

BUYER'S GUIDE

DSLR Video



by Adriel Brunson

DSLR Video Buyer's Guide

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What's Right For You

In one of the busiest online forums, a new convert to DSLR video expressed frustration that I believe is shared by many people. He said:

“I thought I knew what I wanted to buy but the more I read here the more confused I get.”

Boy, can I relate to that!

I remember when the Nikon D90 came out. I spent a lot of time reading reviews, looking at test footage, and scanning forums looking for information. I got so involved that I started calling it “camera porn”.



I finally ordered a D90 and I've never regretted it.

It took me back to when I started shooting photographs with a SLR 35mm camera in my early 20's. It was lots of fun and I learned a lot that I still use.

At that time, I was composing and producing commercial sound tracks for what were called “multi-image” shows. We'd rack up three slide projectors and group as many racks as we could. Twelve projector shows were common, the largest I worked on had twenty-four slide projectors clacking away.

It was a very powerful communication medium but it had one significant problem. It was difficult to transport and took hours to set up. Adjusting the alignment of all those projectors was not for the faint of heart.

One of my clients asked if we could video tape the show so they could just ship a VHS tape to their sales offices.

I took the entire rig to a large studio and paid a guy a significant amount to point a video camera at the screen to capture the show. We recorded the audio track directly to the recorder so I shot the master in one pass. We reset everything and shot it again for a backup. Very crude by today's standards but pretty advanced at the time.

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The next time I had a show to videotape I rented a pro camera and deck for a couple of days. It took most of the first day to shoot the slide show. I spent the rest of the time learning how to shoot video. I was hooked and I still love producing video to this day.

Shooting video with a DSLR took me back to those early days. The cameras are tricky to set up and the results are not always predictable. You have to manually adjust everything and understand a good bit about how light, lenses, and cameras all work together. For me, the fun of mastering DSLR video technology is a big part of the game.

There's another element, though, that is even more exciting. Anyone wanting to tell a story using the language of cinema now has an affordable tool that will produce high quality images. You can edit on a laptop and have access to more powerful tools than entire post-production facilities in the 80's. Add in the explosion of video sites for distributing your work and you have the recipe for a revolution in film making.

These are exciting times to be in this business.

But then, there's that visitor to the DSLR video forum. He's excited but he's not moving forward because the more he reads, the more confused he gets.

I think I know why.

The people in online forums have unique backgrounds, experiences and goals. There's little chance that they will look at anything in the DSLR video world with the same perspective. So their questions and comments will be all over the place.

When you're trying to figure out the right equipment to buy the only valid answer is, "It depends on how you look at it."

What works in a one type of production may not be the best choice for another type of production. The same goes for people, everyone has a way of working that fits them best.

With over thirty years in the production of electronic media I have a lot of experience buying and using new technology to solve production problems. I'll admit to making more mistakes than most people

because I've experimented more than most people. My experimentation came from a love of new technology but it was also driven by the need to gain a competitive advantage by using new tech to solve old problems better.

I decided a *DSLR Video Buyer's Guide* that brought all of this together might be useful.

I know that the choice of photographic or video equipment carries about the same depth of fervor as choice of religion. So, rather than try to convince you of what's right, my goal is to give you reference points.

A reference point lets you know where you are so you can decide where to go next. It's like the "You are here" arrow on a map in an amusement park. The "where to go next" part is up to you. You'll have to work out what's right for you and your production needs.

What's In This Guide

While your interest is in shooting video with a DSLR, there's more to equipping a video production than the camera. Actually, you may find that the camera is one of the equipment selections that changes the most over the years. A good camera support system may outlast several generations of cameras. The same goes for good lenses.

I've grouped the equipment required for a DSLR video production into several categories:

- Camera
- Lenses
- Camera support
- Audio
- Lighting
- All the rest of the kit

It would be great if there was only one right choice for each of these categories but, like I said before, everyone has unique goals.

So, for each equipment category we'll look at three levels of systems:

- Basic (get in the game and learn how it works)
- Intermediate (working on a professional level as a solo entrepreneur)
- Advanced (ongoing video production company)

You may find yourself at one level in one category and at another level in another category. For instance, professional photographers will be at the advanced level in terms of lenses but are likely to be at the basic level in the audio world.

Feel free to pick and choose the topics that are the most interesting to you.

Your Focus

From my time blogging, reading forums and talking with people in this market I believe there are the three types of people who are interested in getting into DSLR video:

- Professional photographers
- Video professionals
- Aspiring film makers

I realize it's difficult to write something meaningful to people with such different backgrounds but I believe the common ground of learning how to create video with a DSLR provides an even playing field.

Like I've said, you may be an expert in one area and a beginner in another. I believe this is both the biggest difficulty and the most fun challenge of shooting video with a DSLR. You must take on a beginner's mind.

If you're reading this guide, then it's likely that you're willing to experience the learning curve so relax, drop your "professionally perfect" persona and enjoy the ride!

In my process of learning to shooting video with a DSLR I've found myself going back and forth between being amazed with the images

and frustrated with the limitations of the equipment. As I'm writing this guide, I want to make sure you get an accurate understanding of what it takes to produce high quality video with a DSLR. To do that, there will be times when I need to point out the limitations.

Back to the map analogy, there are areas that need to be marked, "Experimental Zone Here!" In other words, expect to spend time learning how to work around the limitations so you can have a better chance of producing amazing footage.

When you look at the expense and complexity of the equipment I'm recommending and wonder if it's really necessary, trust that I'm doing my best to guide you through the jungle without running into too many pitfalls.

Actually, my experience is that the least expensive way to produce the highest quality video is to hire top production companies.

You get the benefit of years of experience and truck loads of equipment. And when you want to work with the latest camera or support system you work with your production partner to make it happen.

But if you *are* one of those production companies that people hire, or you're determined to shoot your own video with a DSLR, this guide will be useful in making your way forward.

One last thing before we get into the *DSLR Video Buyer's Guide*. The development of technology moves fast. This guide is probably obsolete in more than one area as you read it. I'll do my best to keep it updated but you'll need to go to <http://dslrhd.com/buyersguide> and subscribe. I'll let you know when a new version is available.

You can email me at adriel@dslrhd.com with suggestions, comments and feedback or leave them on the web page.

Camera Body

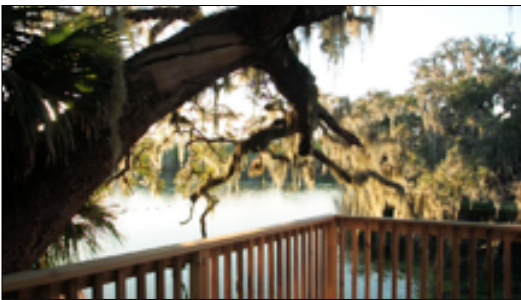
For some people this is the main event. But I suggest thinking of it in terms of image acquisition.

There lots of ways to acquire the images used in the final edit. You can use still cameras, film cameras, video camcorders, screen capture applications, and graphics applications.

Rather than forcing one tool to do everything, it's wise to consider the best way to capture the images (and sound) that are required. In some cases a DSLR is a great image acquisition tool. It's not so great in other situations.

I remember looking at some of the first footage from my D90.

I went to a beautiful spot on a local river where manatees were likely to be found. I shot footage driving to the spot and walking down to the river. I shot tourists peering over the side of the railings, pointing at the manatees. I caught nice shots of manatee families playing in the crystal clear water.



To play with the narrow depth of field of the D90, I framed up shots with spanish moss swinging in the sunshine close to me then racked focus to interesting little coves on the other bank.

It was juicy stuff and I couldn't wait to drop it into a timeline in Final Cut Pro.

When I got home and looked at my shots on the computer I got discouraged. Not much of that footage was usable.

I was shooting hand held for everything and the 'jello' from the CMOS sensor of the D90 made it look like the worst home movie you've ever seen. Move a camera with a CMOS sensor too fast and it will warp all the vertical objects in the shot like they were made of jello.

The few steady shots I got where I braced myself against something had the forest shimmering in a rainbow of colors as the aliasing broke up the complex image.

The compression of the HD video causes complex patterns to break up producing an iridescent shimmer.

Lesson learned – DSLR's are not right for every shot. Most prosumer camcorders would have recorded beautiful video.

So, let's assume that your project calls for the feature set of a DSLR – great low-light capability, small and light-weight body, shallow depth of field and that beautiful film-like look of DSLR video.

We'll also assume you don't need to shoot segments that run more than a few minutes, that you don't have to deal with lots of brick walls, quick pans or other elements that make DSLR's look so bad.

And, mostly, let's assume that you're determined to get into the DSLR video game and learn how to make this technology work for you.

It all starts with the camera so let's look at the three production levels for DSLR camera bodies.



Basic

For an entry to shooting video with a DSLR I recommend the [Canon T3i](#), known as the 600D outside the US. Here's why.

- Cost – this is the cheapest real DSLR that shoots HD
- Video quality – virtually the same as a Canon 7D at half the cost
- Manual controls – audio levels, frame rate, shutter speed, and ISO give you reliable control
- Swing out LCD monitor – see the monitor from most any angle

Like any tool, there are limitations when shooting video with this camera and they may be significant based on your production needs.

For instance, the T3i uses a smaller battery that won't work with your 7D or 5D batteries or their chargers. This is not a problem unless you already have a 7D or 5D with several extra batteries.

But the bottom line is this: if you want to shoot high quality video with a DSLR the Canon T3i will get you in the game.

Intermediate

The big news here is the [Panasonic Lumix GH2](#).

In the previous version of this Buyer's Guide all the camera recommendations were Canon. About the time Canon released the T3i, a great DSLR video camera, Panasonic released the GH2 and things got interesting.

