

AN EXAMINATION OF THE NIKON D90 (REFINED)

As a cinematographer & photographer who has worked with numerous cameras on various mediums, I must say, when the Nikon D90 first came to my attention, I was quite pleased. Since its introduction, I have spent countless hours working with the camera on a large number of film productions, and despite the several other Digital SLRs to be released since the D90 emulating similar motion picture capabilities, I have yet to find one which compares to the collective capabilities the Nikon camera bears. The information I have gathered from studying the D90 and its competitors have proven to me that the D90 far surpasses the full frame Canon EOS 5D Mark II, the Panasonic Lumix DMC-GH1, and even Red's 8x Fixed & Cinema model Scarlets (based on what information has been released), which sits outside of the Digital SLR camera type and is made specifically for Cinematography.

The Nikon D90 records motion pictures at a resolution of 1280x720 pixels, at 24 frames per second (fps), with Motion JPEG compression; The Canon EOS 5D Mark II records motion pictures at a resolution of 1920x1080 pixels, at 30fps, with MPEG-4 compression; The Panasonic Lumix DMC-GH1 records motion pictures at 1920x1080 or 1280x720, at 24, 25 (in 1080p mode), 60, 30, or 50 (in 720p mode) frames per second, with AVCHD compression & Motion JPEG compression (the latter used for footage recorded at 30 frames per second); Red's aforementioned Scarlet models record motion pictures at 3k resolution, at the variable frame rates of 1-120 frames per second & 1-150 in a "burst mode", with Redcode RAW compression. From these specifications alone, it would seem that the D90 does not quite compare in quality to its competitors, though these specifications alone are rather misleading.

First, I would like to address the sensor size of each of these cameras, as well as their relation to their 35mm film counterpart. The D90 has a sensor size of 23.6x15.8mm; The Canon EOS 5D Mark II has a sensor size of 36x24mm ('Full Frame'); The Panasonic Lumix DMC-GH1 has a sensor size of 17.3x13mm; The two Scarlets have a 2/3" Sensor. The largest sensor here belongs to the Canon, followed by the Nikon's, then the Panasonic's & finally the Scarlets' which are of a standard size among most "prosumer" level video cameras. Red does however, have two other models of the Scarlet—the S35 DSMC and the FF35 DSMC—which have 30x15mm and 36x24mm sensors respectively. The size of the sensor greatly effects a camera's dynamic range, or its ability to understand and interpret light & color, making a larger sensor the more ideal choice. The Canon's sensor is referred to as a 'Full Frame' sensor, as it bears the same dimensions as a 35mm film frame. Though, this information can also be somewhat misleading, as the size of 35mm film meant for photographic purposes is actually a different size than the 35mm film meant for motion picture applications. This is due to the fact that photographic cameras print images onto a film strip horizontally, while motion picture cameras print them onto the strip vertically. Motion pictures shot on 35mm film recorded at an aspect ratio of 1.33:1 (4:3), or the 'Academy' format, have a frame size of 24x18mm; Film recorded at 1.85:1 (similar to the 16:9 aspect ratio of which the Nikon, Canon, Panasonic, & Scarlets all record motion pictures in) has an approximate frame size of 24x12.95mm. While the larger sensor size of the Canon can potentially offer a greater dynamic range and greater low light performance, the Nikon D90's sensor is roughly the same as a 1.85:1 35mm motion picture film frame (Nikon D90: 23.6x15.8mm, 1.85:1 35mm: 24x12.95). In reality, the D90 actually has a slightly larger surface area than the aforementioned film format. With 35mm optics and a sensor near identical in size to one of the major 35mm film formats in use today, the Nikon, unlike the rest of the cameras listed here, attains almost exactly the same type of field of view—in relation to its lenses—one would expect from a 35mm film camera.

