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Everything you need to know about copyrighting your video page 38

# Videomaker

YOUR GUIDE TO CREATING AND PUBLISHING GREAT VIDEO SEPTEMBER - OCTOBER 2023

A REVOLUTION IN PIXELS

## NIKON Z 8

### Diving into the Nikon Z 8's video capabilities

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Also reviewed:  
**Panasonic S5 II X**  
page 10



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# VIEWFINDER

by Matthew York

## AI should aid screenwriters

How do you define creativity, and is it possible with artificial intelligence (AI)? Of course, those two letters seem to dominate technology news. AI was largely considered science fiction until just a few years ago. Even then, it was limited to things that happened “under the hood” in our newest gadgets. For example, Canon announced AI-assisted face recognition in their cameras. It seemed like a great thing. Then along came ChatGPT, and the world took notice.

ChatGPT was officially released in November of 2022. Within a few months, it recorded over 100 million users, becoming the fastest-growing consumer software in history. Essentially, as a chatbot, it’s designed to be able to communicate with a user. You can ask a question, and it responds with an answer gleaned in milliseconds from sources on the internet.

WE NEED TO ... DEVELOP WAYS AI CAN ASSIST WRITERS, NOT REPLACE THEM.


This has a variety of uses, such as connecting an avatar to it and holding a conversation with it. Does that mean it’s a writer?

That is one of the issues that has the Writer’s Guild of America concerned. It’s a secondary issue in their most recent strike. Can a production company have a bot re-write a scene without paying a writer? Could AI write an entire script? At the moment, the answer is no. Before the strike, the WGA formed a committee to investigate the capabilities of this new technology. They found that it would take longer to work this way. Plus, they determined that ChatGPT can only work within



its given perimeters. It cannot generate its own unique ideas.

But can ChatGPT assist you in the creative process? In many ways, yes. For one, AI support can help you find new ways to phrase things. For instance, you could ask ChatGPT to describe a rainforest in the style of William Shakespeare. It will give you some really colorful prose. It can also be a great help in research. Let’s say you’re doing a documentary on a historical figure or event. The AI can do a great job at putting together background information. But one note of caution: Check everything. ChatGPT has been known to return inaccurate information because it can’t distinguish fact from fiction.

Writing with AI can have many benefits, and it’s still in its infancy. There is a lot more to explore about this new, developing technology. However, regardless of how this technology evolves, we must remember it’s a tool capable of both good and bad. Moving forward, we need to think critically and develop ways AI can assist writers, not replace them. 

Matthew York is *Videomaker*’s Publisher/Editor.

You can read this article online by going to: [www.videomaker.com/?p=73019672](http://www.videomaker.com/?p=73019672)

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*Videomaker* empowers people to make video in a way that inspires, encourages and equips for success. We do this by building a community of readers, web visitors, viewers, attendees and marketers.

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# Nikon Z 8

by Nicole Lajeunesse

## Is it right for you?

### Nikon

www.nikonusa.com

#### STRENGTHS

- 8K 60 fps video recording
- Advanced autofocus system
- Weather-sealed construction and rugged body
- Various video formats and codecs
- 4K 120 fps

#### WEAKNESSES

- Short battery life
- Price
- The screen doesn't fully articulate

#### SUMMARY

The Nikon Z 8 is a great choice for those who want a capable 8K video camera that doesn't skimp on photography features.

#### RECOMMENDED USERS

- Narrative filmmaking
- Corporate and event videography
- Marketing video production

\$4,000



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TESTING LABS

Curious about the video capabilities of the Nikon Z 8? Look no further than this comprehensive review. Today, we're going to unpack the Nikon Z 8 and help you decide if it's right for you. We'll cover everything you need to know, from the camera's 8K N-RAW video to its 45.7-megapixel stills. For this review, we tested out the Z 8's autofocus, rolling shutter, low-light performance, dynamic range and more.

If you're considering the Nikon Z 8 for your next videography project, this is definitely the review for you. Let's explore together what the Nikon Z 8 can do, how it compares to other cameras and the pros and cons of using it for video.

### Getting to know the Nikon Z 8

The first thing you need to know about the Nikon Z 8 is that it has a 45.7-megapixel full-frame stacked CMOS sensor that can shoot up to 8K 12-bit N-RAW internally at up to 60 frames per second. In 4K, it can record 12-bit N-RAW video at up to 120 fps. In addition to huge 47.5MP stills, the Z 8 also lets you export 33 MP stills from video recordings.

The Z 8's high-res sensor ensures the camera records clear detail. Plus, a high bit-depth and RAW recording mean the Z 8 can capture a lot of color information and dynamic range in both photos

and videos. The higher frame rate options allow you to capture smooth cinematic slow-motion video. And you can do all of this without needing an external recorder. As another bonus, the Z 8 doesn't crop the image, even at the highest frame rates.

There's another benefit to shooting with such a high-resolution sensor, even if you don't plan to shoot 8K video. When shooting 4K, the Z 8 oversamples from 8K to provide a more detailed image.

In addition to 12-bit N-RAW, the Z 8 also records 12-bit ProRes RAW HQ, as well as 10-bit ProRes 4:2:2 HQ for those who prefer a ProRes workflow. At the same time, the camera can record Full HD proxy files while capturing in ProRes RAW or N-RAW to streamline ingest and editing.

For even more color information, the Z 8 even has the option to output 16-bit RAW via HDMI to an external recorder. Of course, you'll sacrifice some of the Z 8's agility with this setup, but the extra color information recorded in 16-bit RAW might be more valuable in some instances.

### What's the big deal about bit depth?

When we talk about bit-depth, we're talking about how many bits of color information are recorded for each color channel. In the case of 8-bit vid-

eo — the standard for most consumer media — there are eight bits available for each color, meaning there are a possible 256 shades of each color: red, green and blue. This multiplies out to a possible 16.77 million colors; that's how many different colors can be rendered in 8-bit video.

Bumping up a couple of bits in bit-depth might not seem like a lot, but the number of possible colors rapidly increases as you move from 8-bit to 10-bit to 12-bit and beyond. In fact, while 10-bit video can reproduce around 1.07 billion colors, 12-bit video boasts an astounding 68 billion possible colors.

The result is better color accuracy and precision, better dynamic range preservation, more flexibility in post and more latitude when it comes to compositing and visual effects. As you can see, more bits are definitely better.

### Dynamic range and N-Log

When shooting in RAW formats, you get more flexibility and control over your color grading and exposure adjustments in post-production. Adding to this, any of the RAW shooting options in the Z 8 can be combined with the N-Log picture profile. Shooting in N-log will allow for more control over the final look of the image in post-production. While the footage may initially appear less visually appealing due to its flat and desaturated look, it provides a solid foundation for color correction and grading in post-production.

Both N-Log or HLG color profiles allow you to preserve more information in the highlights and shadows. This gives the Nikon Z 8 an impressive dynamic range. We measured the camera's dynamic range using a dynamic range chart, which features a series of backlit rectangles. Each rectangle is one stop darker than the one preceding it.

When we tested the dynamic range of the Nikon Z 8, we saw a maximum

of 14 stops of dynamic range. That was when shooting in N-RAW with the N-Log color profile. In the real world, the Z 8's 14 stops of dynamic range allow that camera to capture more details in challenging lighting situations.

On the other hand, while the N-Log picture profile performs great, its usability could use some work. We got lost trying to find the N-Log setting in the camera's menu. It's a bit hidden, so here's how to get there: Once you are at the resolution you want to shoot at, navigate to the right in the menu to find the function.

### Low-light performance

To evaluate the Nikon Z 8's low-light performance, we compared apparent noise levels at different ISO settings across a series of gray cards ranging from light to dark. When you're shooting, you can expect a noise-free image at ISO 3200 and below. You might notice some noise at ISO 6400, but it's acceptable.

However, when you get to ISO 12800, unfortunately, the noise starts to cause color shifting. This is when the noise starts to show inaccurate colors, especially in very dark areas of the frame. We wouldn't recommend shooting at that level or above since this color-shifting effect can be extremely distracting to viewers. Keeping the ISO setting at 6400 and below is ideal for professional use cases.

### Rolling shutter

In addition to a wealth of high-quality video format options, the fast readout speed of the sensor also reduces the effects of the camera's rolling shutter. Indeed, the Nikon Z 8 displays surprisingly little rolling shutter effect. We looked for the rolling shutter effect by shooting a vertical post and quickly panning the camera back and forth. Even at high panning speed, we saw minimal rolling shutter effect.

This makes the Z 8 a great choice for capturing fast-moving subjects or



any other situation where you need to move your camera quickly.

### How it feels

On the hand, the camera feels quite hefty. It has a body-only weight of 1.8 pounds with a deep front-hand grip to make the weight manageable. Plus, the Z 8 camera body is sealed to protect against moisture and dust. It also includes a sensor shield to keep your sensor safe during lens changes. The illuminated buttons are a nice touch, as well.

Nikon touts the system's overall compactness with its carbon fiber and magnesium alloy construction. However, it's about on par with similar cameras. In any case, the camera's powerful internal recording does mean you won't need an external recorder to capture high-quality video. All of this positions the Z 8 as a good option for shooting handheld video, especially when you consider our next feature up for discussion: image stabilization.



TECH SPECS

<b>Lens mount:</b> Nikon Z	<b>H.265 4:2:2 10-bit</b>
<b>Sensor resolution:</b>	UHD 8K (7680 x 4320) at 23.98/25/29.97 fps
Actual: 52.37 megapixels	UHD 4K (3840 x 2160) at 23.98/25/29.97/50/59.94/100 fps
Effective: 45.7 megapixels (8256 x 5504)	<b>ProRes 422 HQ 4:2:2 10-bit</b>
<b>Image sensor:</b> 35.9 x 23.9 mm (full-frame) CMOS	UHD 4K (3840 x 2160) at 23.98/25/29.97 fps
<b>Image stabilization:</b> Sensor-shift, 5-axis	H.265 4:2:0 8-bit
<b>Built-in ND filter:</b> None	UHD 4K (3840 x 2160) at 23.98/25/29.97 fps
<b>Shutter type:</b> Electronic shutter	<b>H.264 4:2:0 8-bit</b>
<b>Shutter speed:</b>	UHD 4K (3840 x 2160) at 23.98/25/29.97 fps
Electronic shutter	1920 x 1080p at 23.98/25/29.97/50/59.94/100 fps
1/32000 to 30 seconds	<b>RAW 12-bit</b>
0 to 900 seconds in manual mode	7680 x 4320 at 23.98/25/29.97/50/59.94 fps
<b>ISO sensitivity:</b>	<b>External recording modes</b>
Photo/video	HDMI
64 to 25,600 (Extended: 32 to 102,400)	UHD 8K (7680 x 4320) up to 29.97 fps
<b>Metering method:</b> Center-weighted average, highlight-weighted, matrix, spot	UHD 4K (3840 x 2160)
<b>Exposure compensation:</b> -5 to +5 EV (1/3, 1/2 EV steps)	<b>Sensor crop modes:</b>
<b>Metering range:</b> -3 to 17 EV	Super 35/APS-C
<b>Interval recording:</b> Yes	4K (3840 x 2160)
<b>Bit depth:</b> 14-bit	1080p (1920 x 1080)
<b>Internal recording modes</b>	<b>Gamma curve:</b> HDR-HLG

Image stabilization

To our delight, built into the Nikon Z 8 is a 5-axis in-body image stabilization system to reduce camera shake. Nikon promises up to six stops of shake reduction. This is useful when you're shooting handheld or using a gimbal or a tripod.

To test the effectiveness of the Z 8's stabilization system, we compared the footage shot while walking on uneven ground with and without stabilization. Watching the footage back, we found that turning on stabilization improved our shot dramatically. And because it uses sensor-shift stabilization — not

electronic stabilization — image quality and resolution are not affected when the system is on.

While this stabilization system does not eliminate all the bumps and jostles that come with handheld camera work, it does help. We can't say that it's perfect, but if you don't have any other form of stabilization, the Nikon Z 8's IBIS is extremely handy.

Autofocus performance

Nikon promises a sophisticated autofocus system that can perform even in super low-light shooting situations. They say it's Nikon's most advance

<b>Recording limit:</b> None
<b>Audio recording:</b> Two-channel 24-bit 48 kHz LPCM audio
<b>Media/memory card slot:</b>
Slot 1: CFexpress Type B / XQD
Slot 2: SD/SDHC/SDXC (UHS-II)
<b>Video I/O:</b> 1 x HDMI output
<b>Audio I/O:</b> 1 x 1/8-inch / 3.5 mm TRS stereo headphone input
1 x 1/8-inch / 3.5 mm TRS stereo microphone input/output
1 x Nikon 10-pin control input
<b>Monitor resolution:</b> 2,100,000 dots
<b>Display type:</b> 4-axis tilting touch-screen LCD
<b>Viewfinder type:</b> Built-in electronic (OLED)
<b>Viewfinder resolution:</b> 3,690,000 dots
<b>Focus type:</b> Auto and manual focus
<b>Focus mode:</b> Continuous-Servo AF, Manual Focus, Single-Servo AF
<b>Autofocus sensitivity:</b> -9 to +19 EV
<b>Battery type:</b> 1 x EN-EL15c rechargeable lithium-ion, 7 VDC, 2280 mAh (Approx. 340 shots)
<b>Tripod mounting thread:</b> 1 x 1/4-inch-20 Female (Bottom)

AF system to date. With its 493-point hybrid autofocus system, the Z 8 can track subjects with eye, face and animal detection. Throughout our testing, the camera managed to keep a subject's face in focus even when they were walking or running toward it.

As we experimented with the autofocus system, we found that adjusting the sensitivity and speed of the focus to the type of subject matter we were shooting made a big difference. The camera offers custom settings for AF speed and tracking. There is also a custom Wide-AF mode, which provides more precise control over the focus area.



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Back screen



We recommend setting the autofocus to match your shooting situation for the best results. Overall, the camera did a great job finding and holding focus.

### Rear display

The Nikon Z 8 has a 3.2-inch tilting touchscreen monitor that has a resolution of 2.36 million dots, providing sharp and clear images and videos. Another boon: The rear monitor offers a brightness of 2100 nit. That's super bright. With this display, it's easy to see what you're recording, even in bright sunlight or when shooting in HLG.

The display also has a touch AF function that lets you tap on the screen to select your focus point. Plus, another quality-of-life feature for astrophotographers is the Z 8's warm display colors option. When turned on, this casts the camera menu in red tones and reduces the overall brightness of the screen.

While we love the brightness and clarity of this display, we were disappointed that it's not fully articulating. That means there are some shooting situations where you won't be able to see the monitor. Because of this, it's not a good choice for vlogging or other use cases where you need a monitor that flips all the way around to the front of the camera. Even if you

don't vlog or present to the camera, you still may find situations where this monitor configuration is limiting — shooting a top-down sequence for a cooking tutorial, for example.

### Shoot assist tools

The Nikon Z 8 includes a number of useful shoot assist tools, including a red REC border that makes it easy to be sure that you are actually, truly recording. The standard lineup of shoot assist tools is here, as well, with focus peaking, zebra stripes and a waveform monitor, all of which ensure precise focus and exposure. Additionally, ISO Fine Tune allows you to refine your exposure in 1/6 EV steps.

Other handy features include time-code syncing, an audio attenuator, slow shutter speed options and what Nikon calls Hi-Res Zoom. This is an electronic zoom function, but it takes advantage of the Z 8's high-resolution sensor. That means it provides sharper images than electronic zoom features in other cameras we've tried.

### Recording media

The Nikon Z 8 has two card slots, one CFexpress Type B and one SD UHS-II. We would have liked to see the same media accepted in both card slots, but it's great to at least have the option to shoot using the

faster CFexpress card format.

However, some resolutions and frame rates require faster cards with higher write speeds. For example, the list of approved memory cards for RAW video internal recording is much shorter than the list of approved cards for other formats. You can find the full list of supported cards for the Nikon Z 8 at [nikonimgsupport.com](https://nikonimgsupport.com).

The mismatched card formats will be especially annoying for photographers looking to maximize burst shooting frame rate since the SD card won't be able to keep up in terms of frame rate or buffer capacity.

Back to video, the Nikon Z 8 can record up to 125 minutes in 4K at 60 frames per second and up to 90 minutes in 8K at 30 frames per second. The specific limit varies depending on how the camera is set up — and the capacity of your recording media. Heat and battery life can also play a role in the camera's maximum possible record time.

### Burst shooting

One of the most impressive features of the Z 8 targets wildlife and sports photographers: burst shooting. With the Z 8, you can shoot RAW photos with JPEG proxies at up to 20 fps. In the JPEG Fine format, that jumps to 30fps. This will give you lots of high-quality options to choose from when shooting unpredictable or fast-moving subjects.

However, if you need even more speed, you can choose to shoot photos in JPEG Normal DX Crop Mode at up to 60 fps. Or, you can shoot 11 MP JPEGs at 120 fps for a huge number of photos to choose from. This is combined with the camera's Pre-Release Capture feature, which saves shots from the second before shutter release. Together, these features can help you capture even the most elusive moment.

### Battery life

The Nikon Z 8 uses the same EN-EL15c battery as the previous Z cameras — with the Z9 excluded. The battery life is up to 100 minutes,

but that will greatly differ depending on what you are shooting and how. We could always go for more battery life, but this seems about on par with other similar cameras.

Luckily, however, if you want never-ending power, the Z 8 supports USB charging and power delivery via a USB-C cable. Other connection options include Wi-Fi, Bluetooth, a full-size HDMI port and an additional USB-C port for communication.

When testing the camera's battery, we wanted to see how the Z 8 camera performed at its limit. So, we shot some 8K N-RAW video at 60 frames per second. Additionally, we cranked the camera's screen brightness all the way up and tested the camera indoors at 77°F. Initially, we expected the camera to overheat after a few minutes because that's what a lot of other reviewers experienced. However, the camera ended up going for a whole hour without any problems. We were blown away by how well the camera handled the 8K N-RAW video mode. It didn't overheat or shut down at all during our test.

But there was a catch: The memory card we used got really hot after just 10 minutes of recording. The camera warned us that the card was too hot, but we ignored it and kept going. We didn't have any issues with the camera, but we were worried about the card. If repeatedly exposed to these conditions, the heat could shorten the card's lifespan or cause it to fail. When considering battery life and overheating, the crutch is the size of the memory card. When using a 512 GB card, we could only hold 12 minutes of 8K 60p N-RAW video. That equates to having to change cards more often than we had to concern ourselves with overheating or battery life. But because CFexpress cards are not cheap, the cost of production and storage afterward will be major issues. We were using 512GB Lexar Professional Diamond CFexpress cards, which retail at more than \$500 each. We would need at least five of them to record an hour of video. That's a lot of money for just one hour of footage. Sure, you could go back and forth between two or three cards,

but that forces the production to now need a system with enough storage to offload the data.

### In the marketplace

Competing with the Nikon Z 8 we have the Canon EOS R5 and the Sony a7R V. All three of these cameras offer high-resolution full-frame sensors and a great selection of matching lenses. In terms of both pricing and image quality, the three cameras are a close match, so let's focus on what's different about each of them.

### Canon EOS R5

While the Nikon Z 8 shoots 8K at up to 60 fps, the Canon EOS R5 tops out at 30 fps in 8K. However, the Canon features more autofocus points with its proven Dual Pixel CMOS AF II autofocus system. Canon also promises improved subject tracking with Deep Learning. However, the Canon trails behind Nikon in terms of burst still photography, offering only 12 frames per second compared to the Nikon's 20 fps RAW and 30 fps JPEG burst shooting.

