so far remains the Tokina 10-17mm for DX crop sensor cameras. Despite the Tokina's popularity among photographers, it is unlikely we will see a full frame equivalent in the near future.

Quality

It's more than a little disappointing to watch this video on the web. There's so much motion, even the best delivery video codec at low bit rates seems to turn it into mush. Watching my final high resolution version in full 1080p on a 52 inch LCD HDTV is the real reward for all this effort. When played from my computer on the HDTV, my little video looks sharper and has better color than even the best HD broadcast. I'm not trying to be a filmmaker, but I'm now capable of capturing video resolution that has the look and feel of being there.

The Disadvantages

No Live Autofocus

Probably the greatest downside of the 5D Mark II in video mode is the lack of auto focus while recording video. Traditional video cameras such as the Sony XR520 and Canon S10 are easier to point and shoot, as they can continually focus while recording. While this lack of autofocus during recording is OK for wide angle shots, it really requires use of a tripod when shooting macro.

Due to this focus limitation, wide angle lenses are more easily used. The larger depth of field inherent in wide angle optics is forgiving and you can easily lock your focus on your fin for distant subjects or minimum focus for close passing subjects.

Macro lenses and moving macro critters are more difficult. It is best to use a tripod for these subjects and plan your shots to allow the subject to move in and out of focus. This might sound difficult, but the images obtained are so much more unique and interesting.

Limited Zoom While Shooting

Many modern SLR lenses shift focus during extreme zooms. Thus you will need to minimize use of zoom during all shots. This is not a huge problem as zooming while shooting usually looks unnatural and is rarely used in professional work. This disadvantage might be a great feature in disguise to use better shooting techniques.

Evil Sensor Dust

DSLR users are very familiar with the negative aspects of dust on imaging sensors. Black dust specks on a still image is a minor nuisance that can be fixed with a click in Photoshop. However, removing dust from a long video clip requires advanced editing skills and rendering time.

On my first day of video testing, I realized a need to clean up my act. I now take the extra time to use lens and body caps, blow out my mirror box with a Rocket Blaster, and shoot a test exposure of a blue sky each morning to check for new dust.

Cleaning a sensor is actually quite easy and something every DSLR user should feel comfortable to perform. I've tried many cleaning systems, but since I frequently have o-ring grease on my hands, I prefer one time use disposable Sensor Swabs for both lint plucking and wet solution cleaning. If you need reading glasses or are working in low light, the Delkin Sensor Scope is an essential tool to help visually identify the exact location of offensive dust on the sensor and is a great tool to use when you can't shoot a test image of blue sky at midnight.

No Viewfinder When Shooting Video

When shooting in very high ambient light, optical viewfinders can be helpful to verify focus and framing. The 5D Mark II shoots video in live view mode and restricts framing and focus feedback to the LCD monitor. Aftermarket companies offer

For these Bahamas tests I used an Aquatica 5D Mark II housing that had just survived 5 weeks of brutal Backscatter staff testing and was then handed out to countless Digital Shootout guests, but despite it's history, it performed flawlessly.

add-on optical LCD magnifiers for topside use. Backscatter is working on solutions for underwater use.

However, it should be noted that few video cameras feature quality viewfinder solutions. Most compact video cameras have either completely lost their viewfinders or have reduced them to unusable sizes. Only the larger professional level video cameras continue to feature high quality viewfinders, but even many of these viewfinders are not compatible with most underwater housings.

No Flip-in Filters or interchangeable lenses

Most traditional video shooters will groan at the loss of a flip-in color correction filter and the need to use a dedicated lens for either macro or wide angle. These users are accustomed to being able to shoot wide angle and macro subjects on the same dive, and with the ability to switch between ambient light shots with a filter and artificial lighting with video lights on the fly. Current SLR shooters will have an easier time adjusting to this as they are already accustomed to these limitations.

Limited Clip Length

The 5D Mark II limits clip lengths to a maximum size of 4GB. This amounts to about 12 minutes of video. You can immediately start shooting another clip after the limit is reached. This is not much of an issue as a continuous shot 12 minutes long without editing will probably be pretty boring to watch. I haven't even come close to reaching the limit so far.

Berkley White
www.backscatter.com

To view the clip, visit
www.backscatter.com/5d2