A reader asked:

I was wondering if you could compare the Canon 600D and the Panasonic GH2. I would mainly be using the camera for video production. Am torn between them. Any insights or advice you could provide? Thanks!

Here's what I came up with.



Panasonic GH2 – DSLR?

Okay, let's get this out of the way right now. Yes, the Panasonic GH2 is not a really a DSLR. It has no optical viewfinder fed by a mirror that flips up out of the way when you take a picture. Is this an important distinction? Not if you're shooting video.

When you shoot video with a DSLR the mirror is locked into the up position and you use the LCD screen to frame your shot. If you're shooting stills for a living you'll likely be more comfortable with the optical viewfinder but for video you're either using the LCD or tapping the camera for an external monitor. And that's true of all DSLR's.

Take A Look At This...

And, speaking of LCD's, this is one of the reasons why these two cameras are better for video than other DSLR's. Both have articulating LCD screens. You can flip the LCD out and adjust it like virtually all video camcorders. You no longer have to keep the camera at eye level to see what you're shooting.

If you really want to see what you're shooting, one of the unique features of the GH2 is clean HDMI output. Not only is it perfect for feeding an external HD monitor, the HDMI output on the GH2 is uncompressed 8bit 4:2:2 like the AF100. That means you can add an external recorder like the [Atomos Ninja](#) or the [Blackmagic Design](#)

[HyperDeck Shuttle](#) and the GH2 delivers high quality ProRes 422 video.

The Canon T3i has a higher quality LCD on the camera but it suffers the same fate as other Canon DSLRs (except for the 7D). When you hit the record button the HDMI output drops from HD to SD.

So, this point goes to the GH2. In some matches, the ability to output clean HDMI alone would be the end of the story, making the GH2 the game winner.

Testing 1, 2, 3...

Both of these cameras give you manual control of the incoming audio level and they both have a stereo microphone input. Even if all you use it for is reference audio, it's great to have that reference be a usable audio track when you get to edit. And if you plug in a decent microphone you can get much better than just usable audio.

The GH2 also has on screen audio levels which makes it even easier to get good audio. While I recommend treating on screen meters as an indicator that you're getting audio rather than accurate tools like professional VU meters, it's way better than nothing.

And this point goes to the GH2.

Codec – Compressor/Decompressor

My perspective about the two codecs these cameras use is simple: it doesn't really matter.

- Neither codec is used by high end professional video camcorders.
- Both codecs lose important information.
- Both keep the most important details intact.

Unless you're editing with Adobe Premier CS5 you're going to need to transcode your footage from either camera to a format better for editing.

In the overall workflow of a production it doesn't make any real difference. Whichever camera you use you'll need to learn the limits of

the system and how to get the best compromise for your type of production. Yes, it's apples and oranges but they are both still fruit.

All this is true as long as you're dealing with recording directly to the SD card in the camera. But with the GH2 you have the option of recording the HDMI output as 100Mbit ProRes 422 video. And, like I said, that makes it a superior choice.

Sorry Canon, another point goes to the GH2.

We don't need no stinking adapters

One of the biggest differences in these two cameras is the lens mount. The Canon T3i uses an EF mount while the Panasonic GH2 uses a micro four thirds. Note that this is "micro" four thirds – there is a normal four thirds mount as well.

On B&H Photo right now, there are 237 lenses that match a Canon EF mount. There are 20 lenses for micro four thirds mounting.

Even more importantly, if you want to take advantage of the continuous auto-focus or the touch sensitive auto-focus features of the GH2 you'll need to use the kit lens. Otherwise, you'll need an adapter.

Panasonic says their DMW-MA1 Mount Adaptor "takes advantage of various functions of the DMC-GH2." There are some Panasonic normal four thirds lenses that use some of the features meant to make video focus easier.

If you want to shoot with Canon or Nikon lenses on the GH2, you're pretty well limited to an adapter with no electrical connection so you'll need full manual control on the lens.

The Canon T3i will work with all EF lenses right out of the box. Of course, it doesn't have all the auto focus features of the GH2 and you'll still need an adapter to use those low-cost Nikon manual primes.

More options for lenses gives this point to the Canon T3i.

I'll see your 1.6x crop and raise you 2x plus 1!

Both of these cameras will crop the image of a full sensor lens. Cropping makes the lens look like a longer lens.

The Canon T3i has 1.6x crop while the Panasonic GH2 has a 2.0x crop. That means a 50mm lens on the T3i will look like an 80mm lens on a Canon 5D. The same 50mm lens on a GH2 will look like a 100mm lens on the 5D.

This is a good thing if you need more telephoto reach for your shots. It's not a good thing if you need more wide angle coverage.

But, with either camera you'll have to deal with this effect. If you absolutely need the wide angle full sensor look you're going to have to go for the Canon 5D.

On the other hand, the sensor size of the Canon T3i and GH2 are closer to the standard for traditional motion picture film cameras and that "look" is acceptable around the world.

But wait – the GH2 has a special trick up its sleeve. It's called the 1:1 (one to one) mode.

The full set of pixels in the GH2 sensor will create a 16 megapixel still. That's a lot more than HD video can handle so the camera down-samples the image to make it fit.

The GH2's 1:1 mode takes a 1920 x 1080 image from the center pixels on the sensor and sends it direct to video. It makes your lenses even more telephoto but it also captures a stunning HD video image with no artifacts from down-sampling.

No contest here – GH2 gets the point.

Shift Happens

One of the reasons people love DSLR video is the shallow depth of field. And what good is shallow depth of field if you don't shift the focus while you're filming, taking the viewer with you from the distant vineyard covered hills down to the lip of the wine glass on the table.

For most people, this means investing in a follow-focus so they can precisely and smoothly control the focus. You can spend from hundreds to thousands of dollars on a follow-focus and you'll need to spend many hours to become a master of using one.

The Panasonic GH2 offers touch screen auto-focus which shifts the focus from whatever you touched to whatever you touch next. You won't get the same precision you'll get with an experienced hand on a high quality follow-focus but it's likely to do the job for most people.

Panasonic claims it will even hold focus on faces when people move through the frame. This type of auto-focus for video can really makes sense for most projects.

Another point goes to the Panasonic GH2.

The Bottom Line

Adding up the score we get five points for the GH2 and one for the Canon T3i. I didn't even get into the "intelligent" GH2 features that may help you shoot better video. And then there's Panasonic's Cinema Mode which not only shoots 24p, it sets up the camera for a very film-



like profile. There's just no other DSLR in this price range that comes close if you're planning to use it for shooting video.

And that is a point worth considering for one more moment.

The [Panasonic AG-AF100](#) uses the same sensor as the GH2. But it comes in a body made for shooting video. It has the same micro four thirds lens mount so you can work with a variety of lenses. Add in

XLR microphone inputs, headphone jack, etc., etc., etc. and you've got a high quality, film-like video camcorder for professional use.

The GH2 is a still camera that shoots video. Amazing video, especially for the money. But it's not a video camcorder.

So, if you have the budget or if you're shooting video as a professional you'll likely be happier with the AF-AG100.

But, if you're looking for a DSLR in the intermediate price range that shoots great HD video the Panasonic GH2 is the only way to go.



Advanced

If you're working at the advanced level there are no two ways about it, you'll be shooting with a [Canon 5D Mark II](#).

Here's why.

- Shooting stills or video with the full frame sensor produces an image that is visibly and technically superior.
- It has better low-light capabilities than the GH2 or T3i.
- The full sensor will produce a more shallow depth of field than a GH2 or T3i, given the same lens, light, and f-stop.
- It has a higher data rate which should capture a better video stream.

NOTE: the biggest issue of shooting pro level video with a Canon 5D is what happens when you connect an external monitor.

I'll cover this in the section on monitors but it can be a show stopper – literally.

- Canon has released firmware updates that allow more choice of frame rates and more manual control of the camera for video.

Again, there are good reasons to shoot with more than one camera. The Panasonic GH2 and Canon T3i offer more frame rate options so you may decide to shoot with one 5D and use a GH2 or T3i for your 'B' camera.

We'll get into this in more detail in the next section on lenses but having two cameras with different sizes of sensors can practically double your lens selection.

Your Focus

Photographer – if you want to play around with shooting video, grab a T3i and have fun. If you're ready to add another camera body and need the higher quality for stills go for the 5D.

Video Professional – it depends on how and where you work. If you're a solo entrepreneur outside of the major markets you're going to love the GH2. If you're in a major market, you may feel the need to get a Canon 5D for the "street cred" but try a GH2 first. You'll love shooting 50p then dropping it on a 24p timeline for buttery smooth slo-mo.

Aspiring Film Maker – if you have the budget go for the GH2 as it will give you more functionality on the set. If you don't have the budget then the T3i is the camera for you.

Oh Nikon, where art thou?

I'm aware that I've not included any Nikon cameras in this list.

There are good reasons for that.

Right now even the best Nikon DSLR camera for video, the D7000, records inferior video when compared to both Canon and Panasonic.

- The D7000 shoots 1080 24p or 720 30p video. Canon cameras offer more choices in video frame rates.
- Nikon's are limited to 4 minutes per clip while Canon DSLR's shoot 12 minutes per clip.
- Other than the Nikon D3s, Canons have better low light capability.
- Even though the D7000 has audio level control it offers only auto, high-medium-low, and off settings.

Don't get me wrong, I like Nikon cameras. Reviews of the D7000 rave about the quality of the still images.

Photographers who are devoted Nikon users, and who are only interested in grabbing a bit of behind-the-scenes footage every now and then, may be happy creating video with a Nikon D7000.

Otherwise, I recommend the Panasonic GH2.

Until the market changes...

LENSES

Time for a physics lesson. If you're a photographer you can probably skip this section except for the last couple of paragraphs.