For solo presenter-camera operators, the R5's 3.2-inch touch-enabled rear display can flip completely around. This means you can monitor the shot while standing in front of the camera.

### Sony a7R V

The Sony a7R V stands out for its tactile controls. It's also the lightest of the three cameras compared here, giving it an ergonomic advantage. Additionally, the rear display combines the best of both the Nikon and Canon design with a screen that both tilts and flips out.

Along with an appealing form factor, the Sony a7R V also has the highest pixel count of the three with

Flip-out screen



its 61-megapixel full-frame Exmor R BSI CMOS sensor. The a7r V touts a five-axis image stabilization system capable of providing up to 8-stops of stabilization. Along with 8K video at up to 60 fps, the Sony also features 4K 16-bit RAW output, matching Nikon in this regard.

### Final thoughts

The Nikon Z 8 offers striking image quality for both video and stills — especially thanks to its 12-bit N-RAW internal recording. Plus, it features a reliable autofocus system, minimal rolling shutter and high frame rate recording.

While the camera has a lot of features that make it ideal for video production, it also has some drawbacks. The battery life is a bit short and the price may put it out of reach for some. The screen also lacks the full range of motion we like to see.

Regardless, the Nikon Z 8 is a great choice for those who want a capable 8K video camera that doesn't skimp on crucial photography features. [U](#)

Nicole Lajeunesse is a professional writer and a curious person who loves to unpack stories on anything from music, to movies, to gaming and beyond.

You can read this article online by going to: [www.videomaker.com/?p=73020209](https://www.videomaker.com/?p=73020209)



# Panasonic LUMIX S5 IIX

by Nicole Lajeunesse

Is it worth \$2,200?



## Panasonic

www.na.panasonic.com

### STRENGTHS

- Records up to 6K 30 fps video with 10-bit color and unlimited recording times
- Supports Apple ProRes recording to SSD via full-sized HDMI or USB for high-quality video files
- 5-axis sensor stabilization with up to 6.5 stops of compensation

### WEAKNESSES

- No CF Express slot for faster data transfer and larger storage capacity
- Flip-out screen blocked by cables when using HDMI or USB ports

### SUMMARY

Although the Panasonic LUMIX S5 IIX has a few weaknesses, it's a compelling choice for professional videographers.

### RECOMMENDED USERS

- Narrative filmmakers
- Marketing video producers

\$2,200

In this review, we will dig into the details of the Panasonic LUMIX S5 IIX to decide whether or not this new full-frame mirrorless camera is worth its price. Designed specifically for videographers, the S5 IIX records stunning 6K 30p video with rich 10-bit color. Plus, it does it all with the quality and convenience of Apple ProRes. To determine what we can expect from the S5 IIX in the real world, we tested everything from its dynamic range and low-light performance to its battery life and heat management.

Let's take a closer look at the Panasonic LUMIX S5 IIX to see how it stacks up to the competition — including its sibling, the LUMIX S5 II.

## Getting to know the Panasonic LUMIX S5 IIX

The Panasonic LUMIX S5 IIX delivers excellent video quality with its 24.2-megapixel full-frame CMOS sensor and newly-designed image processor. The camera offers video recording at resolutions up to 6K at 24 or 30 frames per second. UHD and cinema 4K recordings are available from 24 fps up to 60 fps. Finally, in 1080p HD, you can capture slow-motion video at up to 180 fps.

Video can be captured in a variety of formats, including MP4 and MOV

in H.264 and H.265. There's also an option to record footage in the ALL-Intra format, resulting in footage that requires less processing power to edit. However, the stand-out feature regarding recording format is the S5 IIX's ability to record Apple ProRes 422 internally. The popular video codec balances quality and efficiency, retaining a high level of detail and color accuracy while still offering a smooth real-time editing experience.

### RAW video recording

For maximum flexibility in post-production, the camera offers the option for ProRes RAW and Blackmagic RAW via the HDMI output to an Atomos Ninja V+ or Blackmagic Video Assist. RAW video formats store data directly from the image sensor. That means you'll have much more control over the image in post-production, giving you more flexibility for color correction and grading.

### Gamma curve options

In terms of log shooting capabilities, gamma curve options on the S5 IIX include V-Log and V-Gamut. These gamma curves provide more dynamic range, but you'll need to apply a LUT before working with the footage, adding another step to your

post-production workflow. Monitoring log video can also be a challenge with a preview LUT applied during the shoot.

Alternatively, Cinelike D2 and V2 are also available if you want a flatter image without the extra steps involved in a log video workflow. Other picture profile options include Like709 — for video destined for a Rec.709 color space — and Hybrid Log Gamma (HLG), which optimized dynamic range for high-dynamic range (HDR) viewing while still looking great on standard displays.

## Image quality

With the basic specs out of the way, let's turn our attention to what really matters: image quality. Drawing from our prior experiences with the LUMIX S5 lineup, the latest addition, the LUMIX S5 IIX, continues to impress with its exceptional image quality with sharp details and vibrant, true-to-life colors. The resulting video provides a pleasing, cinematic look.

### Dynamic range

One big factor in the overall quality of an image is its dynamic range. Measured in stops of light, this is the amount of detail preserved in extreme highlights and shadows of an image. Using our waveform monitor and our dynamic range chart, we can see exactly how many stops of dynamic range the camera can capture.

Our test shows that the S5 IIX is able to reproduce up to 14 stops of dynamic range when shooting in the V-Log gamma curve. This gives you plenty of latitude when shooting in mixed lighting conditions and when color grading in post-production.

Though still impressive, we were only able to get 11 stops of dynamic range in the standard color profiles. In both cases, the camera's wide dynamic range allows it to capture rich and detailed footage.

Top view



### Low-light performance

The camera performs well in low-light conditions, with acceptable noise levels up to ISO 25600. To test the camera's low-light performance, we recorded a trophy on a turntable in a dark room. Even in the darkened studio, we were able to capture completely usable footage, even at high ISO settings.

For a more precise evaluation, we also looked at noise levels across the tonal range at different ISO levels. We found that noise enters the image at ISO 3200 but is acceptable all the way up to ISO 25600. And with dual native ISO, we found that the S5 IIX can capture great-looking footage with minimal noise, even in the most challenging lighting conditions.

### Rolling shutter

In our tests, we found that the Panasonic S5 IIX doesn't suffer too much from the rolling shutter effect. This side effect of sensor operation manifests as wavy vertical lines in footage with lots of movement. In the S5 IIX, it's about as bad as you'd expect, given the type of sensor used — certainly no worse than the S5 II.

In our view, the S5 IIX exhibits a typical amount of rolling shutter compared to similar cameras, and it's acceptable for most shooting situations we usually encounter. The exception would be any situation that requires frequent, high-speed pans.

## Phase Hybrid Auto-Focus

Like the Panasonic S5 II, the Panasonic S5 IIX delivers solid autofocus performance with face, eye, head and body autofocus for both humans and animals. You can even prioritize the subject's eye for sharp focus, even when they are in motion or looking away.

The S5 IIX uses a Phase Hybrid Auto-Focus system, which uses two views of the scene from slightly different perspectives to calculate the distance and direction of focus adjustment. In the S5 IIX, 779 AF points cover approximately 90% of the frame horizontally and vertically. However, the camera does offer the option to decrease the size of the AF area for more precise focusing. You can also fine-tune the speed and sensitivity of the autofocus. The camera also offers continuous autofocus during zooming. ►►



TECH SPECS		
<b>Lens mount:</b> Leica L		
<b>Sensor resolution:</b>		
• Actual: 25.28 megapixels		• Presets: AWB, Cloudy, Color Temperature, Daylight, Flash, Incandescent, Shade, White Set 1, White Set 2, White Set 3, White Set 4
• Effective: 24.2 megapixels (6000 x 4000)		<b>Interval recording:</b> Yes
<b>Image sensor:</b> 35.6 x 23.8 mm (Full-frame) CMOS		<b>Self-timer:</b> 2/10-second delay
<b>Image stabilization:</b> Sensor-shift, 5-axis		<b>Aspect ratio:</b> 1:1, 2:1, 3:2, 4:3, 16:9, 65:24
<b>Built-in ND filter:</b> None		<b>Image file format:</b> JPEG, RAW
<b>Capture type:</b> Stills and video		<b>Bit depth:</b> 14-bit
<b>Shutter type:</b> Electronic shutter, mechanical focal plane shutter		<b>Internal recording</b>
<b>Bulb/Time Mode:</b> Bulb Mode, Time Mode		• H.264/H.265/MOV/MP4/ProRes 4:2:2/4:2:0 8/10-bit
<b>ISO sensitivity:</b>		<b>External recording modes</b>
• Photo/video		• 12-bit via HDMI
100 to 51,200 (Extended: 50 to 204,800)		• 5888 x 3312 at 23.98/25/29.97 fps
<b>Metering method:</b> Center-weighted average, highlight weighted, multiple, spot		• 10-bit via USB
<b>Exposure modes:</b> Aperture priority, auto, manual, program, shutter priority		• 5776 x 3056 at 23.98/24.00/25/29.97 fps
<b>Exposure compensation:</b> -5 to +5 EV (1/3 EV steps)		• 4096 x 2160 at 23.98/24.00/25/29.97 fps
<b>Metering range:</b>		• 1920 x 1080 at 24.00/25/50 fps
• 2,500 to 10,000 K		<b>Fast-/Slow-motion support:</b> Yes
		<b>Gamma curve:</b> Panasonic V-Gamut, V-Log
		<b>Media/memory card slot:</b> Dual slot: SD/SDHC/SDXC (UHS-II)
		<b>Video I/O:</b> 1 x HDMI Output

Throughout our test shoots, we found that the camera provided accurate and reliable autofocus. We tested the S5 IIX's ability to focus on fast-moving subjects as they entered the frame and found no issues with the camera's performance.

Though the camera's autofocus system works well, there will always be some situations where you will need to focus manually. In that case, the S5 IIX offers Focus Peaking, Magnified View

and One Shot AF functions to assist with manual focusing.

**Image stabilization**

For handheld shooting, the Panasonic S5 IIX makes it possible to get smooth and stable footage with its 5-axis sensor stabilization. In-body image stabilization (IBIS) is a welcome feature in any mirrorless camera. During our test, we found that the IBIS in the S5 IIX performed well. It's very

convenient to be able to shoot stable footage without additional gear. With IBIS on, even if you're shooting handheld or in challenging conditions, the camera can compensate for up to 6.5 stops of camera shake. The result is smooth, professional-looking footage.

**Ergonomics and build quality**

Moving on, it's time to talk about how the camera feels to use. Con-

structed with a magnesium alloy chassis, it's relatively small and lightweight for a full-frame camera. It weighs in at around 1.5 pounds and measures just 5.29 x 4.03 x 3.55 inches. While some video shooters prefer the stability of a heftier camera, this camera's compact form factor makes it easy to take on location or rig up with support equipment.

But aside from its size and weight, the S5 IIX has a number of other features that enhance that camera's overall usability. Let's take a closer look.

**The screen**

First up, the camera features a fully articulated three-inch touchscreen with static touch control. You can use the screen to adjust settings, select focus points, review images, and even flip it out for selfies or vlogging. This is a great feature for content creators or anyone shooting a video without a dedicated camera person — you'll always be able to tell when you're in frame and in focus.

The screen has a resolution of 1.84 million dots and a brightness of 800 nits. It's bright enough to see in most lighting conditions, and when combined with full articulation, it's easy to get a good look at what you're shooting.

However, the screen design does have a downside. When you use the HDMI or USB ports on the side of the camera, the cables can block the screen and make it hard to see what you're shooting. This turned out to be a big inconvenience during operation since we relied on the screen for monitoring and framing our shots while recording to an external SSD. At best, the cables limit the monitor's range of movement. It's unfortunate that these two useful features interfere with each other in this way.

**Shot assists**

Along with the bright, articulating rear display, the Panasonic S5 IIX's



shot assist tools provide another way to make sure you're getting the shot. The S5 IIX has several shot assists for an easier shooting experience. These include waveform, vectorscope, zebra and focus-peaking. These tools help you achieve accurate exposure and precise focus — essential for any professional shoot.

**Recording media**

For recording media, the Panasonic S5 IIX features dual SD UHS-II card slots and supports backup and relay recording. This is great, but we were disappointed that the camera lacks a CF Express slot. This would have allowed for faster data transfer and larger storage capacities.

However, the camera does support recording to an external SSD. While this does add some bulk to your setup, recording to an external SSD is an affordable way to capture and store high-quality video footage. In fact, external SSDs are the lowest-cost storage option available when it comes to large-capacity recording media.

The option to record to low-cost SSDs is especially welcome given that there is no record limit when recording in 4K. Be sure to check for compatibility with the specific SD cards you intend to use. Panasonic offers a list of compatible media.

**Streaming capabilities**

For content creators, the Panasonic S5 IIX features built-in wired or wireless IP streaming capabilities. This allows you to stream video at resolutions up to 4K 60 fps directly from the camera. This is great for creators who want to use the same camera for scripted video production and livestreaming.

**Battery and heat management**

As for battery life, you can expect around 76 minutes of continuous recording in 6K 30 fps. This is acceptable, but we would have liked to have seen at least 100 minutes. With that said, we didn't experience any overheating issues at any point during our tests. According to Panasonic, the camera employs an innovative cooling system — and it seems to be doing its job.

**Panasonic S5 II vs. Panasonic S5 IIX**

The biggest question to answer when considering the S5 IIX is whether you should buy this camera over the very similar yet less-expensive Panasonic LUMIX S5 II. Let's address the differences.

**The paint job**

First, let's take a look at some of the more superficial differences. The S5 IIX features a matte black finish. This makes



## Panasonic LUMIX S5 IIX

Dual SD UHS-II card slots



it less reflective and more discreet, which may be important in some use cases. However, this finish can also make it slightly harder to see the buttons in the dark, so this difference comes down to personal preference.

## Recording options

Next up, the S5 IIX can also record video to an external SSD via USB-C. This is not possible with the S5 II. We already touched on the benefits of external SSD recording; we can imagine this will be a major point in favor of the S5 IIX in the eyes of some video producers.

The S5 IIX also supports RAW video output via HDMI to an external recorder — the S5 II requires a \$200 firmware upgrade for that functionality. Another functionality the S5 IIX has that the S5 II does not is IP streaming, allowing wireless video streaming.

## Which is the better value?

That leads us to the question of whether you should buy the Panasonic S5 II or splurge for the S5 IIX. The answer lies in that \$200 upgrade for RAW HDMI output. That also happens

to be the price difference between the two cameras. Considering that, the S5 IIX gives you more functionality for the same amount of money.

## The full-frame mirrorless camera marketplace

With the most obvious comparison out of the way, let's look at a few other full-frame mirrorless cameras that you might also consider.

## Sony a7S III

First up is the Sony a7S III. This 12-megapixel full-frame 4K camera lacks the ability to record 6K video, so it's immediately at a disadvantage in that regard. However, the Sony camera does match or exceed the capabilities of the S5 IIX in terms of image stabilization, color rendition and gamma options, and both cameras offer advanced autofocus systems. In terms of price, the S5 IIX has the advantage again; the Sony a7S III is priced at just under \$3,500 compared to \$2,200 for the Panasonic camera.

## Canon R6 Mark II

Next, let's consider the Canon R6 Mark II. At \$2,500, this camera is more closely aligned to the S5 IIX in price point. Likewise, it offers a very similar feature set with a 24.2-MP sensor, 6K video recording and in-body image stabilization, along with a robust Dual Pixel CMOS AF II autofocus system. If you need the features in the S5 IIX, but you're already invested in the Canon ecosystem, the R6 Mark II is worth considering.

## Nikon Z 8

Finally, let's take a look at the Nikon Z 8. At nearly \$4,000, this is the most expensive alternative we considered. So what do you get for nearly twice the cost?

or one, you get a 45.7-MP FX-Format Stacked CMOS Sensor capable of capturing 8.3K 60 fps N-RAW and 4.1K 60 fps ProRes RAW video. That's along with 10-bit Internal 8K 30 fps and 4K 120 fps. Nikon bills the Z 8 as ideal for hybrid shooting, and it makes

sense; photographers will love that huge stills resolution. Videographers, however, will likely not mind trading those extra pixels for better video features in another camera.

## Is it worth it?

The Panasonic S5 IIX is a highly capable camera that delivers professional, cinematic video footage. With the ability to record videos up to 6K resolution at 30 frames per second, the S5 IIX supports Apple ProRes recording with the option to record directly to an external SSD. Another

... THE S5 IIX'S STRENGTHS MAKE IT A COMPELLING CHOICE FOR VIDEOGRAPHERS ...

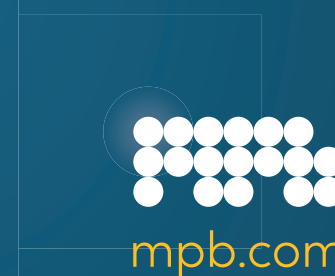
strength lies in its 5-axis sensor stabilization, which offers up to 6.5 stops of shake compensation.

However, there are a couple of weaknesses to consider. Firstly, the camera lacks a CF Express slot. This limitation could potentially affect the camera's efficiency and workflow when dealing with large amounts of data. Additionally, we loved the flip-out screen of the camera, but it's obstructed by the HDMI or USB cables when using those ports.

Overall, despite these weaknesses, the S5 IIX's strengths make it a compelling choice for videographers looking for professional-grade capabilities. The S5 IIX isn't meant for everyone. However, if you need the extra features, the Panasonic LUMIX S5 IIX is well worth its \$2,200 price tag. [U](#)

Nicole Lajeunesse is a professional writer and a curious person who loves to unpack stories on anything from music, to movies, to gaming and beyond.

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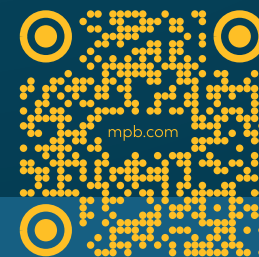
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# BEST SMARTPHONE CAMERAS FOR VIDEO — 2023

Smartphones have become truly powerful tools for capturing high-quality video in a moment's notice. But, some are more capable than others.



Nowadays, more and more people are reaching for their smartphones to shoot video. In recent years, smartphones have advanced drastically in regard to their shooting abilities. However, which smartphones boast the best shooting capabilities? After much consideration, we have picked out what we believe to be the best options.

At the end of this article, we will go over some of the special considerations to think about when choosing a smartphone for shooting video. But first, here are our picks:

## Best video smartphone camera

### Sony Xperia 1 V

Taking over this category from its predecessor, the Xperia 1 IV, the Xperia 1 V continues Sony's dominance in the world of smartphone video recording. It is capable of 4K HDR recording at up to 120 fps. Plus, you can view the 4K video you shoot on the phone's 6.5-inch 4K 120 Hz OLED display.

Regarding the phone's lenses, its three lenses consist of a 12 MP 16 mm ultra-wide lens, a 48-megapixel 24 mm wide-angle lens and a 12 MP telephoto lens. Its telephoto lens offers

actual optical zoom, featuring a range of 85 to 125 mm.

And the Xperia 1 V now implements a two-layer transistor pixel technology that improves the phone's overall low-light performance. The Sony Xperia 1 V is a smartphone designed for video professionals, and its features speak for themselves.