The optics used in conjunction with each of these cameras are particularly notable as well; The Nikon, Canon, & Panasonic cameras can all be fitted with numerous lenses, and using adapters, one can even use lenses manufactured by companies separate to the camera's. Now, the 8x Fixed Scarlet has a fixed lens that cannot be removed, causing it to be distinctly lacking in versatility, however, the Cinema model Scarlet, as well as three other models of the camera, do share this ability with their SLR counterparts. Nikon, Canon, & Red all make fine lenses, and while Panasonic's model can be fitted with many lenses, including those made by Nikon and Canon, it utilizes what is called the 'Four-Thirds System' (4/3s System). The 4/3s System utilizes smaller lenses with smaller rears allowing lesser room for light to travel to the sensor, which is also smaller among 4/3s System cameras, causing the sensor itself to have inferior ability to gather light as well. Another disadvantage to a camera utilizing the 4/3s system, is that the Focal Depth ('Depth of Field') is kept from becoming as shallow as one could achieve using 35mm optics (or even a 35mm Adapter on a standard video camera) due to the smaller back end of the lenses that do not allow for the iris to open wide enough to do so. As already noted, adapters can be secured to cameras of the 4/3s variety to allow use of lenses such as those manufactured by Nikon and Canon, however, because the lenses would be fixed to a 4/3s System lens mount, many of the above issues would not be addressed by doing so.

While the Canon, Panasonic, & particularly the Scarlets, all shoot at higher resolutions than the D90, I find this matter to be one of the most insignificant regarding these cameras; The further features of the D90, I find outweigh even the Scarlets' 3k resolution. Of course, the Scarlets has yet to be released, and there are very few images taken by the camera that are available to be seen, though based on the specifications available (id est, the sensor size/potential dynamic range & the '8x Fixed' model's anchored lens), I find that the optics & the quality of the sensor within the Nikon camera are worth far more than a higher resolution. I have found during my work and studies with cameras and lenses that resolution is worth nothing without pristine optics and a fine medium, be it film, or a digital sensor. While it is the optics and the sensor size/dynamic range that specifically separate the Nikon D90 from the Scarlet(s) and the Panasonic, what separates it from the Canon is relatively simple.

As already addressed, the Nikon D90 records motion pictures at 24 frames per second, while the Canon EOS 5D Mark II records at 30 frames per second. For a cinematographer working in the realm of theatrical films, it is in no way economical to attempt selling a film shot at 30 frames per second; This is in part due to the fact that the frame rate of 24 has remained the motion picture standard for close to one-hundred-years, since the introduction of sound into films, and has since become recognizable by even those who know nothing in regard to how motion pictures are captured. Demand for 24fps exists not only among filmmakers, but within the subconsciousness of the audience, whom associate the frame rate of 24 with major motion pictures, while 30fps (or the interlaced format 60i) is widely associated with television and/or home video. It is absolutely necessary that a motion picture camera meant for cinematic purposes to shoot at 24 frames per second.

The Nikon D90, as well as recording images at 24 frames per second, has another particularly nice feature in relation to its capture rate. Most video cameras that record at 24 frames per second (including the Panasonic Lumix DMC-GH1) must apply what is called a "pulldown" to the video signal, which, put simply, creates a pattern of repeated frames or fields that convert the video to a 60i signal while retaining the appearance of footage being played back at 24 frames per second. Pulldowns, depending on the type of pulldown and the editing system one is working with, can be somewhat troublesome to remove. The D90 utilizes no pulldowns, keeping the recordings at their native capture rate of 24fps. This makes working with the footage in an editing system much easier, and certainly less time-consuming.

No one, including myself, can stress the absolute importance that any camera system allows its user to have full control over it; The Nikon D90 and the Canon EOS 5D Mark II both disallow manual control over the aperture & shutter while in their respective motion picture capture settings (though both carry AE Lock Options), while the Panasonic Lumix DMC-GH1 and Red's Scarlets both have constant full manual control. Now, the loss of manual control within Nikon's camera is significant, though one can easily bypass the automatic controls of the D90 (and I would presume the same can be done with the Mark II), in order to regain authority over them. To do so, what one needs is a lens with an aperture ring, and though most lenses built for Digital SLRs have no aperture ring around them, there are a few, particularly those that were initially fashioned for film cameras, that do. Using a lens with an aperture ring allows one to adjust the exposure manually, by physically opening and closing the iris. Doing this will override the electronic automatic functions of the camera, and give you control over the aperture. This essentially turns the camera into an "Aperture Priority" camera system, allowing one to change between shutter speeds simply by turning the iris dial left or right. Opening the iris as wide as possible will set the camera to a very fast shutter speed, while closing the iris as tightly as possible will set the camera to a very slow shutter speed. When the proper shutter speed is attained, one must simply activate the AE-Lock. Taking advantage of this function becomes very effective, and changing shutter speeds works flawlessly using the iris dial. Neutral Density filters can also be very useful in taking full advantage of the shutter, allowing one to have very slow shutter speeds while shooting at even f/1.4 in the middle of the day.