Full Frame Sensor



APS-C 1.6x Cropped



Micro four-thirds 2x Cropped

The Canon T3i and Panasonic GH2 have a sensor smaller than the Canon 5D. Technically, the T3i has an APS-C sensor, the GH2 has a micro four-thirds sensor, and the 5D has a full frame sensor.

We'll side-step all the interdependent factors for video quality with sensor size versus pixel size, compression algorithms and data rates to get this one thing clear:

When you put a full frame lens made on a camera with a smaller sensor, you make the lens more telephoto.

From a full sensor image, an APS-C sensor produces a 1.6x crop and a micro four-thirds sensor has a 2x crop.

This means that a 50mm full frame lens looks like an 80mm lens on a T3i. That same 50mm lens will look like a 100mm lens on the GH2.

The pictures on the left show the difference in the field of view. It's as if you just added a telephoto adapter to your lens.

This telephoto effect can be a good thing in some circumstances.

Let's say you're shooting a two-shot with people that don't have much experience being in front of a camera. Maybe they are not even actors but employees or customers or wedding party members.

Drop a nice 85mm lens on your T3i or GH2 and you can shoot a great close-up while still staying several feet away. You'll create more space for them to relax if the camera is not shoved right into their face.

DSLR Video Buyer's Guide • Lenses

There are times when this telephoto effect can be a problem. Let's say you need to be eight feet from the subject to get the frame you want with a 50mm lens. If you only have six feet of room to work with you'll need a wider lens.

To get a shot that matches a 28mm on a Canon 5D, you'll need to use an 18mm lens on your T3i or 7D. An 18mm lens can cost quite a bit more than a comparable 28mm lens.

Here's a link to an online calculator at Abel Cine Tech where you can dial in the focal length on various sensors and see how sensor size affects FOV –<http://www.abelcine.com/fov/>.



You won't see all the effects of wide angle or telephoto lenses but you can see how the crop factor works. And all images in the calculator are formatted as 16×9 so it's great for video.

There are a few other things to consider about lenses.

Field of View

Wide angle lenses are called that because they include a wide field of view or FOV. If you leave the camera in a fixed position and change from a 100mm lens to a 10mm lens the picture you see will be a wider shot of the subject.

Duh, I know this is very basic but stick with me a little bit more.

If you look at your shot and feel that there's too much in the picture, you can either move the camera closer to the subject or change lenses for a tighter shot. If you're shooting stills you can crop your images to tighten them up or reframe so they tend to shoot a little wider to be safe.

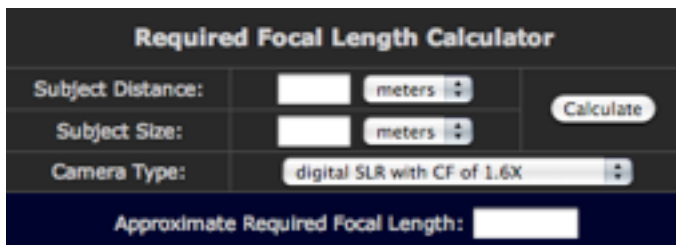
But, in general, there is no cropping or reframing in video.

If you want to crop and reframe in video you'll need to shoot 1080 clips and edit on a 720 timeline. Depending on your intended distribution format, you may want to shoot "action safe". That means shooting wide enough to keep the action away from the edges of the frame.

A great resource for getting a better grasp of the subject of basic lens function is Understanding Camera Lenses. Here's the link:

<http://www.cambridgeincolour.com/tutorials/camera-lenses.htm>

This article includes a very cool calculator. You enter the distance to the subject, the size of the subject and chose a sensor size. It will show you the focal length of the lens you'll need to get the shot.



The image shows a web-based calculator titled "Required Focal Length Calculator". It has a dark background with white text and input fields. The calculator is organized into three rows of input fields and a "Calculate" button. The first row is for "Subject Distance" with a text input field and a "meters" unit selector. The second row is for "Subject Size" with a text input field and a "meters" unit selector. The third row is for "Camera Type" with a dropdown menu currently showing "digital SLR with CF of 1.6X". To the right of these three rows is a "Calculate" button. Below the input fields, there is a dark blue bar with white text that reads "Approximate Required Focal Length:" followed by a white text input field.

There's more to focal length than FOV

Different focal length lenses not only have different FOVs, the feel of the image they produce is different as well.

Wide angle lenses enhance perspective. Extreme wide angle lenses take perspective so far they bend straight lines producing a fish-eye effect.



Shoot a close up of a beautiful actress with an extreme wide angle lens and you may be looking for another job soon. Skylines and landscapes, on the other hand, usually look better with a wide angle lens as it opens the perspective up.

Telephoto lenses flatten perspective. Your beautiful actress may not be too happy with that result either.

But if you're shooting a person walking on a busy street a telephoto lens will make them look lost in the crowd.

Most portrait photographers like an 85mm lens because it treats the human face so well. And a 35mm lens is used for basic photography courses because it's close to what the human eye sees.

So, besides thinking about the distance to your subject and the FOV you want, your choice of lenses starts to include thinking about the perspective you want to show your audience. We're still talking about the basics, but now we're moving into pro territory and working on production value.

A crazy thing about crop factors and lens perspective

The crop factor of a smaller sensor has the same effect on the FOV as increasing the focal length. *But it does not change the effects of the lens on the image.*

No matter what size the sensor is, a wide angle lens will still enhance perspective. A telephoto lens will still flatten perspective. And an 85mm lens will still make people look great.

Now you see why keeping this discussion “basic” can still make things complex?

Now let's talk about the effects of the f-stop of the lens

Most people shooting video with a DSLR want a film-like image. One of the factors in getting this image is controlling the depth of focus or DOF. And the two factors that influence DOF most are the lens aperture (or f-stop) and sensor size.

Decreasing the sensor size has the same effect as increasing the f-stop. Doing either will increase the DOF giving your shot a wider area in focus and reducing the softness of the rest of the image.

While you may believe you want the razor sharp DOF of a Canon 5D Mark II with an f/1.2 prime lens, the truth is that you'll lose focus so quickly that any movement by the subject will throw them out of focus.

On the other hand, shooting at high noon with the Panasonic GH2 and a lens set at f/16 will make almost everything in focus. This is why you'll need to carry ND filters to shoot in daylight outside so you can get the f-stop back to a more workable range.

Most films are shot with an f-stop between 3.5 and 5.6. So, if you want a film-like image that is a good range to work in. Also, most lenses are not at their sharpest fully wide open. Inexpensive lenses often look much sharper closed down a couple of stops.

But the most important thing to consider about exposure is the effect of the image on the audience.

Where do you want them to focus?

What's the right perspective to bring them into the shot completely?





Stu over at Prolost.com has created a couple of posts with a great series of stills that show the effects on DOF of various lenses, sensors and f-stops.

He's made it so the FOV is constant in all the shots so you can quickly see how the other factors change the feel of the shot.

Here's the main article:

<http://prolost.com/blog/2011/1/9/the-shot-you-can-make.html>

While you're there look for the follow-up article with more lens examples and instructions for how to use them.

Okay, what about shutter speed and ISO

Still photographers have two other factors in the equation of choosing their lens. They can keep the exposure where they want it for DOF and adjust shutter speed to get a good shot and they can change the ISO of the camera.

While you can play around with different shutter speeds on a DSLR when shooting video, in general the shutter needs to be set twice as fast as the video frame rate.

If your subject and camera are not moving – like shooting a landscape – you can drop the shutter speed and get more light into the shot. But if anything moves you'll get motion blurring.

As for changing ISO, video seems to have a much more limited ISO range than stills. And, depending on your camera, you may not be able to dial in the ISO in small increments. A Canon T3i jumps ISO from

100 to 200 to 400 to 800 with no choice of anything in between. Those are big jumps when all you need is a bit more light hitting the shot.

Generally for video you'll want to keep ISO at 400 or less to keep the noise out of your image. You'll want to learn how to use shutter speed and ISO to help get great stills but don't count on them when you're shooting video.

The lens creates the image, the camera just records it

Professionals look at all these factors and choose their lens based on the effect they want the shot to create.

Read that last part again... that bit about "the effect they want the shot to create."

Most of us are doing great when we can get a shot that is well lit, in focus and correctly framed. For a pro, it's as more about what they want the audience to perceive and feel rather than just getting a decent shot.

When you read Stu's post at Prolost.com, you'll see that he has taken a shot from a film he did not shoot as the basis of his lens series. I was struck that he could deduce the lens and the camera just by looking at the still of the shot. That's what a pro can do.

Take your shot composition and production value to a higher level. Go beyond getting a decent shot and choose your lens to move your audience deliberately where you want them to go.

Fast + full sensor = \$\$\$

You're going to need fast lenses if you plan to shoot inside with low lighting and want to keep the noise in your video manageable. A lens is fast if it has a low f-stop.

You'll need faster lenses for video than for stills because all lenses have a sweet spot where they are the sharpest. The sweet spot is normally a couple of stops up from wide open. So, to get the sharpest video in low light you'll need really fast lenses.

You also have choice of sensor size for lenses. You can buy full frame lenses or lenses made for the smaller APS-C sensor. If you want the extra benefits built into the Panasonic GH2 you'll need to use their lenses.

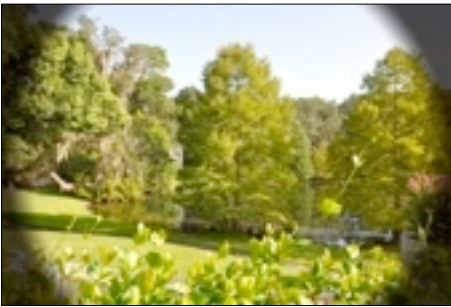
While you may find savings in APS-C lenses you'll find more selection in full frame lenses.