## Best point-and-shoot smartphone camera

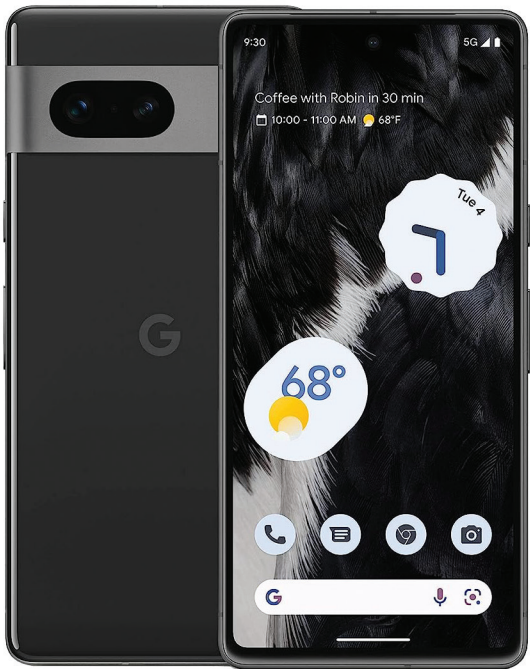
### Google Pixel 7

The Google Pixel 7 brings a few new things to the table compared to its predecessor — namely, Photo Unblur and Macro Focus. With Photo Unblyr, the Pixel 7 will remove any blur or visual noise in Google Photos. It doesn't matter if the photo was taken on the Pixel 7 or with another camera. Additionally, the smartphone's Macro Focus can get really up close and personal to see tiny subjects and capture all their details.

In terms of video specs, the Pixel 7 can shoot video at up to 4K resolution at 60 fps. Additionally, the phone features a 50 MP wide-angle lens, a 12 MP ultra-wide-angle lens and a 10.8 MP front-facing lens. The Google Pixel 7 is a great phone that works great for users who don't want to fuss with settings and still take great videos. ▶▶



Sony Xperia 1 V



Google Pixel 7



Best hybrid smartphone camera  
Apple iPhone 14 Pro Max

Apple iPhone 14 Pro Max is a feature-packed smartphone that works incredibly well as a video camera. Apple has improved all of the iPhone four cameras. The smartphone's main camera features a 48 MP sensor with an f/1.78 aperture. Moving on to the smartphone's ultra-wide camera, the lens now has a larger sensor. According to Apple, the sensor operates three times better in low light than it did before. As for the telephoto camera, this camera technically didn't receive an update, but the smartphone's Photonic Engine and improved ISP improve its low light performance. And the selfie camera now works better in low light as well, and also now can autofocus and features f/1.9 aperture.

In terms of video shooting specs, the smartphone can shoot 4K video at 24 fps, 25 fps, 30 fps or 60 fps. It also features a Super Retina XDR display. The Apple iPhone line always impresses, and the iPhone 14 Pro Max continues that trend.

Best budget smartphone camera  
iPhone SE

Sometimes, the best smartphone for you is not always the most expensive. The iPhone SE offers some great features for an affordable price.



Apple iPhone 14 Pro Max

Originally, the 2016 iPhone SE was a budget 4-inch iPhone. However, it was discontinued. Apple later brought the iPhone SE back in April 2020 with a new 4.7-inch model and now has an updated version for 2022. The phone is still a great budget option, costing under \$500. There is a single-lens 12-megapixel rear camera with an f/1.8 aperture. The iPhone SE can record 4K video at up to 60 frames per second with optical image stabilization.

Design-wise, the iPhone SE is practically identical to the iPhone 8. The top bezel features the 7-megapixel front-facing camera and microphone. Also, the iPhone SE sports the A15 Bionic chip. While it is not the most feature-heavy smartphone out there, it is an excellent option for those wanting to save money and still capture images with excellent quality.

Special considerations for smartphone cameras

If you're like a lot of people, your smartphone is the camera you reach for the most. Even if you don't plan to shoot with your phone in a professional capacity, functionality and image quality matter. Everyone knows the disappointment of snapping what should be a gorgeous pic of the sunset on your phone, only to be left with an overexposed image that in no way reflects the real-life experience.



iPhone SE

Let's go over a few key points to consider when evaluating a smartphone camera. The right features ensure great photos and video from your phone, whether you're making a feature-length film or just making memories.

Pixel count vs. sensor size in smartphones

Because of their design requirements, smartphones have smaller sensors than most dedicated cameras. Typically, this also means lower pixel counts, at least until very recently.

Pixel count is complicated, however. More is usually better, but not always. Sensors with higher pixel counts, and therefore smaller individual pixels, capture more detail when given enough light. On the other hand, fewer but larger pixels generally result in better sensitivity and a larger dynamic range.

Smartphone camera sensors need to strike a balance between detail and sensitivity. While 12 MP sensors are more common, the best smartphone cameras today offer up to an astounding 108 MP, as we see in Samsung's Galaxy S20 Ultra.

With that camera, you have the option to switch from 108 MP to 12 MP. This takes the pixel size from 0.8 µm to 2.4 µm. You can, therefore, adjust the resolution to favor either detail or better low-light and mixed-light performance. You can also select the 12 MP option to save on storage space.

To do this, the S20 Ultra uses an increasingly popular technology called pixel binning. There are other phones that use pixel binning to boost low-light performance, but the S20 Ultra is unusual in that it gives the user control over this setting.

The bottom line is that high pixel counts make for impressive specs on paper, but sensor size will most likely have a larger impact on the final image.

Why so many cameras?

Google once insisted that its Pixel phones had no need for a second or third lens. It was a way for them to differentiate the Pixel from its competitors. Ironical, then, that the Pixel 4 features a two-camera module. ▶▶

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By why do modern smartphones so often include that second and even third lens in the main camera module? In essence, it's a clever way around physical design constraints. Dedicated cameras aren't expected to fit in your pocket. They have larger bodies that can hold larger sensors, and no one complains about protruding lenses.

Smartphones, on the other hand, must fit in your pocket. Plus, protruding lenses — aka camera bumps — are often seen as unaesthetic liabilities. That means manufacturers have to find other ways to meet consumer demand for more powerful and versatile smartphone cameras, specifically when it comes to zoom capability.

Rather than attempt to cram a longer optical zoom into a single camera setup, the best smartphone cameras now include up to four separate lens and sensor pairings arranged in multi-camera modules. This allows for a broader range of focal lengths as well as other optimizations and special features.

Focal length and zoom range

With multi-camera modules, smartphones today have a greater optical zoom range than ever before. However, just like with dedicated cameras, smartphones often tout both an optical range and an extended digital zoom range. Depending on the phone, that may be good enough. However, digital zoom will always result in a loss of resolution and image quality; it's simply cropping in further to isolate your desired subject. Keep this in mind whenever you're comparing zoom ranges on any camera.

On the other end of the scale, today's smartphones commonly feature an ultra-wide lens. Depending on the type of scene you anticipate shooting most, you may want to look for either a wider ultra-wide lens or a longer telephoto option.

Video resolution and frame rate

Like today's camcorders and DSLRs, the best smartphones out now can

capture 4K video at 30 frames per second. Ultra high-end phones go even higher with 8K recording.

Along with the increase in resolution, phones now offer higher frame rates like 60, 120, 240 and even up to 960 fps in lower resolutions for super slow-mo video. Look for high frame rate options if you want to add cinematic slow motion to your projects.

Phones compensate with more advanced software

Though manufacturers continue to improve smartphone camera hardware, smartphones can also compensate for physical limitations with better software. This is where smartphones excel. They're already equipped with more computing power than a dedicated camera, and that allows smartphones to pull off some neat tricks like HDR shooting, improved low-light performance, motion photos and portrait mode.

Therefore, it's important to consider more than just the sensor and lens capturing the image when judging a smartphone's camera. The central processing unit and the graphics processing unit, as well as the image processing algorithms at work, will all impact the final look of your photos and videos.

As you shop, decide what features are most important to you. If you like taking selfies with your friends on fun nights out, look for a phone that offers a night mode, portrait shooting and a solid selfie camera with a wider focal length. If you're a foodie with an Instagram following, look for phones with an awesome food mode. Want to use your phone as a B-cam (or A-cam!) in your next production? Look for cinematic shooting modes that give you lots of manual controls.

The best smartphones have smart features

Indeed, it's becoming more and more common to see artificial intelligence at work behind the scenes. The Huawei P40 Pro even goes so far as to include separate neural-network pro-

cessing units to support the camera's AI functions.

Other manufacturers have not gone this far yet, but automatic scene selection and image correction are becoming more common. These features rely on AI to give the user a seamless shooting experience.

Video vs. photography

When choosing a smartphone, think about how and when you are most likely to use it. Note that photo features are often more heavily marketed than video capabilities, so if shooting video is a priority, make sure those fantastic tools aren't photo-only. If focus tracking is essential to you, for instance, make sure it's available in both photo and video modes.

Apps and compatibility

Phone manufacturers continue to improve their native camera apps with additional shooting modes and editing tools. However, many mobile videographers have a favorite camera app they swear by. If you're considering switching from Apple to Android or vice-versa, make sure the apps you need are available on your new platform.

Likewise, if you plan to edit your footage on your phone, you'll need to make sure your editing tools are available as well. And if your favorite editing app includes a feature you can't live without, make sure that feature is available on both platforms. The same app can sometimes offer different features depending on the version.

Bottom line

When shopping for a new smartphone, there is much to consider — carrier availability, operating system preference, cost — but for videographers, filmmakers and photographers, a phone's camera is at the top of the list of priorities. With the right features, smartphones can undoubtedly assist in professional productions.

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# THE BEST AUDIO AND VIDEO RECORDERS 2023



Modern cameras offer a lot more recording options and controls than they did in the past, but they still may not address all of our production needs. It's common to find that the camera you've chosen for a shoot doesn't offer all the features that you need to get through your workflow with ease. This is where portable recorders can help.

In this article, we'll cover the best external recorders for both video and audio recording. Then, we'll go over the specs we considered when making our selections so that you can choose the best recorder for your specific situation.

## Best video recorder

### Atomos Ninja V+

The Atomos Ninja V+ delivers up to 8K 30p and 4K 120p continuous recording in Apple ProRes RAW with HDR while sitting atop your camera. It records and plays back up to DCI 4K. Additionally, it has a 10-bit screen with a brightness of 1000 cd/m<sup>2</sup> AtomHDR. Also, it supports log formats from cameras like Sony, ARRI, Canon, JVC, Panasonic, Nikon, RED, Sony and Z CAM.

Plus, the Atomos Ninja V+ supports anamorphic de-squeeze. This allows you to view anamorphic footage with 2x, 1.5x, 1.33x or Panasonic 8:3 ratios. If you're looking for a recording monitor, you can't go wrong with the Atomos Ninja V+.

## Best budget video recorder

### Atomos Ninja V

The Atomos Ninja V uses AtomHDR image processing to display more accurate exposure and color information in RAW, Log, PQ and HLG HDR images with 10+ stops of dynamic range. Likewise, the ability to preview 3D LUTs brings the image displayed on location even closer to the final product, as do options for de-squeezing anamorphic content. Also included are shot assist tools like false color, focus peaking, waveform and more.

The Ninja V shares many of the same specs as the larger Shogun Inferno, with the ability to record up to 4K at 60 frames per second in 10-bit 4:2:2 ProRes, DNxHR and ProRes RAW, though not CinemaDNG. The big differences between the Ninja V and the Shogun Inferno are the size, screen brightness and connectivity options. The Ninja V has a 1000 nit, 1920 x 1200, 5-inch screen and offers only HDMI in/out. It's also missing the XLR audio inputs of the Shogun Inferno. ▶▶



Atomos Ninja V+



Atomos Ninja V



**Best audio recorder**  
**Zoom H6**

The Zoom H6 Handy Handheld Recorder allows six simultaneous input signals to be recorded at once. This user-friendly recorder also has two swappable stereo microphone capsules and six mic/line inputs.

The two interchangeable stereo microphone capsules make recording everything from speech to concerts to environmental sounds easy. The XYH-6 capsule provides phase accurate capture in two different X/Y positions — 90 degrees for a tight stereo image or 120 degrees for a wider perspective. The MSH-6 capsule records in a mid-side configuration, and its front-facing directional element makes it great for sound design, broadcasting and stereo-to-mono compatibility.

The H6 is equipped with four XLR-1/4-inch combo inputs, as well as a 3.5 mm stereo mini-jack input. It can accommodate condenser microphones, +4 dB balanced line-level sources as well as signals from unbalanced instruments.

The H6 is also capable of six-channel recording at up to 24-bit/96 kHz resolution.



Zoom H6

**Best budget audio recorder**  
**Tascam DR-40X**

With the Tascam DR-40X, you can record two mics via XLR while simultaneously capturing the audio from the recorder's two adjustable onboard condenser mics to two additional tracks. This allows you to mix the four tracks together in post to get just the right amount of background sound. The DR-40X records to SD card in either WAV/BWF or MP3 file formats. It features a built-in limiter and switchable low-cut filter. Plus, dual recording mode captures a safety track as further insurance against peaking and distortion.

The DR-40X does have built-in mic preamps that can provide your mic with phantom power, but their noise floor can't compete with the more expensive Kashmir preamps from Sound Devices. This difference will be more noticeable in less-than-ideal recording conditions.

The DR-40X features both an integrated speaker and 3.5mm headphone out and can be powered via battery, AC or USB.



Tascam DR-40X

**Factors we considered**  
Just like cameras, there is no single recorder that's perfect for every production; however, you can enhance your camera's capabilities with a recorder that fills in the gaps.

**Video recorders**  
The internal recording capabilities of your camera are often limited by recording media and processing power. An external recorder can often open up a lot of options in terms of format and record time, letting you record in higher-quality formats — like ProRes, DNxHR, CinemaDNG and RAW — for longer periods of time.

**Recording format and color**  
At times, because of a client's needs or to streamline your own post-production workflow, you may need to record in a specific format like ProRes 422 or DNxHR HQx to work more easily with editing software like FCP or Media Composer. Recorders often support these formats while many cameras don't. If your workflow demands a particular format, make sure it's available on any recorder you consider.

Along with additional recording formats, many external video recorders also offer enhanced color capture. Many cameras only record in 4:2:0 chroma subsampling, which can lead to some images having color that looks a little off or that is difficult to correct and grade in post-production. 4:2:2 subsampling has four times as much color information as 4:2:0 color and gives you color that looks almost exactly like full bandwidth color (4:4:4). Many recorders support 4:2:0 color via HDMI and 4:4:4 color via SDI.

RAW recording is another reason to invest in an external recorder since this will give you maximum flexibility in terms of color grading and image correction — RAW recording pulls image data directly from the camera's sensor, bypassing any image processing or compression.

**Screen size, resolution and brightness**  
Though external video recorders do not always include a built-in monitor, this feature can add a ton of value to your purchase. Onboard camera monitors are typically small, low res and not very bright. There are many monitors/recorders with 5-inch to 7-inch screens in HD resolutions; some are even bright enough to see in sunlight.

These will often also provide handy shot assist tools like focus peaking and LUT preview in addition to their larger, more production-friendly viewing area. If you know you will be working with HDR footage, look for a monitor that supports HDR previewing.

**Audio recorders**  
On some projects, you can mask problems with your picture in post-production with alterations in color and contrast, making them look like stylistic choices; however, you usually can't do that with audio. You might be able to ADR (additional audio recording) all the dialog of your short film in post, but it's not likely that the bride and groom are going to want to re-record their wedding vows after you've done the shoot for them. In some cases, there simply is no alternative to professional quality production sound.

Most cameras don't offer all the features needed to ensure that you can get good-quality sound for your production. This is where an external recorder can give you the ability to capture great sound, either with better input and output jacks, a lower noise floor, higher audio sample rates and bit depth, or by offering more control to adapt to the recording environment.

**Connectivity**  
Sending an audio signal through an XLR jack doesn't automatically make it better quality; however, using XLR cables and jacks can help eliminate some common problems with audio signal flow in production. Reliability is very important for signal flow. XLR connections lock in place; most 1/8-inch connections do not and can easily come out. Equipment using XLR jacks typically use grounded connections to help eliminate RF noise in the signal; most 1/8-inch jacks don't allow for grounded connections. During production, the size of XLR jacks makes them more durable and less likely to break in contrast to smaller 1/8-inch connections. As an added bonus, XLR inputs usually can provide the phantom power needed by many professional microphones.

**Noise floor and audio formats**  
All audio recorders have a noise floor. When you start a recording with no microphone attached or enabled, what you will hear in the recording is that noise floor. Generally, the better a recording device is designed and built, the lower the noise floor will be. Many cameras and recorders don't list audio noise floor information in their specs, but this is certainly something you can learn by doing test recordings with the equipment before you shoot.

If you want great audio, you're going to need to record in WAV or another uncompressed format since recording compressed audio severely limits what you can do in post. Of course, if your only delivery is a live web stream, then recording compressed audio may be fine; but you should test your workflow just to be sure.

Changing your record format from 16bit/48khz to 24bit /96khz WAV may not give you a noticeable difference in sound quality. However, it will give your audio signal more information, meaning that it will be easier to make alterations like noise reduction and equalization in post-production, often delivering a final audio track of significantly higher quality.

**Ergonomics and isolation**  
Beyond boom poles, we don't hear much about the ergonomics of working with audio equipment on a shoot. This can greatly affect the sound you're recording, however. You'll find that the easier the gear is to operate, the more consistent your results will be. Gain controls that are physical rather than menu-based can be quickly and easily adjusted. This will help you maintain proper audio levels. Using an audio recorder that is separate from your camera rig will eliminate the risk of vibrating the camera while adjusting gain. Likewise, if your audio gear is separate from your camera rig, you're less likely to pick up camera noise in your audio recordings.

**Summing it up**  
Production has its challenges, but with the right tools, the work is a lot easier. Audio and video recorders can help fill some of the needs when your camera falls short. They can also make your job a bit more comfortable. [V](#)

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# THE BEST TRIPODS FOR VIDEO 2023

Carefully comparing and reviewing system specs will ultimately help you find the best tripod to fit your needs and your budget.



**W**hile shaky-cam films like “Cloverfield” have been incredibly successful at the box office, many recent “found footage” movies are now opening with shaky, handheld shots, which then transition into stabilized tripod footage. In fact, stabilized footage is expected in most projects like commercials, corporate videos, documentaries, and wedding videos. Think about it — would you really want the video of your sister’s wedding to look like a sequel to “The Blair Witch Project”?

That said, with so many tripods on the market, you can narrow your choices based on tripod design, construction elements and your budget. However, before we get into the details, let’s take a look at the best video tripods on the market today.

## Best travel tripod

### Manfrotto Befree Live Video Tripod Kit

This extra lightweight tripod is designed specifically to travel with you. The kit includes a fluid video tripod head with a 501PL plate, along with legs, a pan bar and a carry case. With a height range of 17 inches to 59.5 inches, the Manfrotto Befree can support payloads of up to 8.8 pounds. This and its manageable carry weight (of about five pounds) make it a good choice for vloggers and travel videographers using mirrorless and other lightweight cameras.

Though minimalist in design, the tripod still offers separate pan and tilt lock knobs for added control. 360-degree panning and a built-in bubble level should make it easier to get the shot you want on the go. ▶▶



Manfrotto Befree  
Live Video Tripod Kit



**Best tripod head**

**Manfrotto 504X Fluid Video Head with Flat Base**

The Manfrotto Fluid Video Head with Flat Base features a wide top surface and a long sliding plate, adding to the tripod head's overall stability and balance. Its flat base comes with a 3/8-inch-16 female mounting thread. This is compatible with a wide range of tripods, monopods, sliders, jibs and rigs.