The D90 & the Mark II share one more trait that they do not have in common with their Panasonic and Scarlet counterparts; A 'take limit' (the amount of time the camera can record a single clip) which is designed to prevent the system from overheating. The D90 has a take limit of 5 minutes and the Mark II has a take limit of 12 minutes. As a cinematographer who utilizes the D90 for shooting theatrical motion pictures, I find the take limit to be particularly unimportant. While shooting a feature film (or short film), it is rare that a take is ever intended to last any longer than five minutes on screen, and it is just as uncommon that a take would continue for five minutes without the director calling cut. In regard to the concerns of the camera's potential to overheat, as a cinematographer who just completed a feature film on the D90, I experienced only two instances, over a shooting period of three months, where the camera overheated. The camera does not get hot, and there are no problematic side-effects; The camera simply warns you with a silent countdown of the remaining time it can remain on, and closes the shutter at zero. Wait no more than five minutes, and the camera will continue without interruption from there on.

A minor element worth noting is that each of these cameras carry what is called a 'Rolling Shutter' system (due to their CMOS-type sensors). A Rolling Shutter system captures images differently than the commonly used 'CDD Sensor'; CCDs capture images in their entirety all at once, while rolling shutters capture images from top to bottom. This can sometimes cause what some refer to as a 'Jello-Effect'. If the camera is moved with excessive speed, straight objects can become distorted and appear as though they are leaning (for the duration of the time the camera is moving). While this has been referred to as a impassably nasty factor, I find that to be severely untrue; Not only within the D90, but the rest of the aforementioned cameras (though particularly so of the Nikon), the numerous other superior systems they contain in comparison to most other CCD camera systems vastly outweigh something such as a rolling shutter that, as I have learned while shooting a feature film on the D90, can be easily worked around with ease.

Finally, the issue of recording sound; The Nikon D90 and the Canon EOS 5D Mark II both have built-in microphones that are heavily under qualified to record sound for a motion picture. The Panasonic Lumix DMC-GH1 as well has a built-in microphone, though also includes a 2.5mm input for an external microphone. It is not known as of yet whether or not the Scarlets support sound recording, but regardless of the sound systems on either of these cameras, one can always shoot sync sound on a separate device, having the advantage of balanced inputs, unlimited audio tracks, and high resolution recordings beyond that which is capable of achieving with the Nikon, the Canon, & the Panasonic. When I was first introduced to the Nikon D90, I did not consider the absence of quality audio recording capabilities as an issue, and I still do not. I saw the camera as a device designed for capturing cinematic images; I likened it to a 35mm motion picture film camera and the situations surrounding one while shooting, making the opportune choice to shoot sync sound separately.

The Nikon D90 bears the most important elements that a motion picture camera require; Grand optics, and a sensor plane with a vast ability to discern subtle changes in light and color. These two elements within the Nikon D90, I have found, completely outweigh higher resolution or finer compression in the Canon EOS 5D Mark II, the Panasonic Lumix DMC-GH1, and even Red's 8x Fixed & Cinema model Scarlets. While the Canon has a larger chip and respectable optics, the camera can only record at 30 frames per second, giving the Nikon D90 a major advantage as a digital cinema camera with a frame rate of 24. The Nikon camera's optics and sensor reign superior even over the Panasonic and the Scarlet's manual controls that the D90 and Mark II lack; This is because by making use of lenses with aperture rings, one can regain full manual control over the D90's settings, effectively changing it into an aperture priority camera system. The intensive studies I have undergone in regard to these four cameras have led me to the conclusion that as a cinematic tool, the Nikon D90 is absolutely the ideal choice.

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