Full frame lenses work on APS-C cameras but you'll get vignetting – a dark halo around the edge of the frame – when you put a lens made for a T3i on a 5D.

While fast, full-sensor lenses are expensive, good glass can last a long time.

Also, you don't have to use the same brand of lenses as your camera. There are adapters on the market that will adapt almost any brand of lens to Canon or Panasonic cameras.

Do not be afraid of old glass, it can be perfect for video. Just make buy from reputable dealers and sure that the lens has full manual control as most adapters bypass the electronic controls of the camera.



Vignetting

Basic

If you're going for the T3i I recommend you start with the Canon 18-55mm kit lens and pick up a Nikon AF Nikkor 50mm F/1.8D lens with an adapter. The Canon 18-55mm give you a decent "walking around" lens for photographs and will shoot great video outdoors in daylight.

While Nikon DSLR's may not be the best for video, Nikon produces excellent lenses. The Nikon 50mm 1.8 is an affordable prime lens that will shoot in fairly low light. I've used mine outside at night with decent results.

A prime lens is a fixed lens. You can shift the focus of the lens but you can't zoom in or out.

To change the frame of what you see in the camera you change the lens or pick up the camera and move it.

This will be very strange for a video shooter as all camcorders come with zoom lenses but the look of a prime lens is part of why you're shooting with a DSLR.

After you've shot for a while with these basic lenses you'll be able to go into a camera shop and immediately get the feel of other lenses.

Intermediate

With the Panasonic GH2 for an intermediate camera, you have some interesting choices to make about lenses.

The GH2 offers continuous autofocus and "touch screen" focus but only if you use one of the Panasonic micro four-thirds lenses designed for HD video.

At the time of this writing that is one lens - the 14-140mm F4.0-5.8.

While this may be a fine lens for shooting outside, you'll likely find it less useful in low light.

Panasonic offers [14mm F2.5](#) and [20mm F1.7](#) prime lenses with micro four-thirds mounts.

Both of these would be perfect for low light video and the crop factor will give you an effective focal length of 28mm and 40mm, respectively.

Whatever you decide about using Panasonic lenses, I suggest you go for three prime lenses: wide angle, standard angle and a medium telephoto.



While the labels wide, standard and telephoto depend on your style of shooting, here are my recommendations:

- Wide angle – 24mm or lower
- Standard – the [Nikon Nikor 50mm F1.8](#) is a safe bet
- Medium telephoto – anything above 80mm

The key for you will be matching budget against fast lenses.

You'll also want to pick up at least one Neutral Density (ND) filter and a polarizing filter for shooting outside. There's no sense in putting cheap filters on good glass – buy multicoated filters.

Advanced

The full sensor on a 5D makes it worth buying the best glass you can afford. You'll want a range from super wide to telephoto, likely four or five lenses.

Many shooters swear by Canon L series glass and that's what was used on the final episode of the television drama "House."

However, if you're shooting at a professional film level you'll need lenses that function like pro cinema lenses. Until recently this meant modifying the camera body to accept lenses with a PL mount.

Zeiss has released a set of [professional cinema prime lenses](#) with EF mounts for Canon DSLRs. These lenses are all the same physical size so follow-focus and other attachments work easily. They're accurately calibrated for f-stop and focus. And they offer stunning quality.

While a set of these lenses is a substantial investment, the difference in shooting on a professional set is well worth it.



Your Focus

Photographer – you likely have plenty of lenses. If you're not shooting Canon you'll need adapters. Buy more than one so you can leave them attached to the lens for faster changes.

Video Professional – you're going to have to get used to moving the camera, changing the lens—or both—to get the shot you want. Using prime lenses can be more time consuming but the look of a prime is why you're shooting with a DSLR.

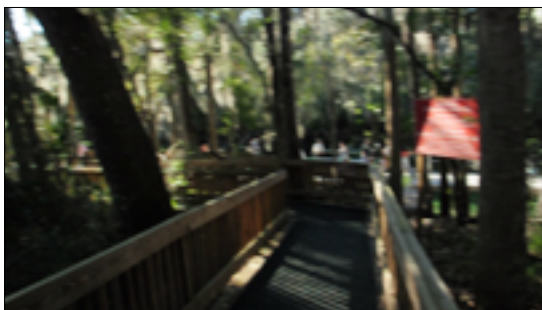
If you use zoom lenses, I do not recommend zooming while you're shooting video. Even with very steady hands, manually zooming a DSLR while filming is very difficult to keep smooth. Buy pro-level glass or the lens will change f-stop as it changes focal length.

Aspiring Film Maker – if you're working with a DP (director of photography) they will take care of lens selection. If you're doing it all, then stick with the basic lens recommendations until you learn more about how it all works.

Camera Support

Okay, I'm old school. I was taught that the scene motivated the shot and the edit. You didn't move the camera unless the scene called for it. Edits were all cuts unless you wanted the effect of a dissolve for a specific purpose.

Hey, I love 40' Jimmy Jibs and long slow dolly tracks and Steadi-Cams as much as the next guy. But just because you can fly the camera around a lot doesn't mean you should—especially when you're shooting video with a DSLR.



DSLR cameras have a few glaring faults. One of them being distortion of horizontal lines moving quickly across the image.

Remember how my manatee footage was useless because of the 'jello'? The trees in this frame were not all bent to the left in real life and it was actually in focus. CMOS jello caused the poor result.

Most professional video shooters can hold a camcorder in their hands and make amazingly smooth moves. It's very difficult for anyone to do the same with a DSLR.

That's why you see all those support-the-camera-on-your-shoulder rigs for sale.

I understand that these cameras are small and light-weight.

I understand that it seems like a great idea to walk around with them while you're shooting.

I'm just suggesting that most of the time you'll be better off shooting from a stable tripod.

Besides, I know very few people who have the arms to hold several pounds of equipment in shooting position for very long without getting the shakes.

If you are going to move around with the camera use a wide-angle lens with the iris closed down. Lots of light helps – sunlight is perfect.

You'll lose the shallow DOF (depth of field) that drew you to a DSLR in the first place. But you can't touch the lens to focus when you're using most Steadi-Cam type devices – the balance is too tricky. This is one time when deeper DOF is a good thing!

If this is the kind of thing you dream of shooting, you may want to try a camcorder in a shoot-out against a DSLR and see for yourself.

I recommend shooting from a fluid-head attached to a stable tripod. This is especially true when you add a cage to hold all the extra gear you need with your DSLR.



Here are some attributes to consider for your tripod purchase:

- Light weight – every pound you have to haul around on a long day seems to double as the day goes on.
- Mid-level spreader – spreaders connected to the feet of the tripod work okay indoors but they get in the way outside.
- Three-stage legs – you get more stability and more height, both are useful
- Ability to go low – if you want interesting shots put the camera in interesting places, like a few inches off the ground.

As for which brand to buy, that's one of those "religious" decisions. But most true believers are more in love with the fluid head than with the sticks.

Here are attributes they look for:

- Match the head with the camera. Heads are designed to work best with cameras within a certain range of weight. While I'd rather have a camera that was too light for the head than too heavy, it's easy enough to make sure they match.

Just remember to include the weight of the lens, microphone, audio recorder, external monitor and any other gear you plan to work with.

- Look for fast, easy weight balancing. Cameras tend to go on and off the head a lot and each time you need to re-balance the camera.
- Make sure the quick release plate works the way you think it should. I love some of them, can't get used to others. If you have more than one camera, or more than one support system, you'll need to make sure the quick release plates fit everything.
- You need smooth and accurate drag controls. Sometimes you want lots of drag so you can make those awesome smooth pans. Sometimes you need to get the camera around quick to follow the action. All heads work differently and it's worth learning what you like best.
- Check out the mounting brackets built into the head. Lefty or righty (or both) – professional heads provide ways to move handles; threaded holes to screw in adapters; and sturdy mounts for various devices. Cheap heads have none of these but you'll quickly wish they did.

Find a rental house where you can try different brands, even different models of the same brand and get a feel for yourself. Fluid heads have very different feel from brand to brand, even model to model inside a brand. It's good to know what works for you.

Basic

The basic tripod I recommend is something like the [Manfrotto 701HDV](#) kit. I bought one of these as a second tripod and now find it's the one I go for almost all the time. It's made for cameras the size and weight of a DSLR so the fluid head moves perfectly. It doesn't weigh much so it's easy to carry to the shoot. And it only costs about \$300 USD. It feels like a tripod that costs at least twice as much. It will always have a place in your kit.

Intermediate



Most of the video shooters I know love their Sachtlers. The [FSB-6/2](#) system starts at just under \$1,800 USD. Sachtlers go up quickly from there and most agree they're worth every penny.

Advanced

We're definitely in the realm of religion here but you'll find many top pros who almost worship their Vinton systems.

You have to get to the Vision line to get a 'real' Vinton and the [V3AS Vision Pozi-Loc](#) Aluminum Tripod System goes for about \$2,000 USD.

Your Focus

Photographer – your regular tripod and camera mount are just not going to cut it. You may want to look for a fluid head that will mount on your existing tripod.

Video Professional – you already know what I'm talking about. You may find yourself using a head made for a 20 to 30-pound rig with a 3-pound camera. It looks a bit strange to say the least.

Aspiring Film Maker – unless you plan to make skate-board flicks, get a good set of sticks. Your audience will appreciate it forever.

If you do need to move the camera a lot, consider a quality monopod like the [Manfrotto 561BH DV](#). It's made for video and even has a bit of fluid head feel to it.

It's lighter and easier to carry than a tripod and it's more stable than any shoulder or handheld rig. Keep it collapsed and it can act like a



counter-balance for the camera if you want to shoot while walking as a substitute for a Steadi-Cam type device.