In total, the Manfrotto Fluid Video Head with Flat Base supports up to 26.5 lb, which should support most current cinema cameras, DSLRs and mirrorless cameras. Its counterbalance system has four presets from 0 to 4.8 to 9.7 to 14.3 lb as well.



**Manfrotto 504X Fluid Video Head with Flat Base**



**Manfrotto 504X Fluid Video Head & 645 FAST Aluminum Tripod with Mid-Level Spreader**

**Best tripod system**

**Manfrotto 504X Fluid Video Head & 645 FAST Aluminum Tripod with Mid-Level Spreader**

If you're looking to save some time and money, a tripod system can be a great option. This Manfrotto system contains the Manfrotto 504X Fluid Video Head & 645 FAST Aluminum Tripod with Mid-Level Spreader. The system's head features a 26.5 lb maximum load, a pan bar and a quick-release plate. Plus, its counterbalance system comes with four presets.

The Manfrotto 504X Fluid Video Head & 645 FAST Aluminum Tripod with Mid-Level Spreader twin-leg aluminum tripod offers a 55 lb maximum load and a 5/100 mm ball head mount. The system also comes with a 3/8-inch-16 female mounting thread and a carry bag.

**Best tripod legs**

**Sachtler flowtech 75 MS**

The lightweight Sachtler flowtech 75 MS tripod legs have an innovative design and a price tag that reflect their value. The flowtech 75 features a 75-millimeter bowl and two-stage, three-section carbon fiber legs, adjustable from 10.2 inches to 61.8 inches. That said, they support up to 44 pounds and come with removable rubber feet to cover their dual spiked feet. Plus, this set of sticks has independent leg movement and adjustment along with a magnetic transport lock.

**Sachtler flowtech 75 MS**



This isn't your typical tripod, however. All of the leg length adjustments are controlled with three levers positioned at the top of the tripod. It has a mid-level spreader that can be quickly attached or removed so that the tripod can pancake almost all the way down to the ground.

The big question is why it has taken so long to make a tripod that is controlled at the top of the legs. Who knows why, but we are glad someone finally made one; it makes the tripod much more usable.

**Best budget tripod**

**Magnus VT-4000**

The Magnus VT-4000 is a super affordable tripod system that comes with everything you need in a tripod. While the Magnus VT-4000 is a cheaper option, it's built with stable aluminum, allowing it to support up to 8.8 lb. Plus, it has a ton of features you would find on more expensive tripods, like a two-way fluid head with a half-ball mount with a 65 mm diameter. It also comes with left and right pan bar mounts. That's nothing to scoff at for a tripod under \$200.

Featuring a two-stage leg design, the tripod offers some height flexibility. You can adjust the leg's height from 27.6 inches to 59 inches. It also features separate pan and tilt locks and a bubble level. Plus, its head controls are positioned on the left side. This leaves your hand

**Magnus VT-4000**



open for panning. In total, the VT-4000 weighs 7.9 lb, making for easy placement adjusting and transportation.

The Magnus VT-4000 Tripod System is a great tripod for those looking to save some bucks but not skimp out on camera stability.

**Features we considered**

On the most basic level, tripods consist of a head and a set of legs. Indeed, many economy tripods are just that. However, if you take a closer look, you'll be surprised by the differences.

**Plates**

It all begins here. Your camera mounts to a plate that sits on top of your tripod. Typically, on small or inexpensive tripods, this is a fixed plate with a screw mount that attaches directly to the bottom of your camera. More convenient quick-release plates allow you to quickly remove the camera from the tripod without removing the plate. Once you try it, you'll be hooked.

For shooters who own a single camera, a quick-release plate can be extremely important. This is especially true if you're rapidly alternating between handheld and tripod shooting. You can even leave your camera in its bag with the plate attached, which makes for a speedy setup.

For added convenience, try to use the same style quick-release on different camera supports; this allows you to go from tripod to monopod without having to change the camera plate. Quick-release plates and bases can often be bought separately from the camera support in order to match other models. When purchasing, make sure your quick-release system has a locking mechanism.

There are other types of plates based on your needs. Balance plates can offer a sliding range. This helps when balancing uneven payloads, such as a camera sporting a long lens or a matte box. Also, some plates are wider, which is great for DSLR shooters. The way the plate attaches to the tripod, such as a side-load, can also be important depending on the location of other gear attached to your tripod.

**Heads for photography**

With so many filmmakers shooting content with smaller, lighter cameras, perhaps you have wondered: "Why not use a photo tripod?" Photo tripods can be a great inexpensive solution if you are shooting a wide shot with little to no movement, like a speaker in a sit-down interview. However, that only works well for coverage with static shots. Let's take a quick look at the



two main types of photographic tripod heads that you might encounter.

**Pan-and-tilt head**

A pan-and-tilt head allows you to adjust your tripod head one axis at a time by loosening and then retightening the positioning knob. This knob may have an arm attached. So, with this style of head, you can pan up and down or right to left.

**Ball head**

A ball head features a ball-and-socket style design. Attached to a base, the ball moves freely in its joint. A knob is used to tighten the ball and secure it in place. Movement is controlled with this knob, which often has an arm attached to it.

**Heads for motion**

The ability to shoot smooth, beautiful pans and tilts will be substantially affected by the materials and the design of your tripod head. For videography and cinematography, it's next to impossible to get smooth movement without using a fluid head.

**Fluid head**

As the name suggests, fluid heads are sealed with lubricant fluid inside. This lubrication provides for the smooth movement of your head when panning or tilting. It's important to note that because these video heads use fluid, not all are suited for work in temperature extremes.

That said, the best tripod heads will pan 360 degrees and have a + / -90-degree tilt. The pressure on the fluid in the head can be fixed or it can have adjustments. These adjustments, called drag, provide greater control in your movements. Another desirable feature is a bubble level, preferably illuminated. Heads attach to tripod legs using either a ball or a flat mount.

On midsize to large fluid heads, the camera plate often has a slider adjustment. This lets the camera move either forward or backward on the head. This makes balancing the camera on the tripod much easier. Larger fluid heads have counterbalance adjustments. The counterbalance allows you to compensate for a heavy load toward the front or rear of the camera. This can be very useful when using large camera rigs, large lenses or control arms with focus and zoom controls.

**Arms**

Most film/video tripods have a control arm or handle for panning and tilting. Some tripods, however, have options on how and where the handle is mounted. Some models even offer the ability to use a second handle for greater control. This can also be a mounting point for separate focus and zoom controls. When using remotes, two-stage telescoping arms are very convenient.

**Legs**

Many tripods on the market today feature legs that are constructed from aluminum or carbon fiber. Aluminum tends to be cheaper, while carbon fiber is lighter and significantly stronger. The price between the two can be significant although the material for the legs really don't affect your tripods' functionality. Most manufacturers will list the weight of the tripods and/or legs. Ultimately, you'll have to decide if the weight difference is worth the expense.

Legs for video tripods are usually either single legged or double, tandem legs. Double legs offer greater support and stability and are often the only choice for support of heavy payloads. The number of telescoping sections that make up a leg is also something to consider. The more sections or

stages a tripod has, the smaller its collapsible size. However, more leg sections can also lead to slightly longer setup times and a slightly heavier weight to haul.

**Leg locks**

Additionally, leg sections have locks on each individual leg stage so you can adjust your tripod to the proper angle needed. This is often necessary and quite common when shooting on uneven terrain. Leg lock designs and materials are not universal and can be an important feature. Tandem legs typically have locks that engage with a lever. Many single legs have locks that engage horizontally.

Horizontal locks unlatch unexpectedly and collapse when bumped, so beware. Many lighter-weight tripods have twist locks that aren't as durable and often cannot be easily replaced if broken. Consider the cost of the tripod; you'll definitely want to be able to replace locks on an expensive tripod. Some leg locks can be ordered from the manufacturer and easily replaced. This may be an area you want to explore before your purchase.

**Spreader**

A spreader is another good feature for your legs to have since this provides added stability. Spreaders near the bottom of the legs are designed with studio and indoor shooting in mind. Spreaders located higher up on your legs allow you to adjust your tripod for uneven, outdoor terrain while still providing extra support so your tripod does not collapse.

**Feet**

Tripod legs also have feet. Rubber feet are almost universal. Versatile tripods will feature spiked foot options for outdoor terrains. The form of this varies from wind-down spikes to retractable spikes to interchangeable feet.

**Center columns, bowls and levelers**

Larger fluid heads come with ball mounts that tend to range in size from 65 mm to 100 mm; this head will rest on top a bowl of a corresponding size

**IF THE HEAD YOU WANT IS REALLY EXPENSIVE, YOU MAY OPT FOR CHEAPER LEGS ...**

that connects to your tripod legs. With a bowl mount, you can level the head independently from the legs.

A leveler allows you to level a flat mount fluid head on a tripod, often without adjusting the leg length. This can greatly decrease your setup time on uneven surfaces. Smaller fluid head tripods tend to level the head by individually adjusting the legs of the tripod to obtain the proper angle, although some do have levelers.

While center columns can increase the vertical reach of a tripod, they often lack stability with larger camera payloads. Don't rely on center columns for this purpose. Instead, check the height range of your tripod's legs and make sure it will work for your projects. Speaking of height range: some lighter sets of legs will allow you to shoot from very low minimum heights. This can make it easier to quickly get low-angle shots.

**Payload**

When considering the maximum payload your tripod can support, you'll need to think about more than just the weight of your camera. Lenses can be quite heavy. Thus, a longer lens not only weighs more, but that weight is not distributed evenly. Larger batteries and external recorders that mount on the rear of your camera are additional weights that can cause your tripod to have balance issues. Finally, you'll want to consider the added weight of anything you mount on your camera's hot shoe, such as lights or microphones.

Tripod heads have a rated weight capacity. It's very important not to exceed this as it can cause damage to the head. The fluid in the head creates a damping effect which stabilizes your shots. When you exceed weight limitations on the head, it affects its damping abilities. This makes smooth shots more challenging for your operator.

**It's about more than your camera**

When you look at a head's capacity, it's not just the weight of the camera that you need to support. You also need to factor in any accessory that will be mounted onto the tripod as well. For example, you might want to mount your whole shoulder rig to your tripod, including camera body, lens, matte box, rails, follow focus, recorder, monitor, light, battery and cables. It's easy to see how quickly the weight can add up. You may even want to use a slider or jib arm with your tripod. That would definitely require a higher weight capacity. For best results, you'll want to stay between the minimum and maximum payload weights while operating your tripod.

As you think about the payload your tripod needs to support, you should also think about your workflow. Do you do run-and-gun shoots? The ability to quickly go from handheld to a tripod can be seamless if you leave your camera on your rig and mount it directly onto your tripod. Maybe you only want to transport one set of sticks, so the ability to mount a slider or a jib arm to your tripod legs might also be a big plus.

**Mixing and matching legs and heads**

It's common for many shooters to mix and match heads and legs when purchasing tripods. You may decide you like the way one tripod folds or a specific leg lock design, but want to pair those legs with a different fluid head. If the head you want is really expensive, you may opt for cheaper legs from a different manufacturer.

When looking at tripod specifications for these parts, you'll often note that there are different weight ratings for the heads and the legs. If you are mixing and matching heads and legs, remember that you need to include the weight of that head in addition to your camera and its ac-

cessories when calculating the total payload for your legs.

**On a budget? No worries.**

You're likely familiar with the saying, "you get what you pay for?" That's definitely the case when it comes to tripods. At first glance they may be similar, but many mid-range and higher-end tripods do have very specific features that are valuable for some camera operators and the work they are doing. On the other hand, economy tripods have their uses especially for those on a budget.

You'll notice the biggest variables among the tripods in various price ranges relate mostly to fluid adjustments for the head for pan, tilt and counterbalance. Typically, economy models have fixed fluid heads, while mid-range and high-end models may have multi-step adjustments, continuous adjustments, and/or multiple counterbalance settings.

Those on a budget shouldn't fret, however. You can still get great shots with an economy tripod; however, you just might have to work a little harder to get those shots.

**Final thoughts**

Remember, your tripod is holding precious cargo, so pay attention to your payloads. You really don't want the embarrassment of having your tripod crash to the floor in front of a new or important client because you only considered your camera's weight and not the entire payload. A tripod collapse that damages or destroys your camera and accessories would also be equally devastating.

In the end, when selecting a tripod, you may also want to consider not only the cameras and gear you currently own but also future purchases. If you have the opportunity to visit a store to look at models, this might make your purchase decision easier. However, carefully comparing and reviewing system specs will ultimately help you find the best tripod to fit your needs and your budget. **U**

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**FOR VIDEOGRAPHY AND CINEMATOGRAPHY, IT'S NEXT TO IMPOSSIBLE TO GET SMOOTH MOVEMENT WITHOUT USING A FLUID HEAD.**



# THE BEST LIVESTREAMING EQUIPMENT – 2023

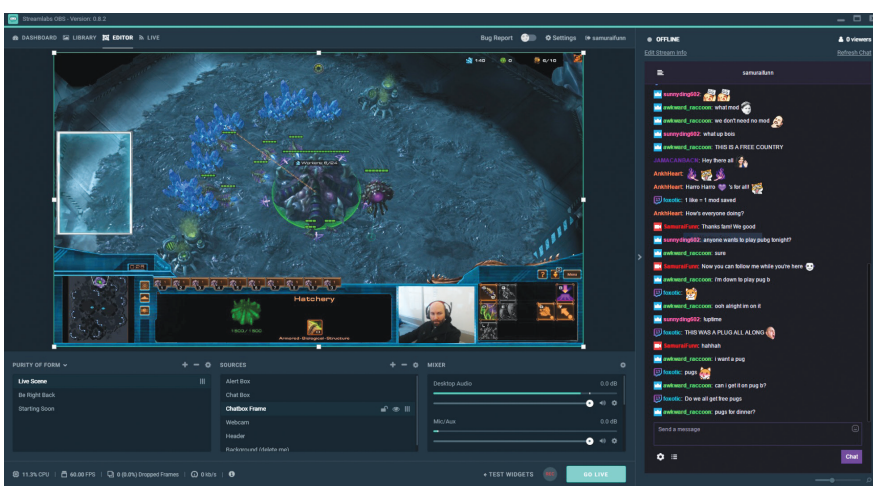
To provide the best quality stream possible for your community of loyal followers, it's imperative to invest in livestream equipment that's up to the task.

These days, anyone with access to a smartphone can connect with fans and friends from all over the world. However, the more complex your stream, the more gear you'll likely need. Each setup has advantages and disadvantages, and each can be customized to suit your specific needs. Let's take a look at the best livestreaming tools in several categories. Then, we'll talk about how these pieces come together in a complete livestreaming setup.

## Best streaming software Streamlabs OBS

Streamlabs OBS is a free streaming app built on the open-source OBS (Open Broadcast Systems) app. The software provides a streamlined user interface and claims to have the fastest set-up process on the market. The all-in-one application is designed to make streaming simple, and it comes with built-in tools that will be especially helpful for stream-

ers looking to build a consistent audience on platforms like Twitch or YouTube. These include tools for engagement, growth and monetization. Streamlabs also offers a mobile app, allowing users to access Streamlabs tools while streaming from a mobile device. While some larger live productions may run into limitations with Streamlabs OBS, it's accessibility and ease of use bump it up to the top of our list. ▶▶



Streamlabs OBS



Best switcher

Blackmagic ATEM Mini Pro ISO HDMI

The Blackmagic ATEM Mini Pro ISO HDMI is a live production switcher that allows for direct streaming via its Ethernet connection. The ATEM Mini Pro ISO HDMI allows you to switch and stream up to four HDMI inputs directly to platforms like Twitch, YouTube and Facebook. Or, you can connect to a computer via USB to use the ATEM Mini Pro ISO HDMI as a web-cam input.

Each of the ATEM Mini Pro ISO HDMI's four HDMI inputs features its own dedicated standards converter. This means that the device will automatically convert 1080p, 1080i and 720p sources to the video standard of the switcher. There's also added support for recording to USB flash disks in H.264 and recording to multiple disks. This should allow streamers to continuously record their streams without running out of storage space. Also, the new model features a multiview on the HDMI video output. That allows all inputs to be monitored on a single monitor, along with the live status of recording, streaming and the audio mixer.

If you need a livestream switcher, consider the ATEM Mini, priced at \$795.

Best I/O device

Blackmagic Decklink Quad HDMI

The Blackmagic DeckLink Quad HDMI Recorder is a PCIe card that adds four HDMI 2.0b inputs to your PC. These sources can include any combination of SD, HD, Ultra HD, 4K and even computer formats. The card is designed for software live switching between cameras

and other video sources, real-time computer game capture and livestreaming. In addition to its four HDMI inputs, the card supports eight audio channels embedded in SD/HD/UHD/4K. It uses the PCI Express 8 lane generation 3 interface and is compatible with 8 and 16 lane PCI Express slots.

If you just need to add more camera inputs to your computer-based streaming setup, this is a good choice.

Best livestreaming encoder

The Teradek Vidiu X can stream HD video to practically anywhere on the internet. It also integrates easily into many professional setups. With HDMI video connectivity, it works great with most cameras and switchers. If there's an HDMI video source, it can connect to it. In total, you have three ways to connect: Ethernet, cellular connectivity with an LTE USB modem and WiFi 6. These options give you a lot of connection flexibility.

This encoder is great for on-the-go creators. Its compact size allows for easy mounting and portability. Plus, it's USB-C powered, making it easier to keep your stream up during long broadcasts.

The Teradek Vidiu X can also record to SD cards. So, you can save your streams, make copies and make edits afterward.

For \$699, the Teradek Vidiu X delivers professional recording functionality for a reasonable price.

Best streaming box

NewTek TriCaster Mini Advanced HD-4

The NewTek TriCaster Mini Advanced HD-4 provides everything you need to conduct a

pro-level livestream at a reasonable price. This is a good choice if you want a stand-alone, turn-key solution for multicamera livestream production.

With the TriCaster Mini, you can stream directly your platform of choice, with presets for popular platforms includes Facebook and YouTube. The TriCaster Mini also comes with a 750GB internal hard drive and can record up to four simultaneous video input or output signals at full resolution. You can also record to external drives via USB 3.0.

This streaming solution allows you to switch between four HDMI or eight NDI video sources. Additionally, you can mix audio, and add titles and graphics. There are also built-in tools for effects like virtual sets and animated transitions. Two HDMI outputs allow for sending the Program output to external devices or monitoring the multiview output and user interface.

The setup includes a wireless keyboard and mouse. Or, you can also add the optional TriCaster Mini Control Panel with T-bar and illuminated buttons.

Essential livestreaming gear

There are many paths to a successful livestream. Let's break down each component to see how it fits into the overall setup.

The foundation

First of all, whether you're streaming from your phone or a dedicated livestreaming system, you'll need a reliable internet connection. The bandwidth requirements will vary based on resolution, frame rate, encod-

ing method and scene complexity, but most standard hardware or cellular connection will be enough to support some level of streaming. You may need to experiment to see what your connection can support.

Next, you'll need to decide how you will get the camera signal or signals streaming to your destination of choice. With a built-in camera and network connectivity, the modern phone is an all in one device perfect for livestreaming. You can take it with you and stream anywhere you have an internet connection and most streaming platforms make it easy to stream through their mobile app. But while a smartphone provides an all-in-one solution, it's likely you'll eventually want more flexibility.