It's not for everybody but I picked one up after that shoot on the river and wouldn't be without it. It's great if I'm going to be moving around all day catching shots when and where I can.

Another option for camera support that works beautifully for DSLR cameras is a portable track system.

I use the [GlideTrack](#) brand, though there are solid competitors in the market.

One reason this works well for DSLR video is that most moves made on a track are slow and graceful.

Plus, the shallow DOF of DSLR video enhances the feeling of movement of the foreground object against the background.

And, as it's difficult to zoom while shooting with a DSLR, you can increase the production value of your video by physically moving the camera toward your subject.

I flip my track 90 degrees and move the camera through doorways. It's interesting to move the camera into focus on an object rather than racking the focus on the lens. You can even mount the track on a fluid head and tilt it up or down to simulate a crane shot.

This is one of those areas where a little goes a long way. You don't want to use this effect for every scene but a slowly crawling camera is a reliable cinematic trick to add energy to static shots.

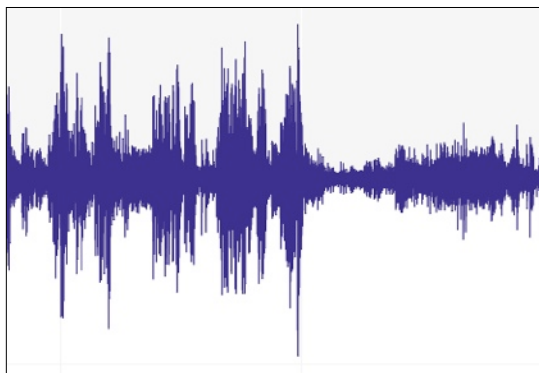


Audio

For photographers and aspiring film makers there is no area less understood—and more overlooked—than audio. Even most professional video shooters spend more time on lighting than getting the audio levels and mic position correctly set.

In the 1940's the US Navy produced hundreds of training films. They kept testing to improve the communication value of their films. In the end, they determined that 60% of the communication in a film was from the sound track.

You can test this for yourself.



Turn off the sound on any television channel and watch for a few minutes.

You may be able to get some idea of what is going on, especially if there are lots of graphics on screen, but it is likely to be kind of a broad concept.

Now turn on the sound but look away from the set and listen for a few minutes.

Chances are good that you'll be able to get a pretty good idea of what's going on.

Listen to a few minutes of one of the BBC nature productions like *The Planet* or *Life*.

Put your attention on the subtle cues that flow under the images. Consider how much was original sound versus how much was added during post production.

Imagine the movie *Jaws* without those violins pulsing dah-dee-dah-dee-dah-dee-dah-dee... every time the shark makes a move.

Okay, so you get the idea. The soundtrack is at least as important as any other production element. But here's the real kicker.

The fastest and cheapest way to increase the production value of a project is by improving the sound track.

If you're concerned about creating a competitive advantage in a tight market, spend the time to record good audio during production and polish the sound track in post.

Here are some tips and tricks that will make all the difference.

Tip #1 – There is no zoom on a microphone

Your camera is likely to be several feet from the talent. You can change the lens or grab the zoom and frame a great close up if the script calls for it.

But if your microphone is mounted on the camera the sound will be exactly the same as when you were shooting a wide shot.

Actually, you don't want the sound to zoom anyway. You want to record the sound as close to the source as possible no matter what the shot looks like.

Some people mistakenly believe that the answer is a shot-gun mic mounted on top of the camera.

That will improve the audio but it's a false sense of security. The mic is still too far away from the action.

In my experience it's more difficult to get good sound with a shot-gun mic than with almost any type of microphone. And that's with a good sound operator and a boom pole.

So learn how to close-mic your talent and you'll have plenty of good sound to work with in post.



Tip #2 – Two microphones are more than twice as good as one

The next time you see the President of the United States on camera, check the number of microphones being used. Most of the time you'll see two.

Many news shows use a special lavalier clip that holds two mics side by side.

Small problems with the microphone, the cable, or the audio file can wreck your footage. Having a second track to work with can save a project.

Even in a one-person interview I like to put a lav on the talent with a directional mic on a stand just outside of the frame. I never know which will sound the best in post. More times than not it's a mix of both.

All Canon DSLR cameras have an external microphone input but the quality of the audio recorded should only be used as a reference track. Here's what to do instead.

Tip #3 – Always record audio to an audio recorder

I know people keep coming up with ways to make the audio on these cameras better but it's not likely to ever be useful for more than reference.



Actually, I always use an audio recorder even when I'm shooting with high-end video camcorders with XLR inputs, meters, and headphone monitoring.

Why?

It may be hard to believe, but a \$400 USD digital recorder (like the Zoom H4n) can capture audio with higher resolution than a \$20,000 USD video camcorder.

Just like HD video, high resolution audio gives you more to work with in post production.

Bring an audio track to post that is poorly recorded and you'll spend all your time and effort just getting it to not suck.

Bring a great audio track to post and you'll *raise the production value of your entire project*.

Get a digital audio recorder and learn how to use it.

To sync the sound track with your video you can use a great tool called PluralEyes. See <http://dslrhd.com/resources> for more information.

Tip #4 – Trust your ears, not the audio meters

The meters on audio equipment can tell you that signal is getting to the device or, on playback, that you recorded some audio.

They can't tell you if there is hum or buzz or wind noise or a dog barking in the background.

They can't tell you if the microphone is off-angle to the person speaking and sounds like they're on the other end of a tin-can telephone.

You need a good set of headphones. And you need to spend a good bit of time listening to the kinds of things you'll be recording so you know what to trust.

No DSLR camera I know of has a headphone jack.

Aren't you glad that you have that nice digital audio recorder with decent monitoring built-in?

Tip #5 – Each person that talks needs a microphone

Ever hear a wedding video where the minister has a microphone and comes through loud and clear but when the happy new couple speaks, there's not much coming through the track?

If more than one person is going to talk you need to mic each one of them up.

Audio Trick – you don't need to feed all mics to the same recorder and you don't necessarily need wireless lavaliers.

You can plug a lav into a digital audio recorder, check the levels and sound with your phones, punch record, and drop it into their pocket. You can sync the 'wild' sound later in post.

Tip #6 – You can't be in three places at one time.

Someone has to direct the talent and the crew.

Someone has to manage the camera and make sure it's focused and framing the action correctly.

And someone has to listen to the audio as it's being recorded to make real time adjustments and let everyone know if it's a good take.

I've been producing film and video projects for over 30 years and I can't do all three of these at the same time.

Truth be told, I'm barely able to do any one of them at a time.

Yes, you can direct the talent and the crew then shift to camera operator. But you can't operate a camera and handle the sound if either one takes your full attention.

If I'm working by myself, I'll lock the camera down and monitor audio with my trusted headphones while directing the talent.

If I know the camera will need to follow the talent I hire a camera operator and a sound operator. The production value goes up ten times more than the increase in budget.

Okay, here's what I recommend as a basic kit for audio. The good news is that most of this gear will last you for years so it's an investment that pays off every time you shoot.

Basic

A reader recently asked:

I'm putting together a D7000 rig for video shooting and I was wondering what the best approach to audio equipment would be?

My budget is about \$450 and I am going to travel to Indonesia to shoot a pilot for a TV travel show. I was thinking a Zoom recorder (not sure which was is the best), but also a wireless lavalier system so I can be mobile.

I was hoping to record the video with the Zoom for ambient sound while having the lavalier for subject audio.

On first glance, \$450 for a complete DSLR audio kit seems too low. I mean, you can easily spend that much on a single professional microphone.

Then I started working through what you'd really need. It turns out that you can put together an pretty decent audio kit for \$450. Here's what I found.

First, I'd recommend going the other way around – use the camera to record ambient and the digital audio recorder for your subject. The D7000 audio quality is much lower and offers much less control than the digital audio recorder.

I recommend the [Zoom H1](#) for the recorder. It's great quality, low cost and very portable.

For the lavalier I recommend NOT going wireless.



You can plug the lavalier directly into the H1, set levels, lock it and drop it into your talent's pocket. Let it run for the whole session and edit it post.

It cost less than a wireless lav, is one less device to carry along with fewer batteries, fewer possibilities for interference, and wires are more reliable.

An added benefit of this approach is that you'll capture audio even if you're not shooting video. You never know when something great will happen. With the audio captured you can put together enough cover shots to make it work.

For a budget lavalier to plug into the H1 I like the [Audio-Technica ATR-3350](#). At a price of less than \$50 USD you might even want two of them.

Budget so far – about \$150 USD

I also recommend picking up an inexpensive shotgun mic. You can mount it on the camera and improve the ambient recording quality significantly.

I like the [Rode VideoMic](#) for \$149 USD. You could also go with the [Sennheiser MKE 400 Shotgun Microphone](#) for about \$200 USD. Either way make sure you buy a “dead cat” [Wind Muff](#) so you can use the shotgun outside or anywhere there's a breeze. Even the lightest wind will make a shotgun so noisy you can't use it.

Also, I like to double mic talent with a lav and a shotgun then choose the best sound in post. This also create a backup track in case you have a problem with either mic or recorder.

I also recommend picking up a small [Joby GP1 Gorillapod](#) for a mic stand. It will let you put the mic much closer to the subject, costs very little, weighs a few ounces and can be attached to all kinds of objects.

If you want to do this you'll need a [12ft 3.5MM EXTENSION CABLE](#) so you can position the shotgun closer to the subject.

Budget so far – about \$370 USD

I'd also highly recommend a decent set of headphones or earbuds. You want to check the sound every time before you start shooting. Sometimes a small change in mic placement or closing a window to a noisy street will produce a much better result and save hours in post trying to fix a bad audio track.

Ear buds are easier to carry and you can get great sound from them. For instance, the [Etymotic Research MC5](#) are great as they block most of the ambient sound and, for \$80 USD, offer dependable audio quality.

So here's the full kit:

[Zoom H1](#) – \$99 USD

[Audio-Technica ATR-3350](#) – \$45 USD

[RØDE VideoMic](#) – \$149 USD

[RØDE Deadcat Wind Muff](#) – \$39 USD,

[12ft 3.5MM EXTENSION CABLE](#) – \$3.29 USD

[Joby GP1 Gorillapod](#) – \$15 USD

[Etymotic Research MC5](#) – \$79 USD

Total budget – \$429.29 USD

[Click here to see the whole list on Amazon.com](#)

I would also recommend picking up a “Y” cable so you can plug both mics into one device, sending each mic to a separate channel. With this in your kit you can record the lav and RØDE VideoMic to the H1 and use the D7000 for capturing ambient.

Or you could feed the lav and RØDE to the D7000 and use the H1 to close mic a second speaker. If the H1 dies you can still feed the D7000 with both mics and create a backup track in one pass.

If you're out in the field, I recommend carrying at least two of every cable, charger and adapter. That will push your budget over the top but you don't want to be shut down because a cable broke.

If you want to be safe, consider picking up two of the lavs. As a backup for a dead mic or to mic two subjects you will get a lot for the extra \$50 USD.

REPLACE LINKS IN THE NEXT SECTION

In addition to the under \$450 kit here are great audio tools that will give you a much more robust kit.

- A decent wireless lavalier – I use the [Sennheiser EW-112-p G3](#). The receiver has a hot-shoe mount, it's got great sound, runs on batteries for hours and has never let me down.
- A cardioid or hypercardioid microphone – I've used [Shure SM58](#)'s for years and they're great as an all around mic. But a hypercardioid microphone has a much tighter pickup pattern so it's more directional. Not surprisingly, I like the [Shure Beta 58a](#) hypercardioid microphone. It's extremely durable, does not require batteries, is more sensitive and rejects more off-axis sound than the regular 58. I'm always surprised when I test a hypercardioid against a shotgun and end up liking it better in post.
- A mic stand – microphones on stands are almost always quieter than handheld. I carry a couple of [GorillaPods](#) and use them for everything. Or, if you're carrying lighting stands, get an adapter that will fit your mic.
- A good set of headphones – I've used [Sony MDR-7506](#) long enough to know them well. I recently discovered the [Sennheiser HD25-1 II](#) headphones and now my Sony's are sitting on the shelf. The Sennheisers not only have much better sound (more accurate bottom end and more open highs) they close off the sound in the room better.



And they come with fabric ear piece covers that fit great and are much cooler than the Sony leatherette covers. I can wear them a long time without fatigue or getting sweaty ears. I also have a set of high quality ear buds made for an iPod that I've been using for a couple of years. The ear buds are more comfortable but the headphones are more accurate. I carry both.

- The [Zoom H4N](#) has become the standard for DSLR video with good reason. If you're on a budget go for the [Zoom H1](#). Either way it's wise to learn how to record using the built-in mics.
- Pick up a [RØDE VideoMic Pro](#). At \$229 USD it's more expensive than the original VideoMic but well worth the extra investment. And pick up a 'dead kitten' WindMuff. Just a little breeze will kill this mic.

Here's a link to a blog post with sample video recorded with this mic:
<http://dslrhd.com/2011/01/rode-videomic-pro-for-dslr/>

I have one final suggestion that's not a piece of equipment but can make a big difference in your productions.

Find someone with some audio recording experience who wants to learn how to be a sound guy. Help them get some training and work with them on everything until they get it.

Intermediate

- Hire a good sound recordist as often as possible. If that's not possible, follow my advice for the basic kit and find someone willing to



learn how to do it.

- Get a second wireless lavalier, maybe a third.
- It's time for a good shotgun mic. I recommend the [RØDE NTG3](#), a proven performer in the video world. Sound-wise the NTG3 easily compares to shotgun mics costing twice as much and it's made to withstand extreme weather. As shotgun mics are best used outside, this makes for a great combination.

- I highly recommend the the [Azden FMX-42](#) four channel microphone field mixer. It's got most of the features of more expensive pro field mixers and it costs less than \$500 USD.

You won't believe how much better your mics sound with a decent mixer. And it's essential if you need to record a couple of wireless lavs with the boom. You can feed your camera and your H4 at the same time. Even comes with a bag.



- Optional – I recently got to use a [Zoom R16](#) multi-track mixer/recorder and it's amazing. You get 8 XLR mic inputs with pre-amps, two of them have phantom power. You can record all 8 channels live at the same time to SD cards – up to 32GB for 100 hours! This allows you to keep every mic on a separate track for mixing in post.

The R16 sounded great for voice tracks, runs on batteries or AC and, at \$400 USD, it could be a great unit for capturing complex audio situations perfectly. Plus it acts as a controller for your computer mix during post.

Advanced

At this level you need a professional sound recordist on the team. Depending on the event you may need someone doing live sound and someone else handling the audio recording.

Your Focus

Photographer – if you're shooting events you're going to need more than one lav and more than one audio recorder. A good rule of thumb is to add one mic and one recorder more than you think you'll need. You may want to check out that Zoom R16 to capture all those mics cleanly with just one recorder.

Video Professional – you'll need to get comfortable with dual audio systems, like in film. You probably already have the mics, phones, and other gear so you'll be looking for a digital recorder. Consider inserting a quality mic mixer into the system. It will improve your regular video shoots.

Aspiring Film Maker – your shorts and features will require high-quality sound to be competitive. If you're into documentaries, I suggest learning how to capture audio at a quality level higher than the images you're capturing.

Whatever level of production you're working on I recommend "sweetening" the audio in post-production. I came into the video world after owning a professional recording studio so I thought I knew a good bit about audio.

My first film project had a decent budget and the director I worked with talked me into using his favorite audio engineer for sweetening. It wasn't a feature film but the guy treated it like it was.

When I heard all the little bits of sound he added for transitions and effects, the processing on every spoken line, the subtle music cues that flowed perfectly through the entire piece I was blown away. The film came to life and I was hooked on sweetening audio for all my projects.

Lighting

More than the lens or the camera, the lighting in a scene defines the mood of that scene. Just like with audio, you'll need to spend the time to learn how to make light and shadow, camera and lens, all work together to make the shot you're dreaming of become reality.

One of the first things I did when I got my Nikon D90 was go out and shoot at night. I mean, this thing is supposed to work in low light so I wanted to see just how far I could push it.

I walked over to a fairly well-lit park close to me and shot my way around the lake using nothing but available light.

I shot in my office with a single desk lamp, at the dining table with a candle or two, in the living room with just the light of a TV set. I had fun seeing how the camera worked in all the places where shooting video is difficult or impossible.

I even invented a way to use my iPhone to reliably lock the D90 shutter and ISO so I'd get good video with very little noise.

I created a series of jpg files at various levels of white and loaded them into the picture roll on my iPhone. I'd chose the 80%, 90% or 100% white jpg picture on the iPhone, hold it right against the lens, click the Lock and Live View buttons and get low-noise exposures for very low light scenes.

But no trick will let you shoot in the dark with your DSLR.

The low light capabilities of a DSLR just give you a broader range of lighting options than most video camcorders.

The cool thing is there are more lighting options on the market today than ever before. And most of them truly are cool.

LED and fluorescent fixtures produce great light without getting as hot as traditional fixtures.



Plus they operate on standard household current. I've even seen setups using a deep discharge marine battery and a converter for on location work with these lights.

If you have to stock a light kit from scratch I strongly recommend starting with these new devices.

Before automatic metering every professional photographer had to learn how to use a light meter. In the film world I don't know of any professional DP that works without one.

- You can make informed adjustments to lenses.
- You can ensure the amount of light on the subject is relatively the same whether you're in a tight shot or wide shot.
- You can make scene after scene cut together more easily.
- You can come back to a previous setup and match it.

I also recommend learning how to create lighting diagrams as part of your pre-production. Lighting diagrams can ensure a more professional result while keeping your budget lower.

I suspect that many photographers and video professionals who shoot big productions already do this. Aspiring film makers tend to skip this step and it shows in the finished production.

Working out the lighting before you get to the shoot means you won't end up with a group of expensive professionals standing around while you deal with a lighting issue that could have been taken care of in pre-production. And your editor will love you for the consistency of light in scenes, angles and takes.

If you're shooting outside during daylight hours your lighting diagram needs to take into account the position of the sun. There are iPhone apps that can tell you the exact position of the sun at any moment at any spot on the planet.

More than just timing your production to capture the magic of golden hour, you want to work with – not fight against – the constantly moving sun.

Shooting Outside

The biggest issue with shooting in the sun is having to close down your lens to keep from over-exposing footage. You can do a lot with video that is under-exposed in post-production but once you've blown out the highlights that's it.

So now you've got these great, fast prime lenses shut down and your DOF is so deep you've lost that lovely DSLR feel. This can be a good thing if you're moving the camera with a Steadi-Cam type device but otherwise you'll likely not be happy with the look of the footage.

The answer is to add a Neutral Density (ND) filter to the front of the lens. ND filters do not change the color, they just cut the light back. Professional video camcorders have ND filters built in but you'll need to add them to your kit for DSLR video.

Fixed ND filters are available in different densities. I recommend getting a set of three: 0.3, 0.6 and 0.9. The filters screw on to the lens and you can use more than one at a time if needed.

Another approach is to use a variable ND filter. These filters use a pair of polarized filters that can be dialed to produce from 2 to 8 stops of density. Variable filters cost more but it's less to carry and they tend to be higher quality glass.

Either way, you should buy filters sized for your largest lenses and get step-down adapters to fit the smaller lenses.