Streaming with a computer

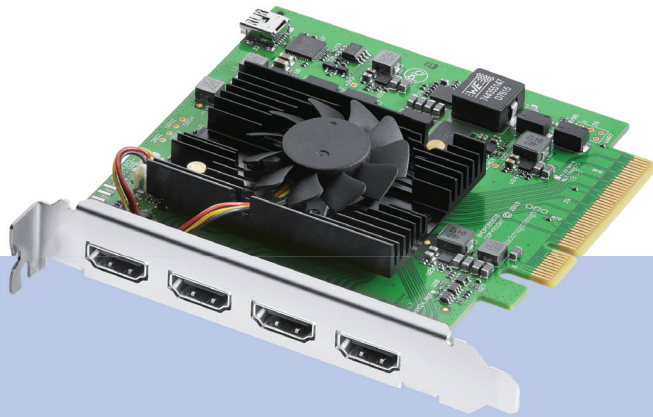
If you choose to stream from a computer, you'll also need appropriate livestreaming software in order to send your video and audio to the web. It's the job of your streaming software to manage your video and audio inputs, encode them to the proper specs and then send your stream to the streaming server according to the correct protocol. Options range from simple and free to complex and extremely expensive. Choose the right option for you based on the complexity of your stream and its destination.

Bringing your camera feed into your computer

A capable computer and the right streaming software are really all you need to start streaming. You can stream gameplay and other screen-based activities to the web with-



Blackmagic ATEM Mini Pro ISO HDMI



Blackmagic Decklink Quad HDMI



Teradek Vidiu X



NewTek TriCaster Mini Advanced HD-4



out any additional hardware, but you won't be able to show your viewers anything else. If you want to appear on screen as a host, you'll need some kind of camera.

When it comes to camera choice you have a few different options. The most convenient cameras to use for a livestream are USB webcams or the built-in camera on your computer. Most livestreaming platforms and software will identify these cameras without any issues, making them easy to set up. However, they provide mediocre video quality and are more limited in terms of placement and camera movement.

If you want the absolute best quality and the most control, you'll want to use a dedicated DSLR or mirrorless camera. But connecting your

ATEM Mini Pro to stream, even without a computer or encoder nearby.

**Streaming without a computer**

We've mentioned the option of using a livestreaming encoder, but so far, we haven't explained what that is. In this case, livestreaming encoder refers to a device that accepts a video input and encodes it for livestreaming. The device then sends the stream to your destination of choice via an Ethernet, Wi-Fi or cellular data connection. If you already have a switcher and just need to get your signal to the web, a livestreaming encoder can fill that gap. These can also allow you to stream a single camera feed to the web without having to connect it to a computer first.

**Turn-key streaming**

If you want all of this functionality in a turn-key solution, look to a dedicated streaming box. Streaming boxes will have a number of HDMI or SDI input and come pre-loaded with streaming software that allows you to switch between inputs as well as add graphics and effects.

You can control the stream through the software interface, but if you plan to stream often and want to use a more complex multi-cam setup, you may want to invest in a control surface made specifically for livestreaming and switch. This control surface will give you more tactile control when switching between inputs, which helps ensure smooth transitions between different inputs.

**Developing your livestreaming setup**

Your equipment needs will scale with the size and complexity of your production. Our best advice is to start simple and build up your set up as you get more experience and figure out where your pain points are. Poor quality audio? Upgrade your microphone or add a mixing board. Want to add another camera? You may need to get a capture card or streaming box that supports a larger number of inputs. There are plenty of fancy, eye-catching streams online, but many streamers attract a loyal audience with nothing more than a webcam. The important thing is that you are using the live format to engage with your audience in a way not otherwise possible.

Got everything you need to go live? Read [Going live, step by step](#).

You can read this article online by going to: [www.videomaker.com/?p=72051338](http://www.videomaker.com/?p=72051338)



WHILE A SMARTPHONE PROVIDES AN ALL-IN-ONE SOLUTION, IT'S LIKELY YOU'LL EVENTUALLY WANT MORE FLEXIBILITY.



camera to your computer can pose another challenge. Some cameras allow for USB live view tethering, but not all. If your camera doesn't support this feature, you'll need to buy an internal or external I/O device to connect the camera to your computer via HDMI, VGA or SDI.

**Multi-camera livestreaming**

What's better than one camera? More than one camera. Multi-camera livestreaming is the most complex setup and will almost certainly require additional gear. However, adding multiple camera angles is an excellent way to give your stream a more polished look.

As soon as you add a second input, you'll want to be able to switch between them. It's possible to use streaming software on your computer to switch between inputs, but the tactile control of a switcher can make directing your stream easier. A dedicated switcher also allows you to connect multiple camera inputs while sending the output signal to either a computer or standalone livestream encoder. From there, it can be sent to the web.

Some switchers even combine the functionality of a switcher and streaming encoder. That means you can use a device like the Blackmagic

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# Everything you need to know

## ABOUT COPYRIGHTING YOUR VIDEO



We're here to cover everything you need to know about what copyright is and how to protect your video for years to come.

**P**rotecting your intellectual property should be a priority for any creative person. Fortunately, maintaining control over your creative work is simple thanks to a legal protection called copyright. With the help of entertainment attorney Larry Zerner, we'll explain what copyright is, how it works and how you can copyright your video or other creative work. Let's dive in.

### WHAT IS COPYRIGHT?

Copyright refers to a person's right to protect their creative works from

infringement — that is, being copied, adapted or distributed without permission from the creator. This right is guaranteed in the U.S. Constitution under Article I, Section 8, clause 8, which gives Congress the power “to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”

Protected works include literary works, software, musical works and accompanying words or lyrics, dramatic works, pantomimes and choreographic works, pictorial, graphic,

and sculptural works, motion pictures and other audiovisual works, sound recordings and architectural works.

“There's only one thing to do. It's just register with the Copyright Office. There's no other — no other choice.”

### THE HISTORY OF U.S. COPYRIGHT LAW

Of course, at the time the Copyright Office was created in 1800, you couldn't register software, motion pictures or even sound recordings. Likewise, the process of securing copyright protection has also changed drastically over the years.

The Copyright Office became a separate department of the Library of Congress in 1897. Since then, as technology developed, the Copyright Act has been and continues to be amended to include more and more types of protectable works. Copyright is an important piece of video production and the law.

Along with allowing more types of protectable works, the U.S. Copyright Office has also modified its rules for registering creative works over time. Originally, the term of copyright protection was 14 years, which could be extended an additional 14 years.

Due to changes in the law, in most of the 20th century, a work could be protected for 28 years once a copy of it — a “fixed copy,” as opposed to a delivered speech, for example — was deposited with the Copyright Office and a notice was affixed to the work. The notice includes the word “Copyright” or the abbreviation “Copr.” or the encircled c symbol © and the creator's name and year date. The registration could be extended an additional 28 years when the holder filed appropriate papers in the Copyright Office during the 28th year after registration.

Congress made very significant changes to the law in 1976 that went into effect on January 1, 1978. Under this most recent law, protection is less complicated than under earlier laws and procedures. The U.S. copyright law is also more compatible with most other countries' laws now.

### HOW LONG DOES COPYRIGHT LAST?

The copyright term is no longer 28 years and is no longer renewable. Under the present law, the term is measured from the author's life



plus 70 years for a natural person. For a company, the term will last for 95 years.

In addition, the creator of the material needs no longer to deposit a copy of the work in the Copyright Office and, in fact, no longer has to affix a notice to the work at all. However, it's advisable to do both. Therefore, even if you do not register your video in the Copyright Office, it is now protected under federal law for your life plus 70 years.

### BENEFITS OF REGISTERING

"Ostensibly, you're protected by copyright protection at the moment of creation. As soon as you have it, you are protected," Zerner says. So why, then, does he still recommend registering your work with the U.S. Copyright Office? As it turns out, registering your work offers several legal advantages if it's ever infringed upon.

#### Registration is required to file a lawsuit

First of all, as of 2019, you are required to have registration before you file a copyright lawsuit. "In the old days, prior to 2019," Zerner explains, "you could file right before suing, and at least in some circuits, they would say, 'Okay, well, as long as it's in the process, okay.' But now you actually have to have the certificate."

Though your video or other work is technically protected by copyright from the moment of creation, it's still important to register your work with the U.S. Copyright Office.

And this isn't the only reason to register your work in a timely manner.

#### You can include attorney fees in your lawsuit

Under U.S. law, you can only be awarded attorney fees if you prevail in your copyright lawsuit if you completed registration prior to the date of infringement or within 90 days of the work's first publication.

Zerner gives an example: "So you put a video on YouTube, and you don't register it, and 91 days later someone copies it ... and you wanna file a lawsuit. You can say, 'Okay, now I'm gonna register it,' wait for the registration to come through — which will take a few months — and then file a lawsuit. But you don't get attorneys fees in that lawsuit."

Zerner points out that, in the scheme of things, such a lawsuit would likely not award a substantial amount of money. "That lawsuit is never gonna go," he warns, "because ... you'll spend more on attorney's fees than you would [get], maybe, in recovery."

#### Actual vs. statutory damages

Here's another big benefit. Under the Copyright Act, you are entitled to be awarded either your actual damages or statutory damages. Actual damages include your lost profits and the profits of the infringers that are attributable to the work. When you register your work, you gain the option to claim statutory damages for infringement — up to \$150,000 — against an infringer without showing actual damages.

Zerner gives another example: "You got a tape of a plane crash or a car crash. And you put it out, and then someone uses it and sells it ... Well, in theory, you can sue ... and if you're registered prior to the infringement, you can ask for statutory damages. And that's what we talk about where a jury can give you up to anywhere between \$750 and \$30,000, or if it concludes the infringement was willful, you could get up to \$150,000. And that's where people talk about the \$150,000."

"I get a lot of cases ... from like a photographer whose work was used by somebody in a way that if they came to him for a license, it would've been a \$1,000 or less." In this example, the actual damages don't amount to much. "But because it's willful infringement," Zerner says, "... you may have to pay us \$150,000." However, he says it's common for people to overestimate the potential payout of their infringement case. "Right now, [that \$150,000 payout] is probably not gonna happen. But the law just says you've got this range. It could be \$750; it could be \$150,000. You don't know." While not guaranteed, these high potential damages can "stop a lot of things before they start," Zerner concludes.

#### Presumed validity

Sometimes, infringement happens years or decades after the work was produced. In these cases, having registered your work in a timely manner will give you the advantage of presumed validity.

"If [the work is] registered within five years of its creation, then there is a presumption that the registration is valid and you own the copyright," says Zerner. "If you don't — if you wait more than five years — you no longer have that presumption and you have to prove that you created it. 'Cause how do they know that you were the one who shot that video?'"

Providing that proof can sometimes be difficult, if not impossible. "We've learned over the past, you know, certainly in my lifetime, the method of filmmakers ... It keeps changing ... if I said, 'Oh, find that old VHS tape that you shot the video from 1989 on' ... You couldn't do it. You don't have it." In this case, simply registering your work within five years of creation could save you a ton of hassle.

#### International protection

Finally, copyright protection, unlike patent or trademark protection, is not territorial; it is international. The Berne Convention is an international

treaty for countries that participate in it. Today, including the United States, there are 181 parties to the Berne Convention: 178 United Nations member states plus the Cook Islands, the Holy See and Niue. The Berne Convention requires its signatories to treat the copyright of works of authors from other signatory countries at least as well as those of its own nationals.

In the U.S., that means another party is legally prevented from reproducing, distributing, displaying or performing the protected work, or from making another work derived from the copyrighted work (i.e., derivative works) without permission of the holder.

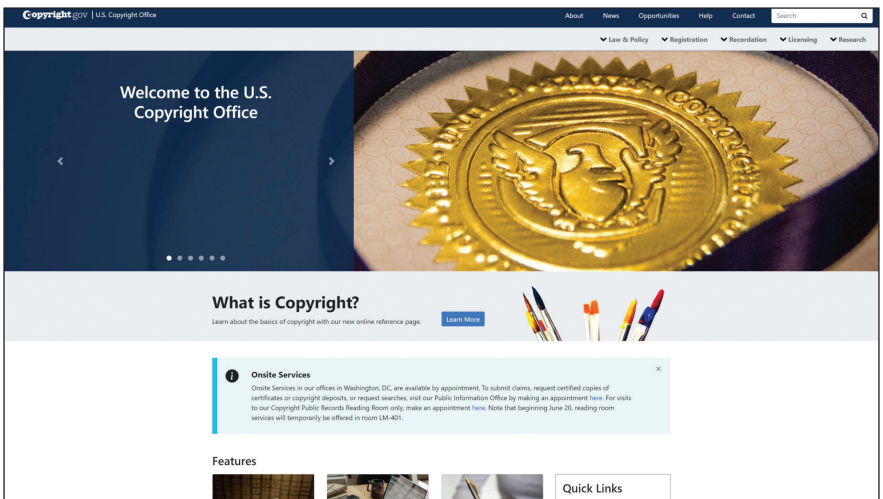
A registered copyright is, therefore, one of the best legal bargains available: worldwide protection for your work is available for \$65.

#### No excuse not to register

Hopefully, you are now convinced of the importance of registering your work with the U.S. Copyright Office. Zerner emphasizes, "It's really important to have registered prior to the infringement because you get all these benefits. These benefits do not accrue unless you have your registration before the infringement."

#### OLD MYTHS DIE HARD

One of the techniques people used before the 1976 Copyright Act, in order to save the \$6.00 copyright registration fee at the time, was to mail themselves the material they wished to protect and not open the envelope when the post office delivered it to them. They believed — erroneously — that such a process would constitute copyright protection. What is required now to prove copyright protection, if you do not have an official registration from the Copyright Office, is your date of creation of the work. Accordingly, various date-stamped mechanisms can help prove your date of creation, such as YouTube videos, email correspondence with attachments, etc.



Head to [www.copyright.gov](http://www.copyright.gov) to begin the copyrighting process.

Needless to say, however, registration is the preferred method to establish your copyright rights.

### HOW TO REGISTER YOUR WORK

Conveniently, you can register your work with the U.S. Copyright Office online at [www.copyright.gov](http://www.copyright.gov). The fee for a standard registration filing is \$65. The average processing time for most registrations is 2.1 months.

Here's what you'll need to do:

1. Provide all required information on the application form
2. Pay the required fee online via Pay.gov (a deposit account option is available for frequent users)
2. Upload or mail in a copy of your work

To get started, head to [www.copyright.gov](http://www.copyright.gov). At the top of the site, click on "Registration" and select "Register Your Work: Registration Portal." Then, click on the button labeled "Log in to the Electronic Copyright Office (eCO)" and follow the instructions to log in or register a new account. Once inside the Registration Portal, select the appropriate option under "Register a Work" from the left sidebar. As you complete the application, remember to read all instructions carefully to avoid delays in your registration.

#### Registering groups of videos

If you have a large number of works that you would like to register, the Registration Portal allows you to register up to 10 unpublished works at a time using the Group of Unpublished Work application. Just make sure to select the correct application option.

#### PROTECT YOUR WORK

Copyright is a valuable protection for anyone producing creative work. It has gone through several iterations over the decades, but today, copyright law protects a work for the life of the creator, plus 70 years. Though your video or other work is technically protected by copyright from the moment of creation, it's still important to register your work with the U.S. Copyright Office. If you are ever unfortunate enough to be a victim of infringement, you'll be happy you did.

To learn more about copyright law or register your creative work, head over to [www.copyright.gov](http://www.copyright.gov).

Nicole Lajeunesse is a professional writer and a curious person who loves to unpack stories on anything from music, to movies, to gaming and beyond.

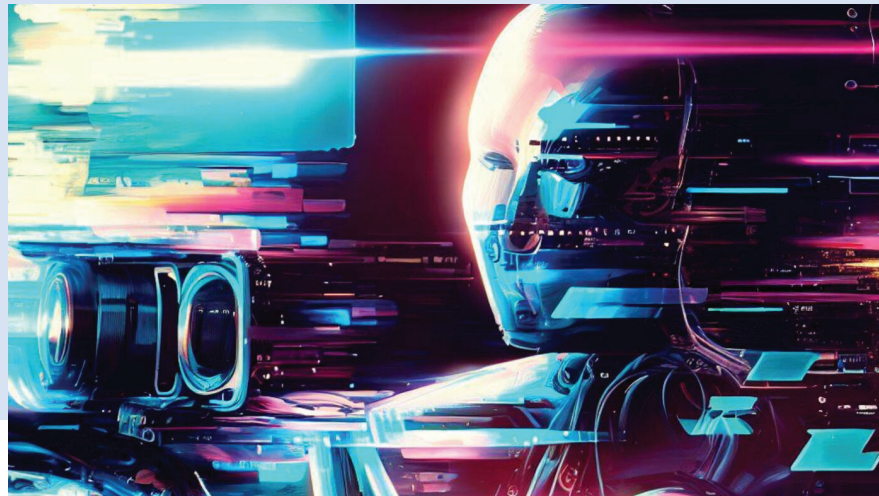
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by Weland Bourne

# How AI helps video production

AI is pioneering a new frontier for video production. Here's how AI can aid in the pre-production, production and post-production process.



When some people think about AI, science fiction depictions like Jarvis, Hal or Kit come to mind. AI is both the most frightening and promising thing for the creative field in recent years. It's the subject of considerable controversy, hostility and excitement. As a result, many ask, "What can I do with AI to make the video production process easier and better?"

## What is AI?

AI, or artificial intelligence, isn't the science fiction super app or super-computer you're probably thinking of. In fact, you've likely been using AI for quite some time without realizing it. Predictive typing, one of the earliest consumer-facing AI applications, is a fitting example. This technology is deemed AI because it offers suggestions based on your past compositions rather than random words, thereby improving its predictions for new messages. The more you use predictive typing, the better it gets at anticipating what you want to write. While this form of learning is rather rudimentary, it is the backbone for more complex AI and is important in understanding how AI essentially works.

## What can you use AI for in video production?

The short answer is you can use AI for everything. It may take some work

and finagling, but you can create an entire video using just AI. The viral Balenciaga AI videos affirm this concept. These videos employ advanced AI forms such as ChatGPT and Midjourney, demonstrating the immense potential of AI in video production.

## AI in pre-production

If you search "AI Writes" on YouTube, you will find an extremely high number of YouTubers who have experimented with AI, specifically ChatGPT. By sourcing prior written works and languages, ChatGPT can create entirely new scripts or stories. While the tool is incredible, it's insanely prone to flaws. If you are a decent editor, you can fix most grammatical issues and structural issues that tend to occur. However, occasionally, the new work is entirely unintelligible and random.

Film and television are visual mediums. Sometimes, no matter how good your logline, treatment or screenplay is, people just can't see your vision. With AI image generators like Midjourney, you can create stunning visuals that can shed some light on what your vision is with producers

Say you're working on a script for a film named "Towering Inferno." It's set on a cruise ship and employs a

similar style to Wes Anderson. You can use AI to generate concept art for the cruise ship. You can then use this AI art as references or as early brainstorming concept designs. Ultimately, AI can give screenwriters who lack artistic aptitude the ability to brainstorm their worlds during the writing process. It also affords the screenwriters this opportunity with minimal time investment.

## AI in production

AI has many practical uses in video production. You can use AI image generators like Midjourney to create a logo or artwork that you can display in any print medium. This helps when you need to populate your sets with artwork but don't want to worry about copyright issues. This can even help if you need to replace or cover real labels or box art and you just don't have the time or resources to do the art yourself.