That being said, the lighting kits I'm recommending are for lighting indoors. If you have to light an outdoor shot your requirements will be quite a bit different. There are fluorescents with enough output to be useful in the sun.

If that doesn't work you'll be renting powerful HMI's and generators and you'll need people who know how to use them.



Basic

- A three-point lighting kit is a basic requirement – that means a key light, a fill light and a backlight plus stands for everything. I suggest renting different lighting fixtures and spending time working with them to see what you like best.
- One interesting light that DSLR's seem to love is called a china ball. The light from these round diffuse balls feels very natural and it's hard to make them look wrong. Also, the light seems to wrap around people beautifully so you might even get away with no fill, depending on the scene. You can find basic units at places like Ikea and there are professional suppliers as well. See <http://dslrhd.com/resources> for more information.
- Reflectors are low cost, light weight, and easy to setup. I highly recommend getting a set with white, silver and gold sides – you can make magic with these. And you can use them with no electricity anywhere you need a little bit more light.
- Gels, diffusion, and cookies are used to modify the light from the fixture to make it work the way you want. They don't cost much and once you see them in action you'll always want a good selection around.
- Light meter – I have an old Sekonic that I still use. You don't need to spend a lot but you do need to get one and use it until it becomes an invisible part of how you work.

Intermediate & Advanced

Beyond a basic kit, it's likely that you'll rent specific lights for specific purposes. And, depending on your production style, it's also likely that you'll have a DP on your team working to get the look you want.

One trend these days is to bring your colorist on the set to work with the DP.

When you're producing highly-styled video there is so much that can be done with tools like Apple Color that it makes sense to run the footage into grading to see how it looks. It's wise to make adjustments in camera knowing that you can get the grade to look perfect.

Your Focus

Photographer – your biggest challenge is moving from strobes to constant lighting. A lot of your equipment will work great for video but you'll need to change the fixtures. You'll also have to deal with lighting scenes where the camera moves – you have to light the entire path of the camera. And you'll need to light for each camera angle – whether you're shooting with a single camera in traditional film style or multiple cameras at the same time.

Video Professional – your biggest challenge is learning to work with low light. If you keep lighting like you're shooting with a camcorder your work will continue to look a lot like normal video. You're going to love using the shallow DOF of a DSLR to keep the frame focused on the talent and let the lighting drop out the background.

Aspiring Film Maker – planning and pre-production are vital to making films. Unless you're deliberately trying to look like a home movie, you're going to need to learn to make light work for you. A DP who knows lighting should be high on your priority list.

That covers the key production equipment for camera, lens, camera support, audio and lighting. Let's spend a little bit of time on some of the other elements that will become more important the longer you're in this business.

The Rest Of The Kit

Monitoring

Yes, there is an LCD built into the back of every DSLR camera. And, yes, you can get some idea of what you're shooting by looking at the LCD. But you need a better way to monitor your video than the LCD.

HD video must be shot in accurate focus and it's really difficult to do that successfully with the LCD built into a DSLR. If you're shooting outside in the sun it's almost impossible.

Bad focus is one of those things that can't be fixed in post production. You have to get it right in the camera.

A popular option is to add a loupe to the LCD on the camera. This allows the camera operator to see the LCD on the camera much more clearly.



Plus a loupe provides a contact point with your body that helps stabilize the camera for handheld shots.

But it's only useful for one person.

If you're shooting with a crew you'll need an external monitor that can be viewed by all important players in your crew. You'll even see multiple monitors on high end video productions.

Besides focus, a monitor can help make sure your video has exposure and color that matches your production requirements.

It can also help you catch interesting objects in the frame, like microphones or boom shadows.

There are several small battery-operated monitors that mount on arms above the camera on the market.

If you're in a studio you can bring along an HD monitor for even better viewing.

The external monitor output of Canon DSLR cameras uses a mini-HDMI connector.

You'll need to make sure your monitor can accept HDMI. Most newer monitors accept this signal format but many older high quality monitors do not.



Also, HDMI was not designed for sharing. There are HDMI splitters – like the excellent Jag35 – but HDMI has a limit of 25' for cabling so you'll need to keep everything close. This is not a problem on small sets but it can be an issue when bringing a DSLR into a professional video set up.



If HDMI is a problem you'll need an HDMI to HD-SDI converter. Blackmagic Design makes an excellent portable unit. HD-SDI is a professional standard with none of the limitations of HDMI.

I mentioned in the camera body section that there is a problem with using external monitors on the Canon T3i and 5D Mark II.

Actually, there are several problems.

When you plug an external monitor into either of these cameras it shuts off the LCD view finder on the back of the camera. Not a problem – unless you were intending to have the camera operator use the LCD while others used the external monitor. This also means that you'll need to deal with the added weight of a monitor on shots when the camera is off the tripod.

Next, when you hit the record button on a Canon T3i or 5D you'll get several seconds of black on the external monitor before the signal comes back. Several seconds of black wiping out the monitor every time the director gives the cue to 'roll camera' can be disconcerting.

Even worse, the reason the output goes to black is that the camera down-samples the monitor output to 480i when recording. If you were counting on using the monitor to improve focus you just lost most of

the resolution of this camera on the monitor. The best idea may be to set the monitor to black and white as that is often easier to use for focusing.

Is this reason enough to swear off shooting video with a Canon T3i or 5D? That's up to you but you won't have the downsampling problem with a Canon 7D. You'll still lose the LCD on the camera but at least the HDMI stays at 1080i.

Of course, the Panasonic GH2 has none of the problems.

Cages

Cages are metal frames with holes and fixtures for mounting accessories. A cage is how you mount a shotgun mic or a wireless mic receiver (or both), the Zoom H4 recorder, and your portable HD monitor all around your camera on the top of the tripod.

I remember when I'd picked up my portable HD monitor and hooked it up to my DSLR. It was a serious improvement in the ability to frame and focus. But where to mount it?

I had an extra GorillaPod that I was using to hold the monitor and that was fine as long as I was near a table. When I needed to move the tripod I wrapped the GorillaPod around one of the tripod legs, grabbed some gaffers tape and made the best of it. I had to tape the battery to the tripod as well. All in all, not very professional looking but it worked.

I recently got my hands on a great inexpensive cage called the [Alzo DLSR Transformer](#) rig. For about \$150 USD you can easily hold several accessories plus the handles on the cage let you shoot handheld video with a lot more stability. [Click here to read my full review.](#)



Rails, Matte Box & Follow Focus

One of the issues of shooting with a DSLR is that it doesn't look much like a real high-end camera. That's good when you're shooting in stealth mode on the street but it's not so good when your client eyes your rig with that "look" on their face.

You know. That look that says, "I'm paying you this much and that's all you brought?"

One of the easiest ways to kick up the look of your DSLR camera is to add rails, matte box and follow focus.

Matte boxes allow cinematographers to insert filters in front of a lens. These filters had areas blacked out to create a matte for inserting other images in post production.

Matte boxes also block light from hitting the lens. Light from the set can strike the lens creating a lens flare. A matte box will take care of a good bit of it.

There are light-weight matte boxes that screw or clip to the front of the lens but many people mount a pair of rods under the camera to hold the matte box. These rods are called "rails" and can be used for mounting many things on the tripod besides a matte box. For DSLR rigs the most common reason for adding rails to your system is so you can use a follow focus.

This is another device from the film world. Most film cameras take more than one person to operate. Keeping the camera in focus takes all the attention of a person and, strangely enough, on a film crew that person is not looking into the viewfinder.



Focus on most film shoots is set by measuring the distance from the film to a point chosen to be the focus for the shot. If it's an actor, focus is measured to their face unless the shot is framing another specific part of the body, such as their hand on a gun.

Besides the focus distance, the camera crew determines the depth of field required to deal with the movement in the shot and the desired artistic look. If the camera or actor moves during the shot (or if the director calls for the focus to shift from one object to another) the follow focus makes marks on a white disc attached to the follow focus and turns a knob between the two marks in time with the action.



The lenses used in film production typically have calibrated focus rings that are geared so they rotate when the follow focus is turned. The focus rings on DSLR lenses are not well calibrated and they have no gears. To manually make smooth focus changes on a DSLR while recording is difficult. Hitting the same focus marks several takes in a row is almost impossible.

Thus the market for DSLR follow focus systems. They provide geared rings that can be mounted on regular camera lenses. The gear drive systems can be adjusted for the changes in size and length of your lenses.

Some can be set for operation from either the left or right side of the camera. Most provide a marking disc and other accessories so a dedicated focus puller can control the camera.

Combine a set of rails, a matte box and a follow focus and you've added a good bit to your camera budget – as well as to the weight and complexity of your set up.

You'll have also added significantly to the look of a "real" film camera. More importantly, you'll find focusing your video is much easier and more repeatable.

If you're into DSLR video at the intermediate or advanced levels your only decision is *where* to buy your rails, matte box and follow focus.

This is a rapidly evolving market and it's expanding at both the top and bottom end.

The latest development is remote-control follow focus units. I've seen prototypes of controllers running on iPhones and iPads.



Memory Cards

The Canon T3i and Panasonic GH2 will record to all three types of Secure Digital cards –SD, SDHC, and SDXC. The differences are that SDHC cards hold more data than SD, and SDXC is for cards with more 32 GB.

These cards also are available with speed ratings, the minimum for video being a Class 6 card. Some manufacturers use an “x” rating rather than using the class system. The minimum for video recording is 40x.

The Canon 7D and 5D Mark II record to Compact Flash (CF) cards. CF cards are bigger and more expensive but they do offer faster speeds and, some believe, better data security.

CF cards are almost always rated using the “x” system. The minimum speed for video capture is a 133x speed rating but faster is better if you can afford it. Even though the video may not be written with more security you'll notice the difference when you transfer the files to your computer. Faster is definitely better for transfers.