And why stop there? You can have AI auto-trace your new AI-generated logo to turn it into a vector image. Then you can use AI to turn the vector and artwork of the logo into a textured 3D piece that you can produce in a 3D printer to make physical signs or props. Some new, early 3D model generator AIs are



If you were to generate concept art for a Wes Anderson-style film named "Towering Inferno" using Midjourney, it would look something like this.

beginning to show a lot of potential when combined with 3D printing.

Of course, less flashy AI tools exist for scheduling, planning and task management. Some of these AI functions exist in popular software like Microsoft Outlook and Teams workflows. Chances are you are already using these.

## AI usage in post-production

Aside from using image generators like Midjourney to crank out artwork during pre-production, you can use it in post-production as well. Specifically, you can use image generators to create motion graphics. They can also be used to apply textures to backgrounds or to text. You can even use it as the main subject itself.

## Photo animation

Some tools are capable of automatically animating photographs. They're mostly there to add blinking, occasional moving or tilting of the head and mouth movement. DiD is the most popular virtual avatar animator (often referred to as photo animator). Sometimes, software like this can create an effect where images look creepy or wrong. However, every version is getting closer to replacing the tedious process of filming live-action talking heads.

## Coding

ChatGPT has revolutionized post-production workflows, particularly in coding. ChatGPT can write in any language, and code is just another language. As a result, people who build custom plug-ins for After Effects (AE) or code for visual effects have successfully incorporated ChatGPT into their workflow to speed up the coding processes. However, no language-processing AI is perfect; there's potential for errors. So, the user will need to have coding experience to effectively use ChatGPT for coding. But that doesn't mean it won't become more user-friendly in the future.

## Audio production

For audio, ElevenLabs offers an auto narration AI. Auto narration AI is extremely controversial because it can be trained to mimic nearly anybody's voice. When paired with a language processor that can analyze someone's distinctive speech pattern, auto narration can replicate that speech, making it a really powerful tool. This can liberate budget filmmakers, as their projects can now feature impeccably recorded audio narration with crystal clear enunciation. Additionally, if a line is muddled or location audio is terrible, auto-narration's AI can help.



Need a company logo for signs in the background or props? AI can generate a logo, turn it into a vector image and make that vector image into a 3D piece for printing.

Its ability to mimic people's distinctive speech patterns means that dialogue can be recovered without the need for ADR.

## Musical scores

Lastly, AI tools such as Soundful and Boomy serve as examples of music-making applications. These AI tools have numerous applications in film and video production, including score creation. Given the recent development of this AI technology, potential issues with these applications are still unknown. However, with continuous technological advancements, any possible issues will likely be solved quickly.

## Ethical considerations

People's opinions vary widely regarding the appropriate uses of AI and the boundaries that shouldn't be crossed. As a result, we haven't addressed the ethics of AI. Though, concerns about IP rights for AI-generated content or the impact of AI on production jobs are important to consider. With that said, it's a hot topic. Obviously, you must form your own opinions when it comes to ethics and AI in the production workspace. Though one thing is clear, AI isn't going anywhere. It's here to stay.

## Just scratching the surface

AI covers many software and applications, and we've barely scratched the surface; however, we hope this has been a good introduction. Circling back to the Balenciaga videos, there's a great YouTube video by Samson Vowles that takes you through how one of the Balenciaga's was made. It delves into what free AI software Vowles used and gives you a good idea of AI's production potential and how you can incorporate AI into your next production. [U](#)

Weland Bourne is an award winning filmmaker, as well as a VFX and motion graphics artist.

You can read this article online by going to: [www.videomaker.com/?p=73019525](http://www.videomaker.com/?p=73019525)



by Jeff Chaves

# A look at Trilith Studios

We had the opportunity to tour Trilith Studios — the film and television production studio behind many Marvel Studio productions.

When you head to Trilith Studios, located just south of Hartsfield-Jackson Atlanta International Airport, you're immediately struck with the stark contrast to other studios. While most major studios are enveloped by the bustling cityscapes and traffic of urban centers, Trilith nestles serenely among trees and rolling hills. At first glance, you forget that, as of summer 2023, this is the largest movie studio in the U.S. We were fortunate to have the opportunity to tour the facility and talk with Frank Patterson, president and CEO of Trilith Studios.

Frank shared the studio's vision, which officially opened in 2014. "It's to have every resource great storytellers need to do anything they can imagine," he says. This means that everything is purpose-built on three pillars: story, technology and facilities. The studio houses virtually everything a production company could need right on site. You can find electricians, carpentry shops, greens, craft services and service vendors within the studio's expansive 900 acres and 24 soundstages.

Originally, Pinewood Studios from the U.K. and Dan Cathy of Chick-fil-a partnered to develop the studio. It all began when Dan allowed a studio to use one of his warehouse spaces for filming. Believing in a more effective method to film in Atlanta, he discovered the site. From there, he formed



All images courtesy: Grace Chaves

a partnership with Pinewood Studios and hired Frank. Pinewood Studios began from a humble beginning with just a few soundstages. Their first major movie was the MCU's "Ant-Man" (2015). Since then, most of Marvel MCU movies have been shot here. In fact, three of the top 10 highest-grossing films have been shot at Trilith Studios. And it's still growing.

## What's the story behind the name "Trilith"?

Within a few years, the studio wanted to expand beyond the facilities busi-

ness, prompting a mutual parting with Pinewood. This separation led to a rebranding.

"We came upon 'Trilith,' which means three stones," Frank tells me. He sees it as a reminder of the structures at Stonehenge, "Which is right up the road from Pinewood. It really served as a great metaphor for what we're doing in this purpose-built place." It respects its U.K. roots yet remains distinct, like its location. Frank points out that Stonehenge, like Trilith, was the technology of its day, rich with story and a unique facility.



But you can't build a studio in the middle of the Georgia woods without having an infrastructure in place as well.

"We now have a town called 'Town at Trilith' with restaurants and a hotel that's about to open and over 1,200 people living here," Frank says. The town, like the studio, is purpose-built — not just to accommodate residents but also to stimulate creativity. "We're really trying to be this place that focuses on story and storytellers and the lives they live, so we can enable them to do anything they can imagine."

The community is filled with different architectural styles and artistic expressions. The plan is to have around 1,500 homes all interconnected to walking paths and "pocket parks." The goal is for residents to have unplanned meetings that will foster community and creativity. Trilith aspires to be a haven where storytellers and their families flourish. Topping it off is the Piedmont Wellness Center, a state-of-the-art facility dedicated to promoting health and fitness. Anyone involved in a studio project has access to the wellness center — a unique idea in the industry.

## The highest tech

One of the reasons that Marvel and other IPs are flocking to Trilith is its commitment to technology. As Frank mentions, it's one of the pillars of Trilith's mission, "I basically just love the technology behind our industry — trying to figure things out and problem solve." One of the newest tools at the studio, found in Soundstage 22, is a virtual production volume named the Prysm Stage. We got a demonstration of this incredible space on our tour.

Frank says this is a collaboration he's been working on for some time. "One of my favorite thinkers in the industry has a guy named Cliff Plumer, who was the first CTO, Chief Technology Officer, for ILM, then the CEO for digital domain." Seeing the need for a virtual set, Frank reached out to Cliff. "I thought we should work on this together, and he brought on Barbara Ford Grant, who is a technology rockstar. Then we hired Barry Williams, who leads our technology here at Trilith. He was on the original Mandalorian team."

Barry was there to guide them through the demo.

"We came around this building within a building that's constructed of seamless LED monitors. We passed by several workstations that run processors. The processors control the virtual environment that can, in a moment, be a temple



The town at Trilith Studios.

in the jungles of Indonesia, a city street with cars whizzing by or floating in the clouds," Frank explains. "A camera is outfitted with a positioning sensor, nicknamed 'the Sputnik' to track what the camera sees. Barry told us that some of their best work has yet to be seen and will be featured in Francis Ford Coppola's upcoming blockbuster 'Megalopolis.' The Prysm stage is the first, but it won't be the last built at Trilith."

## For the future of storytelling

Of course, telling today's stories with today's tools is the present reality at Trilith, but they're also keenly focused on supporting future storytellers and artists. This means they nurture and educate the people who will be the next generation of filmmakers. Between the front gate of the studios and the town hub sits the Georgia Film Academy. The school offers summer camp experiences for younger learners and apprenticeship programs for anyone wanting to enter the industry. "The team created the certificate





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programs, where we fast train every-  
one below the line — grips, electric,  
painters, carpenters, makeup people.  
In their last two months, they actu-  
ally apprentice with union members  
on the set and get them right into the  
workforce.” Frank says.

The education also extends to all  
Georgia schools. “Our newest Trilith  
entity is called the Trilith Institute,  
which is an organization that we

## TRILITH’S SHAPING THE TEMPLATE FOR NEW TECHNOLOGIES ...

formed to be kind of an aggregator  
of all of these education initiatives  
around the state to make certain that  
students K through 12 can plug into  
this education pipeline.” This story  
arts curriculum aims to teach many  
disciplines in a story framework. Ulti-  
mately, the plan is to create a new gen-  
eration of visual storytellers. “Look,  
we’re not dummies. This is a pipeline  
for our talent for the future,” Frank  
says with a chuckle.

## Paving the way for new VFX technologies

Trilith is a booming place for the  
movie industry and is an award-  
winning community designed to  
care for and grow artists. “Today,  
we may only be 900 acres. We’re  
going to blink an eye, and it’s going  
to be 6,000 acres. If we are good  
stewards of the resources we’ve  
been blessed to have at our dispos-  
al and we stay on course to build  
this place where great storytellers  
can do anything they can imagine.  
Twenty-five years from now, this  
will be 6,000 amazing acres of  
great traditions for storytelling.”

Trilith’s shaping the template for  
new technologies and processes.  
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Trilith Foundation. [U](#)

Jeff Chaves is the chief creative officer of Grace  
Pictures Inc. and is a full-time minister with over  
12 years of experience in television broadcasting.

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by Stephen Mandel Joseph

## How to fix shaky video

If you can't reshoot your shaky footage, you'll have to try to fix it in editing. Here are a few apps you can use to fix your shaky footage.



Shaky footage has plagued the video production industry since the advent of the camera. No matter how expensive or high-tech the camera, trembling and unbalanced footage from unsteady hand movements and camera movements are inevitable. Many video enthusiasts and camera operators have addressed this problem with tripods, gimbals and Steadicams. But even camera gear can face unforeseen judders from wind or bumps — not to mention most camera gear can be expensive. So, if you're looking for an affordable and easy way to correct shaky video, video stabilizer apps are the best hassle-free solutions for fixing distorted footage.

### What is video stabilization?

Video stabilization is a video processing procedure used to remove shakiness in video.

In video footage captured with handheld recorders, such as Android phones, iPhones or cameras, vibrations or shudders due to shaky hand movements makes it challenging to trace focal objects or isolate details from the scene you're shooting. Ultimately, video stabilization algorithms compensate for this by eliminating the effect of the high-frequency motion of the camera. Video stabilization methods preserve suitable visual clarity and steady video footage.

Let's look at some of the apps and software that make this possible:

### Adobe Premiere Pro CC

When it comes to video stabilization software, Adobe Premiere Pro is one of the most powerful and versatile tools around. Its Warp Stabilizer effect smooths out undesirable camera shakes with a few simple clicks and fine-tuning precision, so you get the look and feel you want. Premiere Pro helps stabilize shaky footage shot on anything from Android smartphones, drones, GoPro cameras and handheld cameras. Fixing shaky footage in Premiere Pro requires a few steps. First, bring the video clips you want to stabilize into Premiere Pro:

1. Select File > Import from Media Browser.
2. Right-click the file in the Media Browser and select Import.
3. Drag the file from the Media Browser into the Project panel or drag the file from the Media Browser into a timeline.

Then, apply the Warp Stabilizer effect to the shaky clip:

- Select the clip you want to stabilize
- In the Effects panel, choose Distort > Warp Stabilizer.
- Apply the effect by double-clicking or by dragging the effect to the clip in the timeline or the Effect Controls panel.

Keep in mind that if you decide to use Premiere Pro to edit your shaky

footage, Warp Stabilizer is a time-consuming process that takes up a lot of memory. You can continue to work in Premiere Pro during processing, but your system will be slower.

### Apple Final Cut Pro

The stabilization feature in Apple Final Cut Pro reduces camera motion in your video so that shaky parts can be played back more smoothly. Final Cut is ideal for stabilizing video on macOS. It allows you to isolate the problem section by cutting the clip with the Blade tool in the timeline, then applying the correction to the video footage that needs tweaking. It's a simple and straightforward process. You can adjust how much modification is added using the stabilization feature.

1. Select a clip in the timeline, then open the Video Inspector.
2. Select the checkbox for Stabilization or Rolling Shutter.
3. When you turn on stabilization, the checkbox turns blue, and Final Cut Pro evaluates the clip for the best stabilization process.

The downside to the software is that it's exclusive to macOS and iPhones only. But its strength lies in its simplicity of smoothing out a clip's shakiness by correcting stabilization, rolling shutter or both. You can turn the stabilization on or off during editing, allowing you to choose the most appropriate stabilization method — either InertiaCam or SmoothCam.

### Blackmagic Design DaVinci Resolve

Blackmagic Design DaVinci Resolve is another software application you can use to stabilize shaky footage. It's one of the most renowned software programs in the market, and, to use it, you need to know what you're doing. But if you've used it before or are confident in your editing skills, DaVinci Resolve has the pro-level tools to do the job. The process is simple:

1. Import your video: Start by opening your shaky clip with the software and adding it to the timeline.
2. Pick the stabilizing tool: Highlight your clip, switch to the Inspector tab and open the Stabilization submenu.
3. Get rid of the shakes: Choose the stabilization mode and hit the Stabilize button. And there you have it.

DaVinci has the tools to effectively remove shaky footage if you prefer editing on your PC; however, it's a complicated program to navigate, so consider whether learning the program is worth the time investment.

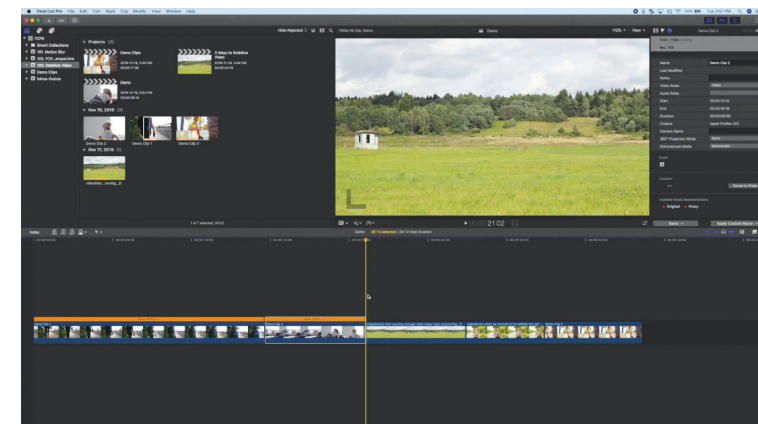


Image courtesy: Serge M

### Apple Final Cut Pro

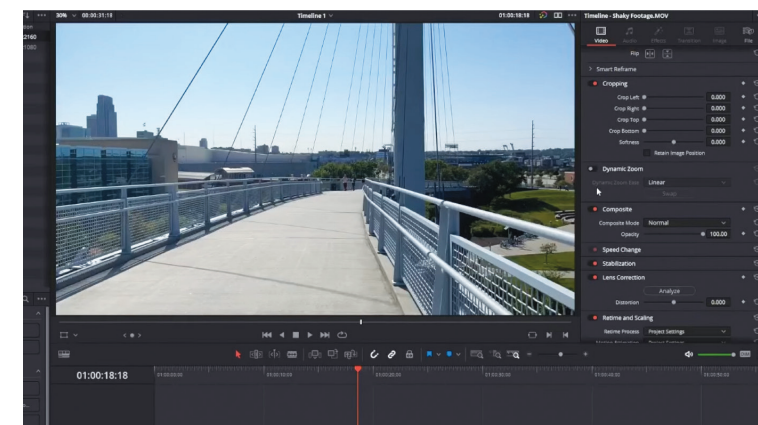


Image courtesy: Timothy Vallier

### Blackmagic Design DaVinci Resolve

### Emulsio

Emulsio is an iOS-based application widely used for smoothing out shaky footage in iPhone, iOS and Android cameras. You can import videos from anywhere, adjust the stabilizer strength, trim footage, play both the original and stabilized videos simultaneously, share edited videos via social media, and so much more. To begin:

1. Open your shaky cam footage. Navigate to the video reel on your iPhone to find the clip you want to fix.
2. Process your video. Now, let the application analyze your footage and stabilize it right away. And you're done.
3. After editing, you can export the video to several compatible applications or save the results in MP4 or MOV formats.

The strength of this app is its ease of use. There is both a free and premium version. The downside to the free version is that you cannot remove the watermarks. Both versions are easy to use, as mentioned; however, you're still limited when tackling significant footage that requires a more robust app for stabilization.



Image courtesy: Gaku Lange

### Adobe Premiere Pro CC



by Tiffany Harness

# 7 exercises for screenwriters

If you want to become a better screenwriter, then you're going to have to practice. Do these seven exercises to become a better screenwriter.



Whether you're a seasoned writer or just starting out, there's always room to improve your screenwriting craft. Writing requires constant practice and dedication, especially in the fiercely competitive realm of screenwriting. Screenwriting is a skill that demands continuous practice and dedication. To become a proficient screenwriter, commitment to honing your craft is vital. Incorporating targeted exercises into your routine can elevate your screenwriting skills and develop your storytelling ability.

Here, we have seven exercises to help you become a better screenwriter. So grab your pen and paper; let's begin.

## Why screenwriting practice is important even if you're a seasoned writer

For a seasoned writer, it's tempting to become complacent. However, practice remains crucial for all writers, regardless of their experience level. Continuous practice helps you prevent falling into bad writing habits or becoming stagnant. It creates an opportunity to experiment with new techniques, styles, genres and formats. By doing so, you sidestep creative ruts that can undermine your overall confidence in your abilities. Moreover, practice can enhance your productivity by making the act of writing feel more natural and fluid. This leads to faster drafting times and fewer obstacles in shaping your story. Practice also serves as a mechanism to identify and strengthen weak spots in your

work and promotes a healthy detachment from your drafts. This is helpful when you try selling your scripts, as most scripts are changed once sold.

Consistent practice, even for an experienced screenwriter, ensures continued growth in writing abilities over time — resulting in better stories. For screenwriting novices with a lot to learn, these exercises will take you far.

## Exercise 1: Writing prompts and stream-of-consciousness

Writing prompts are ideas or topics that give screenwriters a starting point. They can be specific, like "write a scene where two characters argue over dinner," or broad, like "write a story about love." Challenging

## WRITING REQUIRES CONSTANT PRACTICE AND DEDICATION ...

yourself to write on different topics and themes will stretch your creative muscles and spark new ideas.

Stream-of-consciousness writing involves writing without stopping or censoring yourself. The idea of this

exercise is to allow your thoughts to flow freely onto the page. This technique, used alongside writing prompts, can help you discard self-judgment and explore new ideas for your characters. Try out The Most Dangerous Writing App if you'd like to get started with stream-of-consciousness writing.

Try these exercises out if you have trouble getting started or want to flex your creative muscles.

## Exercise 2: Script analysis

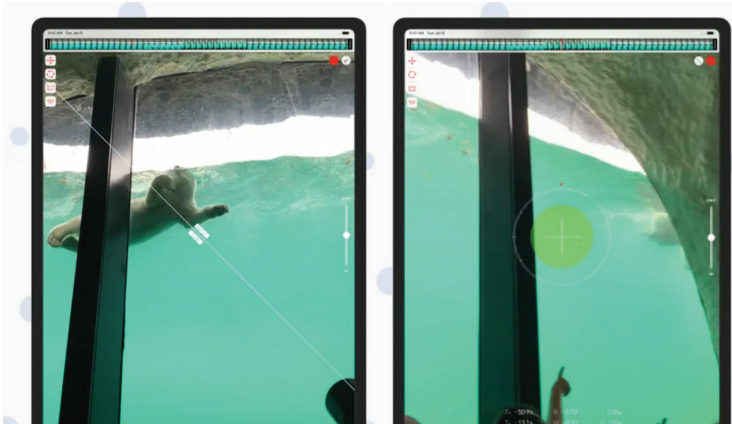
Script analysis, a vital exercise for screenwriters, involves studying and analyzing existing scripts to grasp what makes them work. This exercise helps writers develop a critical eye for storytelling and structure.

Begin by selecting a script that aligns with your interests or chosen genre. Alternatively, pick one you wouldn't usually find appealing for an added challenge. Read through it several times, taking note of the story's arc, character development, dialogue flow, pacing and scene transitions.

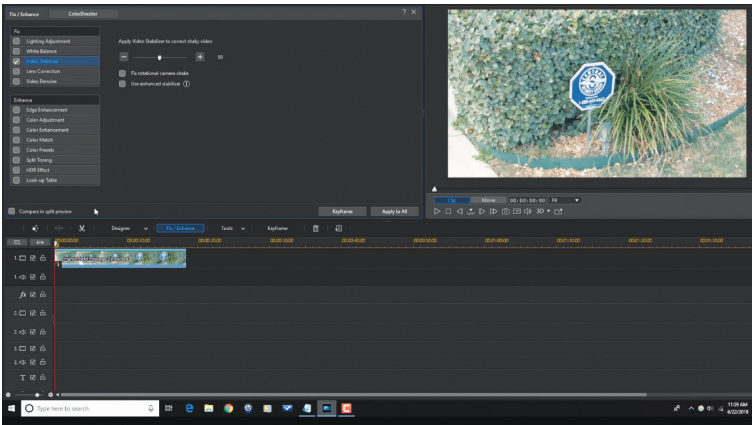
Next, assess every script element in detail. Evaluate its tone, setting and mood. Determine whether it meets market standards. Identify clichés or tropes and consider why these elements work well or not within the narrative.

## PowerDirector

This popular app is iOS, Android and macOS compatible and comes with multi-track editing and a built-in video stabilizer that includes strength adjustment to eliminate camera shake. PowerDirector has one of the most effortless editing processes:



Emulsio



PowerDirector



Shaky Video Stabilizer

1. Open the app in Full Mode and add the video you want to stabilize to the timeline.
2. Open the Fix/Enhance menu with the video selected.

Under Fix, check Video Stabilizer and your video will automatically stabilize. If you plan on working with large files, PowerDirector tends to render videos slower.

The upside is that PowerDirector is free.

## Shaky Video Stabilizer

The Shaky Video Stabilizer app is for Android phones and is compatible with several video formats. It allows you to watch before and after video clips to see how the footage looks before editing and after editing. Unlike other free apps for Android, it doesn't have watermarks on edited videos. You can eliminate shaky video from several supported video formats, such as MP4, MKV, etc. That's one of its greatest tools. You can also choose to work offline. Keep in mind that this app is ideal for shooting videos primarily with an Android phone. To get started using the app:

1. Open your video in the app: Grant access to your gallery. Then import the video clip you want to stabilize.
2. Launch the stabilization process and use the Background or wait. After the video stabilizes, save the results and then compare the before and after videos to observe the improvement.

## Shake no more

Shaky footage can make or break a video. It can distract viewers' attention, appear unprofessional and even leave people feeling dizzy. Selecting the video stabilizer app with the best features for your shoot gives you the perfect tool for fixing camera shake. There are plenty of apps out there today that can help you edit any video with ease. So, whether you're editing videos on Windows or Mac computers, your iPhone or Android or online, a video stabilizer that produces high-quality video results and offers a large variety of format support can turn your next project into something impressive. Choosing the right video stabilizer app or software can enhance your video production quality and ensure your content stands out from the competition. Don't let shaky footage ruin your video; use these tools to create a smooth and professional-looking final product.

Stephen Mandel Joseph is a published, professional writer and director of several Sci-Fi 3D animated shorts and a short drama film.

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Many successful films mix genres, such as the horror comedy "Shaun of the Dead" (2004). Image courtesy: Rogue Pictures

Reviewing films adapted from books into movies also benefits this exercise. It helps you see how one medium informs the other. Analyze the creative choices regarding plot event adaptation. Consider what you might do differently.

### Exercise 3: Genre exploration

Exploring different genres is a great exercise for screenwriters. It can help you expand your writing skills and enhance your storytelling capabilities. Analyzing these scripts will show you how the plot develops, what kind of characters

CONTINUOUS PRACTICE HELPS  
YOU PREVENT FALLING INTO  
BAD WRITING HABITS OR BE-  
COMING STAGNANT.

are involved and how dialogue flows within that specific genre. You will gain insight into the conventions of each genre and develop a broader repertoire to create unique stories.

Try experimenting by combining two different genres in one script. For instance, meld horror with comedy or romance with sci-fi. This experiment could lead to something entirely original and unexpected.

## Exercise 4: Character development

Character development is pivotal in screenwriting. Characters must be three-dimensional and relatable. Understanding their backstory, motivations and flaws inform their decisions throughout the story.

To develop well-rounded characters, start by identifying their goals and conflicts. What do they desire? What obstacles do they face? How will they overcome them? These queries will help you create a character arc that resonates with viewers.

Give your characters unique quirks or traits, setting them apart from others in the story. This addition makes them more memorable and adds depth to their personalities. Also, consider how your characters interact with each other. Character relationships should be complex and dynamic, mirroring real-life interactions. Avoid stereotypes when developing your characters. Strive for originality while maintaining relatability.

### Exercise 5: Dialogue practice

Dialogue brings characters to life and propels the plot forward in any great screenplay. However, crafting convincing and engaging dialogue can challenge even experienced screenwriters.

Dedicate time to observe real-life conversations around you. Note authentic speech patterns and word choices. These observations will help you write more realistic dialogue. However, note that while it's important to write realistic-sounding dialogue, film dialogue trims the filler language real-life conversations typically have. While it's important to make sure your characters are believable, you must make what they're saying interesting and serve the story somehow. Also, give each character distinct speech styles, tones, pacing, vocabulary and colloquialisms.

Other details to monitor include subtext, humor, conflict and tension in the conversations. The more you practice writing dialogue in various contexts, the better equipped you'll be to write dynamic, engaging scenes.

### Exercise 6: Adaptation exercise

Adaptation exercise is an excellent way to hone your screenwriting skills. It involves adapting a novel, short story or real-life event into a screenplay. This exercise allows you to practice storytelling and understand how to translate written material into visual terms.

One of the benefits of this exercise is that it helps you break away from your usual writing habits. When working on original content, writers often draw inspiration from personal experiences, limiting creativity due to attachment to personal truth. However, adapting someone else's work or story allows more room for interpretation and experimentation.

Remember, no matter how good the source material might be, it's up to you, the screenwriter, to turn it into compelling on-screen content.

## Exercise 7: Reimagining

A micro-trend in the production world lately offers an additional mode for practice: Reimagining outdated scripts or stories. Take, for instance, Netflix's miniseries "Hollywood" (2020). It combines several known real-life characters from Hollywood's murky history, adds a few fictional characters, then reimagines the stories with updated themes. It creates an alternate vision of how history might have been without the rampant bigotry, racism and sexism that permeates society.


One approach is to reimagine a popular story from a different angle. Consider changing the genre, setting or even the protagonist's personality traits to see the impact on the overall narrative.

You can also retell it from a different character's perspective, playing with the "two sides to every story" concept. For example, how would

the story of your favorite film change if the supporting actress became the main character?

### Cut and scene

Successful screenwriting involves a willingness to take risks. By following these seven exercises — writing prompts and stream-of-conscious writing, script analysis, genre exploration, character development, dialogue practice, adaptation exercise and reimagining — you'll grow into a stronger writer. You'll enhance your ability to craft compelling stories for television or film screens.

The journey to becoming a better screenwriter never truly concludes. There's always room for growth, improvement and exploration. That's what makes it writing an art form of endless possibilities. 

Tiffany is a professional writer and B2B relations specialist. She has a background in procurement, sales, marketing and management.

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by Jaymee Minner

# Should videographers fear AI?

With all the buzz surrounding all the AI engines and new tools available, how should videographers approach this new technology?



Artificial intelligence is the next significant technological frontier. With all the buzz surrounding all the AI engines and new tools available — ChatGPT, Dall-E, Midjourney, etc. — it's a frontier that creatives and studios are charging toward. Along the way, we're witnessing new techniques and ideas materialize so rapidly that we're barely prepared to address the technological facets, let alone the philosophical and psychological.

## Where the power lies in AI technology

For all the excitement about what AI could bring, we're still at a point where the power of AI resides in people's capacity to do more independently. This idea is at the core of the Institute for Experiential AI, part of Northeastern University's AI initiative. Their motto, "AI with a human in the loop," ensures the ethical issues of AI are tackled directly in AI solutions creation.

In a quick primer, AI's strength lies in its capacity to process massive amounts of data more efficiently than humans. Feeding AI the correct data type is crucial in establishing a proper pipeline for effective AI use. This makes AIs excellent at data prediction, repeating simple concepts and making quick work of menial tasks. ChatGPT, likely the most famous AI as of this writing, is a generative AI that uses large language models to generate text.

Essentially, it's a database of words. Meanwhile, Midjourney, an image-generating AI, creates and manipulates images and photos on demand.

Despite all this new technology, the central questions remain:

What does this mean for individuals, particularly video creators and creative professionals?

## A brave new world for video creators

In short, an AI engine can help you write scripts faster. It can also quickly gather data, make informed predictions and decisions and save editors time on edits. However, it can't create a video, like a commercial, out of thin air. Not yet. And even if it could create a flawless commercial entirely on its own, it's more a conglomeration of past commercials. This doesn't guarantee future success. If you doubt that, see the "Pepperoni Hug Spot" or recent AI-generated beer commercials that lack basic human physiology.

Some suggest viewing AI as a "stochastic parrot." This views AI as a tool that will provide data results that are closer to being correct without understanding the value of what it's giving

to you. For example, AI can produce a grammatically correct sentence or word set, but it will lack the meaning behind those words. This is where the human aspect comes into play. People edit the work of AI, giving meaning back to the words. Ultimately, it enhances the capacity of a single person. It can help an editor key a scene, needing just a few final tweaks at the end to ensure accuracy. The saved time here can be a game changer in many aspects of creation and multimedia.

This seems particularly relevant with the 2023 Hollywood writers' strike. Besides pay rate, studios' use of AI tools for scriptwriting is a major concern. Whether studios agree or not, the coming wave of AI-generated scripts will allow for writing and editing scripts in faster and more meaningful ways. A writer will be able to "punch up" content much faster than the traditional process alone. Many artists are now beginning to worry about adapting to new tools.

## Tools for video creators

For video creators, tools like Wave's Clarity VX rely on AI to eliminate background noise and enhance primary au-

dio for interviews. eMastered also aids with mastering audio for albums and music, using filters that mimic popular hits. Wonder Dynamics inserts, lights and chroma keys CG characters into scenes with a mouse click. This saves days or even months of work for artists. Autopod creates quick podcasting edits based on the video microphone selection to streamline multicamera editing. Murf generates AI voice-overs that offer tools to enhance stress on syllables. Adobe even uses an AI in its transcript tool, which provides a near-perfect transcript of videos directly in Adobe Premiere Pro. Adobe is also rolling out image generation in Photoshop, enabling people to quickly correct or enhance photos.

There is a multitude of other tools taking shape. And they all can save time for creative professionals. These tools don't eliminate the need for artists. Instead, they empower you to accomplish weeks or even months' worth of tasks and edits in a matter of days or hours.

## The creative process still needs artists

Artists will gain more control and command over their tools, and new toolsets will enhance their creative abilities. Human touch is still required at the heart of creation, and the "human in the loop" ensures the vision is articulated as it needs to be. You still need a person to finalize the script, film the video, create the base audio, select the loops and dictate what the media, direction and creative process will look and sound like. The near-perfect transcript isn't entirely accurate and requires someone to review it. However, you can accomplish these tasks with fewer people and in less time. This is good news for independent creators with limited budgets. At the same time, it impacts those in the industry who are constantly buffeted by change and developments as the industry evolves. The shuffling of effects studios, the development of new tools and the rise of new techniques have been constants in some creative industries as the popularity of certain types of movies has grown.

## AI will continue

The reality is that AI will continue to develop and advance. This prospect may excite smaller creators looking to accomplish a multitude of tasks much quicker than before. Conversely, larger shops may feel threatened by the potential reduction in workload. Yet, the nature of video creation and multimedia business is inherently tied to the expanding field of technology. When DSLRs emerged, videographers rejoiced because it allowed them to capture cinematic video at a lower cost. The introduction of non-linear editing systems like Premiere and Final Cut Pro was warmly welcomed. It allowed instantaneous timeline editing and rendered traditional film cutting nearly obsolete. Remember when cameras had just one memory card slot? Today, they often feature two or more, along with backup options, to ensure proper recording.

As we continue developing new technologies and techniques, they become integral to the evolution of technology and creativity. We strive to create more magical content, tell richer stories and provide broader access to tools that enable everyone to share their unique vision. As we continue to develop new technologies and techniques, it's part of the evolution of technology and creativity as we strive to produce more magical things, tell greater stories and increase access to tools that allow everyone to express themselves.

It's a bold and brave new future, one that we'll have to continually adapt to and learn from as we grapple with the new ideas transforming our world. Only time will tell how these advancements will improve our lives and how we will employ these new storytelling tools in our productions. [U](#)

Jaymee Minner is a video professional with 18 years of experience in corporate, health care and educational content creation.

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by Ricky Anderson II

# Directing performers correctly

As the director, your job is to steer your actors toward emotionally rich, convincing performances. So, what is the best way to communicate your desires to your actors?

As a director, you play an integral role in getting the best possible performance out of your actors. You must guide them through the creative process and give them the necessary tools to bring their characters to life. You must identify what works best for each actor, as everyone has unique strengths and weaknesses. Understanding different techniques to evoke a particular emotion or feeling in a scene is crucial. By understanding how actors work, you can ensure that your cast delivers top-notch performances for your project. Let's explore how you can direct your actors to bring out the best possible performances.

## Know the script

Knowing the script inside and out is one of the most essential components in directing actors. As a director, you must be able to communicate the script's story, character motivation and story arc. Since most productions are shot non-chronologically, informing actors of their position in the story is vital. This foundation allows you to answer any questions actors may have about the emotions and larger story their scene is connected to.

## Building a healthy performer-director relationship

It's vital to establish a healthy actor-director relationship. Many first-time directors make the mistake of thinking that actors are just order-takers. However, actors, like directors, also have a creative vision for their characters. It's your job as a director to work with the



actor to bring your vision to life. This all begins with mutual trust, respect and open communication.

### Trust and respect

Establish clear expectations and goals from the beginning to maintain a collaborative atmosphere throughout the production process. The director should create a safe and supportive environment that allows actors to take risks and explore their characters' emotions and motivations.

### Communication

Great directors are excellent communicators. An effective director should communicate their vision clearly to the actors while also being open to their ideas and input. As a director, you want to provide constructive feedback and direction that helps actors achieve their best performances without being overly critical or negative.

When communicating with an actor, avoid line reading — where you repeat the actor's lines how you want them to say them. Giving actors information about the subtext behind the line is more professional and empowering.

Example:

- Do say this: "Can you emphasize 'not,' almost like you're annoyed instead of frustrated at Hellen?"

- Don't say this: "Say it like, 'Hellen, you're not listening to me.'"

## Rehearsals

Rehearsals are a critical part of any successful film production. They offer the actors and crew the opportunity to work together, iron out any issues, and ensure everyone is on the same page. With rehearsal, productions can practice cohesion, continuity and timing. Here are a few rehearsal techniques that best help the actor.

### Table reads

Table reads involve the actors and director sitting around a table and reading through the entire script together. This gives you, as the director, an opportunity to hear how the dialogue on the page sounds when read by the actor. It also allows the actors to get a feel for their lines' pacing, timing and context.

### Blocking

Blocking is the process of deciding and directing where the actors will stand and move during each scene. This is a physical rehearsal for what movement will happen at different parts of the scene. As a director, it's your job to connect action and emotion to the scene. Stage directions, stage business, props and even prox-

imity to their scene partner heavily influence an actor's line delivery.

### Walk-throughs vs. run-throughs

A walk-through is a rehearsal in which a scene is performed in sequence, and actors can work out timing, lines and blocking. The goal of the walk-through is to rehearse the full scene in sequence. It's called a walk-through because it's typically done at a slower pace, and the director may still give notes as they work through the scene. A run-through refers to performing the entire scene from start to finish, complete with wardrobe, props and an operating camera, without interruptions. Many people call this the final rehearsal, as it helps you grasp the timing and pacing before the filming begins.

## On-set tools

### Improvisation

Improvisation is an incredibly valuable tool for getting natural, authentic performances from actors. Improvising typically involves going off-script and allowing the actors to use their own words in the scene while acting and reacting in character. It's important to note that improvisation still requires a director's direction. You will still need to provide the emotional direction and the objective for the end of the scene. This helps actors respond more authentically to the emotions and actions of their scene partners, bringing a greater sense of realism to their performances.

### Memory exercises

Directors can incorporate memory exercises into rehearsals to help actors access their emotions and connect with their characters. These exercises can include asking actors to recall specific memories or experiences from their own lives that relate to the scene or character. Directors can also guide actors in focusing on sensory details or body sensations to trigger emotional responses. By incorporating memory exercises into rehearsals, directors can help actors deliver more authentic and nuanced performances while also creating a supportive and collaborative environment on set.



Table reads present opportunities for actors to get a feel for their lines' pacing, timing and context in the overall narrative.

### Emotional recall

Emotional recall is a powerful directing tool that can deliver powerful performances, but it can also take a lot out of an actor. As the name implies, emotional recall involves guiding actors to recall specific emotions from their personal experiences. Rather than instructing, "This scene is sad, so we'll need you to cry," an emotional recall direction would be phrased as "The character needs to cry in this scene; can you access a personal emotion that might bring you to tears?" Because of the personal nature of the emotional recollection, the actor brings authenticity and depth to their performances.

As previously mentioned, the success of this approach relies heavily on establishing solid trust between the director and the actor. As a director, you need to encourage the actor to identify specific moments or events in their lives similar to those in the script. The actor can then use those memories to trigger the appropriate emotions and behaviors for the scene.

As a director, you must create a safe and supportive environment for the actor to explore their emotions without feeling overwhelmed or triggered. Sometimes this looks like letting the actor have some time alone away from the set or even having everyone except for the director leave so the actor can feel safe to express themselves in such a vulnerable state. The director

should also be sensitive to the actor's emotional state and provide guidance and support as needed.