If you're recording video to digital files there will come a day when one of those files will be corrupt. The most common place for file corruption is when it's recorded to the card in the camera.

That's why I recommend buying the best cards you can afford. But best is relative.

For instance, the new SDXC cards will hold up to 2 TB of data. That's a big jump from the old maximum of 32 GB for SDHC cards.

But with greater storage density comes greater possibility for error.

For instance, it's common for 16 GB SDHC cards to be more securely read in a variety of devices than for 32 GB cards.

Also, having more storage on the card does not change the maximum file size – it's still 4GB per file, or about 12 minutes of video at 1080p.

And then there's the old saying about putting all your eggs in one basket. SDHC cards are very small and light-weight. It takes extra care to move them around without losing one.

So more storage may not be better when it comes to SD cards.

What is better is higher speed ratings on cards from reputable manufacturers. Hoodman has long been known as the pro source for CF cards that provide the highest speed and reliability. Now they have created an SDHC card with better than Class 10 speed and extra rugged construction.

[Watch this video](#) and you'll see why ordinary SDHC cards may not be the best choice for capturing once-in-a-lifetime video. I use [32GB Hoodman RAW Steel SDHC](#) cards on my cameras and I trust my footage is safe. They're even water proof, which is more useful than you might think! If you can't afford the Hoodman cards I used to use [32GB Transcend SDHC Class 6](#) cards and have had no problems writing or reading files on any device.

For CF cards, I use [Hoodman UDMA 32GB cards](#). They use the highest quality process for recording files. They're not the cheapest but I trust them. When you only have one copy of the video file, trust is important.

Cases

You might be tempted to use a case made for photographers for your DSLR video kit. I suggest looking at cases made for video. You need storage for all those microphones, recorders, cables, the loupe and other goodies in your kit. You may need ATA-rated flight cases if you're flying for productions.

Most professionals are expert at packing. While you may have a basic kit you always carry, I find I need to plan the gear for each project and pack accordingly.

Some people believe it's wise to pack your gear so it does not look like expensive photographic equipment. One of my most used cases is an ugly orange poly-something case I bought for \$10 at a garage sale years ago. It doesn't look like professional equipment and can take the abuse of luggage carriers while it protects the equipment inside.

Batteries and Power

Most of this equipment runs on batteries. And most of the batteries are not interchangeable. Neither are the AC adapters. The video world has been dealing with this long enough that there are some standards in place but that's not the case with DSLR's yet.

If you're using rechargeable batteries then charge them up and run them down to empty. Time how long it takes to completely discharge and buy enough to last twice as long as you think you'll need. I've never had too many batteries.

I've always appreciated an extra charger. Label chargers and AC adapters clearly so you'll know which equipment it mates with. I've burned out good equipment by plugging in the wrong AC adapter.

If you shoot on location pick up a cheap AC tester at a hardware store so you can check the wall sockets to see what's working. And I've found it's worth the extra cost and weight to carry 16-gauge extension cables for AC.

Cables and Connectors

Label each cable with the device it belongs to so you'll be able to make sure you have it when you need it. I use one of those label printers made for offices, the ones with the small white plastic-type tape.

I keep an assortment of connectors in a clear bag with a strong zipper. Make sure you've got extras for any adapter or connector that is critical to the system. They are the weakest link in the signal chain and likely to go out at the worst possible time.

Grip Gear

Grip gear such as arms and clamps in various sizes can make life much easier. I carry a three rolls of gaffers tape – black, gray and white. Don't try to use duct tape as it will leave a sticky residue on everything.

Data Wrangling

Right now I've had to hire a guy to just go through several boxes of video tapes I inherited with a project. On the first pass he's creating a log of which tapes we have and a basic idea of what's on them. After that we'll digitize and view each tape to make a detailed log of scenes, time-codes, quality takes and other information.

The cost added to the production is significant and most of it could have been avoided if someone had been assigned to handle this during production.

Another project I had last year covered a two-week long conference. We ended up with over 70 hours of recorded video, much of it direct-to-cards with tape backup. We had a data wrangler, a naming convention, pre-numbered media, and logged everything as it was shot.

It was still a major effort to review the footage for post-production but at least we knew where to find the footage for any segment.

Shooting with a DSLR you don't have the option of tape backup. Everything is on a card.

Unlike most video camcorders, you can't set the time code on a DSLR. Every clip starts at 0:00:00:00.

It's wise to decide – before you shoot – how to transfer, how to backup and how to know where everything is.

And that's if you're handing the footage over to someone else.

If you're doing the post-production you'll need to manage it all the way through to archiving.

Archiving

You are creating digital assets. These assets either belong to you or to your client. It's important to know this before you start.

Right now, hard drives are so cheap that you can store the footage, edits, graphics, audio, grades and renders for a project on a single 1TB USB drive for about \$100 USD. The shelf life of these drives is an unknown but it's likely that USB interfaces will be obsolete before the drive goes bad sitting on a shelf.

I suggest transferring the shot footage to two drives immediately after shooting. On a recent project we had not one, not two, but three power drops due to construction across the street. Everything was on surge protectors with battery backups but that third power drop did something to my main RAID drive and I could not get it to mount.

I had backups for my backups and I was okay. But that 5 TB RAID took a lot of work to restore.

If you haven't had a complete storage melt-down yet then your day will come. You will be grateful for every backup you have available and likely will make plans to add even more.

Where to buy

I like a good deal as much as anyone but I also believe that there's more to the deal than the cash that changes hands.

Sure, I buy adapters and gadgets off of eBay. And I shop the web for the best prices for everything. But I also have relationships with sales people in established companies that I trust. For professional equipment you need to balance the price you pay against the ongoing service you'll need.

Everyone does business differently. I'm a long-term kind of guy with clients, production staff and equipment suppliers that I've worked with for years.

RESOURCES

You'll find more information and links to buy equipment at <http://dslrhd.com/resources>. Many of the links are through my affiliate accounts and I appreciate your support by making your purchases from my site.

Below you'll find the summary lists of basic, intermediate and advanced kits for shooting DSLR video.

Even if you're at the basic level you may decide that your production requirements would be better met with equipment from the intermediate or advanced levels.

For instance, if you're an event production company the Zoom R16 multitrack recorder will be a great addition to your kit.

The equipment listed here is on its way to becoming obsolete so I encourage you to go to <http://dslrhd.com/buyersguide> and subscribe to my email list. It's the easiest way to stay up-to-date.

Basic Equipment List

1. [Canon T3i with 18-55mm kit lens](#)
2. [Nikon AF Nikkor 50mm F/1.8D lens](#)
3. [Manfrotto 5701HDV tripod and fluid head](#)
4. [Sennheiser EW-112-p G3](#) wireless lavalier
5. [Shure Beta 58a](#) hypercardioid microphone
6. [Sennheiser HD25-i II](#) headphones
7. [Zoom H4N](#) recorder
8. [RØDE VideoMic Pro](#) shotgun (optional)
9. Three-point lighting kit, china ball, reflector set, gels, light meter
10. Portable HD monitor and DSLR loupe
11. Camera cage for mounting accessories
12. Cables, connectors and other gear as needed

Intermediate Equipment List

1. [Panasonic Lumix GH2](#)
2. Wide, medium and telephoto prime lenses
3. [Sactler FSB-6/2](#) tripod and fluid head
4. Two or three [Sennheiser EW-112-p G3](#) wireless lavaliers
5. [Shure Beta 58a](#) hypercardioid microphone
6. [Sennheiser HD25-i II](#) headphones
7. [Zoom H4N](#) recorder
8. [RØDE NTG3 shotgun mic](#)
9. [Azden FMX-42](#) field mixer
10. [Zoom R16](#) multitrack recorder (optional)
11. Three-point lighting kit, china ball, reflector set, gels, light meter
12. Portable HD monitor and DSLR loupe
13. Camera cage for mounting accessories
14. Rails, matte box and follow focus
15. Cables, connectors and other gear as needed

Advanced Equipment List

1. [Canon 5D Mark II](#)
2. [Full set of prime lenses](#)
3. [Vinton V3AS Vision Pozi-Loc](#) tripod and fluid head
4. Two or three [Sennheiser EW-112-p G3](#) wireless lavaliers
5. [Shure Beta 58a](#) hypercardioid microphone
6. [Sennheiser HD25-i II](#) headphones
7. [Zoom H4N](#) recorder
8. [RØDE NTG3 shotgun mic](#)
9. [Azden FMX-42](#) field mixer
10. Three-point lighting kit, china ball, reflector set, gels, light meter
11. Portable HD monitor, DSLR loupe, HDMI to SDI converter
12. Camera cage for mounting accessories
13. Rails, matte box and follow focus
14. Cables, connectors and other gear as needed

In Closing

My goal in creating the DSLR Video Buyer's Guide was to establish reference points for you to use when making the decision that's right for you.

It's not a right or wrong kind of game. It's learning how to make the most of every tool in your kit while being flexible to adopting new tools and workflows if the project requires it.

Feel free to pass this guide along to anyone you believe will benefit from it. And get in touch if you have questions or suggestions for improvements.

I trust the DSLR Video Buyer's Guide will be helpful in your decision making process and wish you all the best in your production career.

About The Author

Adriel Brunson has been a producer for over 30 years. Beginning in audio production, he has produced hundreds of programs in video, film, multimedia, and interactive media.

He has an international client list including companies such as Hewlett-Packard, Sun Microsystems, Microsoft, General Electric as well as numerous national and regional companies.

He has a lifelong passion for technology and knows how—and when—to apply new media solutions to proven marketing strategies. His many years of working with like-minded professionals has shown him the win-win benefit of mentoring and he welcomes any opportunity to help others advance their production careers.