Guiding actors through emotional recall can result in powerful performances, but handling it with care and sensitivity is crucial to prioritize the actor's emotional health.

Be aware that different schools of thought regarding highly emotional scene work exist. Some actors use their personal experiences in their acting, as shown above, while others are trained not to rely on their own lives for inspiration. Finding the emotional resources to cry in a scene is mainly the internal work of the actor. Often, professional actors won't need much help at all.

## Foster a healthy actor-director relationship

Overall, a healthy actor-director relationship leads to a successful film production. Various methods to direct scenes empower actors to perform at the height of their capability. It requires patience, dedication and hard work from all parties involved, but the result can be a beautiful and compelling work of art. 🎬

Ricky Anderson II is a Texas-based video producer and editor with over 10 years of experience in creating engaging and entertaining videos online.

You can read this article online by going to: [www.videomaker.com/?p=85155](http://www.videomaker.com/?p=85155)



by Antonio Pavlov

# Free software for video creation

Are you need to making videos?  
Or are your videos not getting  
noticed? You can use free soft-  
ware to make great videos and  
get noticed online.



New filmmakers often have questions: How can I get my projects noticed by the right people? How can I stand out among other filmmakers putting out their own work? While there are multiple ways to answer these questions, this article will focus on one main method: software. In the past, many filmmakers (including myself, the author of this article) wondered how to transition their ideas from paper to screen without access to necessary tools for editing, visual effects and so forth. Well, today, that problem is a distant memory. So sit tight; we'll show you the many free software and tools available to you to get your videos noticed.

## Free software for writing and planning your film

Every film begins with an idea. But before it can become a film, that idea needs to be turned into a script. Theoretically, you can use any writing tool for scriptwriting. But if you want to learn how to format a script properly, then you'd best use an actual script-writing tool. Luckily there are many options to help you do this. While professional, costly programs like Final Draft are available, excellent free options such as Arc Studio exist.

Arc Studio is a great free tool for writing a script that allows you to professionally format your screenplay, color code it and arrange it in a way that best communicates your story. Although Arc Studio offers a paid service, you receive two free projects. This is incredibly useful if you're new

to filmmaking and want to focus on one project at a time. There's a Windows and a Mac app and a browser version, allowing you to write your script from anywhere.

Once your script is ready, the next step is planning your project. A great tool for this purpose is Milanote, an intuitive organizational tool that allows you to visualize your ideas

## ALWAYS LEVERAGE THE POWER OF AFFORDABLE TECHNOLOGY ...

on boards. Milanote offers various templates for different projects, from books to film and TV, including storyboard templates, character pages and mood boards. You can import external notes, images and links to further enhance your project, and once your visualization is complete, you can export your board as a PDF to share with collaborators.

## Free production software

Now that you have a vision your project, it's time to film. But let's

say you don't have a professional film camera; then what? There are several apps out there that are made specifically for filming or assisting with filming to help you get the shots you want. One such app is the Protake Mobile Cinema Camera. This free-to-download app is similar to professional film apps like Filmic Pro, offering you full control over your focal range, exposure and contrast. It even allows you to hardbake a color profile or LUT while filming. It's an incredibly versatile app and will be the perfect tool to capture high-quality professional content on a lower budget.

Additionally, Protake offers two modes: auto and pro. The auto mode allows you to use your phone more freely, letting the app manage aspects like auto-focusing, lighting and applying color profiles to achieve your desired look. In contrast, the pro mode grants you greater control over your shots, enabling you to set your own focal range, exposure, etc.

One exceptional feature is Protake's Wi-Fi monitor, which broadcasts the image from your phone to up to two devices, letting you see what's being filmed from a remote location. Say you have a friend who

is great at filming, but you still want to see everything as it's being filmed. With Wi-Fi monitoring, you can view your friend's recording on your device.

## Free software for video editing

There are several different programs that filmmakers and content creators prefer for post-production editing. If you're looking for a powerful yet cost-friendly solution, consider DaVinci Resolve from Blackmagic Design. Many large productions, like Disney and Marvel, use this software to cut high-end productions. Now, this may lead you to believe it's an expensive program. While Blackmagic Design does offer a paid version of Resolve, the base version of Resolve is completely free. You can assemble multilayer tracks for both audio and video, color grade and correct your footage and export and conform your edits for various online platforms. The user interface is neat and straightforward. You set up a project and begin editing immediately.

One thing that definitely helps you get noticed in today's world of content creation is the "look" of what you put out. Many people will base their opinions on content depending on how it looks, which is where color grading comes in. Color grading is the art of adjusting the colors, exposure, contrast and other factors that play into the feeling and style of a film. Depending on the setting of your shots or scenes, the grade will change to represent them. This is where DaVinci Resolve really shines. No other free editing applications come close to Resolve in the color grading department.

## What about visual effects?

A major factor that plays a significant role in getting new filmmakers noticed online is how they use visual effects. Today, visual effects tools have not only drastically improved over the years but have also become much more affordable and, in some cases, free.

Look no further than Blackmagic Design's remarkable visual effects tool, Fusion. It operates with a node structure similar to Nuke — the standard compositing tool for large visual effects vendors. However, Fusion features a simpler user interface and layout. Just like Resolve, the base version of Fusion is free. Moreover, it's available as a side tab in Resolve. This means you can switch to composite a visual effects shot and then return to your edit in one workspace. I can personally vouch for how seamless



Image courtesy: Blackmagic Design

It'd be hard to come by another free software as powerful and versatile as Blackmagic Design's DaVinci Resolve.

this is. I've been using Fusion to finalize shots on several feature films.

## Building an online presence with free software and platforms

Writing, planning, filming and editing your projects is one step toward getting noticed. The next crucial step is placing your work somewhere people will see it. Fortunately, it's easier than ever to put yourself out there and share your vision with the world. Video-sharing platforms like YouTube and Vimeo allow you to upload video content for free. They also feature a tagging system that can link your content to search terms related to your project.

Another factor becoming increasingly popular among content creators is short-form video uploads to social media sites like Instagram or TikTok. Over the last three years, short-form content from these sites has soared in popularity. You can leverage this to your advantage by using these sites as promotional tools. Attract people with a short video and lead them to longer video content elsewhere by including links in the video's description.

In addition to using these online platforms to upload your content, you can also create your website. An online platform of your own where people can visit, view other examples of your work and learn more about you as a filmmaker can be incredibly useful. While many options for website creation are paid, there are also many excellent free ones. Wix is one of the best and easiest website builders out there. They offer numerous beautifully created



website templates with various functions and capabilities. They also grant users total freedom to customize their websites.

### Free software for collaboration

Before you can start thinking about broadening your reach, you need to streamline your production process. Doing this will help you take on more work, make more connections and, in turn, lead to even more projects. Everyone loves to work with professionals who not only know how to meet deadlines but also know how to collaborate effectively. The best way to facilitate this kind of streamlining is to use tools to help you better organize and manage your projects. Let's look at a few.

#### Trello

Project management tools like Trello will help you do exactly that. Trello is a web-based Kanban-style list-making tool that lets you organize and categorize your projects. With a board-style layout (very similar to Milanote), you can lay out a map of your tasks and order them whichever way you plan to do them. Alternatively, you can create a "to-do" style list and tick off your tasks as you complete them.

Another great feature of Trello is that every card you create can have sub-cards created for it, allowing you to add more layers to your organization structure and helping you manage projects with many different elements.

#### Asana

Asana is another great project management tool. This flexible, web-based platform enables you

to plan, organize and manage your projects. You can create detailed task lists and set their priority or due dates. This helps you to keep track of your production timeline. Moreover, you can visualize your tasks in different ways, such as list view, board view (similar to Trello) or even as a timeline or calendar.

One notable feature of Asana is the ability to create subtasks within each task, allowing you to break down complex activities into manageable steps.

#### Slack


Slack is an instant messaging platform that allows you to create different channels for different projects or topics. It's a very efficient way of communicating with your team and keeping everything related to a project in one place.

### Networking with free software

After streamlining your production process, you now have more time to network. Building a strong network is crucial as a filmmaker. In today's digital age, there are numerous free software applications that can enhance your networking efforts. Platforms such as LinkedIn and Twitter offer immense opportunities for connecting with industry professionals. They allow you to share your work and engage with others. Using these platforms not only provides you with a way to showcase your work but also keeps you up-to-date with industry trends and involved in the filmmaking community.

For example, a strong LinkedIn profile can greatly increase your visibility in the filmmaking world and help you connect with other filmmakers, potential employers or clients.

### Put yourself out there

Getting noticed as a new filmmaker is no small feat, but with the right tools, approach and determination, it is entirely possible. Always leverage the power of affordable technology, continually refine and develop your skills and maintain a strong online presence. Also, network and collaborate with others in the industry, and most importantly, keep creating. 

Antonio Pavlov is a professional freelance videographer, writer, editor and VFX artist. He's most recently contributed to several feature films.

You can read this article by going online: [www.videomaker.com/?p=73019523](http://www.videomaker.com/?p=73019523)

by Kieran Fallon

# Using cohesive color palettes

Color is an incredibly effective communication tool not to be overlooked, and constructing a coherent color palette begins in pre-production.



Color is a powerful communication tool that can significantly enhance visual storytelling. With the rise of advanced camera sensors and accessible color correction and grading tools, the pressure is higher than ever for videographers to use color effectively. Constructing a cohesive color palette is essential for any video producer who wants to create videos that engage their audience and tell compelling stories.

Here's how to use color to enhance your storytelling.

### Understanding color theory

Color theory plays a pivotal role in video production. It helps you understand how colors interact with each other and the emotional responses they elicit. By using color theory to create a cohesive color palette, you can effectively convey emotions, moods and messages to your audience.

To dive deeper into color theory, there are several terms of color theory that you should first understand:

**Color wheel:** The color wheel is a tool that helps you understand the relationships between colors. It's divided into three categories: primary colors (red, yellow, and blue), secondary colors (green, orange, and purple) and tertiary colors (yellow-green, blue-green, red-purple, etc.).

**Color temperature:** Color temperature refers to the warmth or coolness of a color. The two primary color temperatures you'll work with in video production are daylight (5500 K) and tungsten (3200 K).

**Saturation:** Saturation refers to the intensity or purity of a color. Highly saturated colors are bright and bold, while desaturated colors are muted and subdued.

**Contrast:** Contrast refers to the difference between light and dark colors. High contrast can create a dramatic effect, while low contrast can create a more subtle effect.

### Starting in pre-production

The key to a successful color palette is planning. The more thought and planning you put into your color palette, the more effectively it will convey your message to your audience. In pre-production, you should consider locations, production design, costuming and lighting to determine your look. This will help you create consistent visual language throughout your video.

### Lighting techniques for color

Lighting is one of the most powerful tools at your disposal when achieving your desired color effects. There are several lighting techniques you can use to create a specific color palette:

**Color correction gels:** Color correction gels are filters you place over your lights to change their color temperature. They come in various colors,

and you can use them to create a wide range of color combinations.

**Dimming:** Dimming your lights can also help you achieve your desired color effects. You can create a more muted or subdued effect by dimming your lights.

**Color separation:** You can use color separation to help make a scene more dynamic. Emphasizing the warmth of skin tones against a cooler backdrop can be a great way to bring focus to your subjects. At the same time, the cooler backdrop will emphasize the divide between character and environment.

**White balancing:** You can also accentuate the color temperature of a scene with simple white balance adjustments. For example, lighting with daylight lamps and white balancing the camera to around 4300 K can accentuate a dull, sterile environment.

### The green/magenta axis

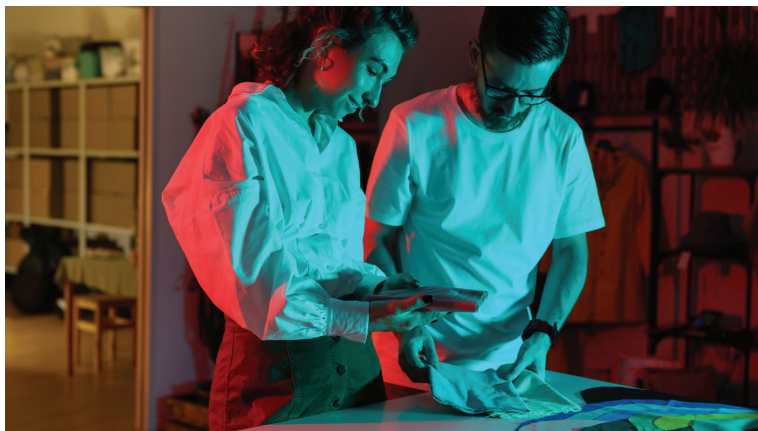
While many cinematographers think in terms of warm and cool tones, much of your mood can be defined by the green and magenta axis of the color vector wheel as well. You can achieve different looks and moods by playing with saturation and tint on the magenta axis. For example, desaturat-



Blackmagic Design's visual effects tool, Fusion, features a simple user interface, making it easy to pick up and learn.

Image courtesy: Blackmagic Design





The key to making a successful color palette for your video is to plan it beforehand. This involves considering locations, production design, costuming and lighting.

ing the magenta and adding violet can create a dreamy, ethereal effect.

**The look must serve the story**  
Regarding cinematography and color grading, your look must serve the story. It's not enough to create a visually stunning video without effectively conveying your message. Your color palette should be an integral part of your storytelling, helping to evoke emotions, create atmosphere and convey meaning.

Autumn Durald, a well-known cinematographer, has said that being a great director of photography is not about making something look great but ensuring the look fits the scene's emotion and supports the story. This sentiment applies to color grading as well. The goal of color grading is to draw the viewer into the story rather than pull them out. If the color palette is ineffective in conveying the intended message or mood, it will distract the viewer and detract from the story.

Color grading can be an intimidating process, especially for those who are new to it. However, it's important to remember that it's not about adding flashy effects or making your video look as polished as possible. It's about creating a consistent and cohesive visual language that effectively conveys your message and engages your audience.

**Tips for using cohesive color palettes in video production**

Here are some tips to help you create a cohesive color palette for your video production:

**Plan ahead**  
One of the most important things you can do to create a cohesive color palette is to plan ahead.

Start thinking about your color palette in pre-production by considering locations, production design, costuming and lighting to determine your look. This will help you create a consistent visual language for your video.

**Use color theory**  
Creating a cohesive color palette involves using color theory strategically. Begin by determining the emotions you want to express and select colors that evoke these feelings. Use the color wheel to choose complementary, analogous or triadic colors that enhance your primary color. Factor in color temperature, leaning towards warm or cool tones based on your narrative or setting. Decide on the saturation level for your colors — high for a bold look, low for a subtler feel. Also, consider contrast, with high contrast creating drama and low contrast providing a softer look.

**Experiment with lighting**  
Lighting is one of the most powerful tools at your disposal when it comes to achieving your desired color effects. By manipulating lighting, you can create depth, draw attention to significant elements in a scene or set a specific atmosphere. Start with the basic three-point lighting setup. But don't feel bound by this setup. Feel free to explore more dramatic or stylized effects. Low-key lighting, for instance, can deepen color saturation for a more dramatic, mysterious feel, while high-key lighting can wash out colors for a light, airy and comedic tone. Experiment with various light sources, like the warm hues of natural light or the cooler tones from artificial lights. Lighting, when used strategically, can be a powerful tool to underscore your narrative and accentuate your color choices.

**Consider the green/magenta axis**  
While many cinematographers think in terms of warm and cool tones, you can define much of your film's mood using the green and magenta axis. You can achieve different looks and moods by playing with saturation and tint on the magenta axis.

**Serve the story**  
When it comes to cinematography and color grading, your color palette must serve the story. Your color palette should be an integral part of your storytelling, helping to evoke emotions, create atmosphere and convey meaning. It's

important to ask yourself how your chosen colors support the story and its message.

**Practice, practice, practice**  
Color grading is a skill that takes practice to master. One way to practice is by analyzing other videos and films that you admire to see how they use color to enhance their storytelling. Another way is to experiment with different color grading software or plugins and try out different looks to see what you like and what works best for your project. The more you practice and experiment, the better you'll become at using color to create cohesive and impactful video productions.

**Mastering the art of color grading**  
Cohesive color palettes are an essential part of video production. They help to convey emotions, moods and messages to your audience effectively. By understanding the basics of color theory, experimenting with lighting techniques and serving the story, you can create a consistent and cohesive color palette that engages your audience and enhances



"Saving Private Ryan" (1998). Image courtesy: Paramount Pictures

your storytelling. With practice and experimentation, you can master the art of color grading and take your videos to the next level. [U](#)

Contributing editors to this article include Kieran Fallon and Steven Wetrich.

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# PRODUCTION TIPS

by Nicole Lajeunesse

## 5 tips for engaging short films

Short films are not just mini-features. They can be a great way to cut your video creating teeth and generally have an easier time getting accepted into film fests, so they are often seen as a stepping stone toward a larger production. However, it's important to understand that shorts have their own language and personality. An effective, engaging short film structure will necessarily differ from that of a feature length film, and the approach you take should reflect those differences. Here are some tips to help your short films pack a punch instead of falling flat.

### Ditch the three acts ...

If you're like many students of cinema, the three act structure has been hammered into you since Screenwriting 101. That's fine for a 90-minute feature that can be neatly broken down into beginning, middle and end, but what about a 10-minute short? Can you really sacrifice even 2 of those few minutes to laying out a complicated backstory? Instead, spend those precious minutes building out the core focus of your narrative — your character's primary dilemma.

### ... but don't neglect beginnings

Leaving behind the tried and true three act structure doesn't mean forgetting about a strong beginning. Start with a hook to draw your audience immediately into the story. Remember, there isn't time for a lengthy exposition, so find a way to let your audience get to know your characters fast, even when your story starts in medias res. For example, if your story takes place the morning after a big party, instead of actually showing the party, maybe it's enough for your main character to be stumbling through the early morning, still looking disheveled.

### Characters matter

Memorable characters are at the heart of the short film — or really any film. Whether documentary or narrative, humans care about other humans. We are intrigued by the struggles and joys that others encounter, but only if those others are presented as authentic and believable. For a concise and impactful short, focus first on developing character in order to find the shape of your story, then leave out anything that doesn't further that development.

### Play with time

Stories aren't always told straight through, start to finish. The condensed nature of the short film is especially conducive to non-linear storytelling, which can allow you to cover more information within a shorter run time. Even if you choose to present your story from beginning to end, leaving gaps in time is perfectly acceptable and can even add mystery and intrigue to your plot. Waiting to reveal details at the perfect moment builds suspense and engages your audience, making that surprise ending to your short that much more rewarding. Let your audience make the connections and enrich your story with their imagination.

### Think visually

Remember, in its essence, video is a visual medium. This is even more important in the context of the short film. Time is limited and minutes spent telling are minutes not spent showing. Dialogue, when needed, should be concise and expressive rather than expository. Take advantage of the filmic language to show your audience what they need to know. From the beginning, plan for maximum visual impact — from setting, to color, to shot composition. Each shot should be dense with story information.

A short film is not just a shorter version of a feature. To be effective, it must distill the most crucial aspects of the story and communicate them in the most succinct manner possible. This requires a compelling story with a gripping hook and memorable characters, told in a suspenseful, visually engaging way. [U](#)

Nicole Lajeunesse is a professional writer and a curious person who loves to unpack stories on anything from music, to movies, to gaming and beyond.

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