VIDEO PRODUCTION HANDBOOK



Steve Shlisky, Vina Cera, Misha Antonich, Christopher Clemens & Jennifer Vaughn
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Detailed Licensing

Licensing

*A detailed breakdown of this resource's licensing can be found in **Back Matter/Detailed Licensing**.*

CHAPTER OVERVIEW

1: Development

Learning Objectives

1. Become familiar with a variety of distribution outlets for video content.
2. Learn how to define your target audience demographics.
3. Gain an understanding of different methods used in single-camera and multi-camera video productions.

1.1: Determining Your Distribution Outlet
1.2: Understanding Your Audience
1.3: Production Styles
1.4: Video Formats

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1.1: Determining Your Distribution Outlet

Developing Ideas for an Audience

The development process entails gaining an understanding of your audience demographics and how they will access your content. Defining these concepts during development allows you to develop a marketing plan and distribution plan that have clearly defined why this project is relevant and who it appeals to.

Before you begin producing video content you need to determine how the content will be consumed by the audience. Will they watch your content on television on a local broadcast station? Will they watch your content online or on Social Media? It's possible that you want your audience to be able to access your content in a variety of formats. Let's start off by taking a quick look at a wide variety of distribution outlets available to content creators today.

Broadcast and Cablecast

Broadcast television commonly refers to national networks such as ABC, NBC, CBS, FOX, and The CW. The programming on these networks are nationally transmitted through local broadcast affiliates and can be picked up through a TV antenna. Viewers can also access network content digitally or through cable providers.

Because networks are nationally broadcast over public channels, they are subject to federal regulations and oversight from the **Federal Communications Commission (FCC)**. Broadcast networks primarily make revenue by selling advertising time during their programming blocks. That's one of the reasons why ratings and demographics are so important to networks, it allows networks to determine how much they can charge for commercial time on their programs.

Cablecast (or cable for short) gets its name by how it's transmitted to the viewer, through coaxial or fiber-optic cables. Unlike broadcast networks, cable channels such as Comedy Central, AMC, USA, TNT, FX, VICE, etc. are not tied to local affiliates, do not have the same regulations imposed by the FCC and have full control over their programming. These channels also make money through ad revenue and many have developed app's to make their content available through Over The Top (OTT) Platforms.

Premium cable channels such as HBO, SHOWTIME, STARZ, etc. require monthly subscriptions that can be added to your existing cable package or accessed digitally. Since these channels make their profit based on subscriptions and not ad revenue, they don't air commercials during their programming and can get away with much edgier content than broadcast and cable programming that is reliant on ad revenue.

Online Distribution

Over The Top (OTT) Streaming Networks such as Netflix, Amazon Prime, Apple+, Disney+ and Peacock, to name only a few, are continuing to rise in popularity and critical acclaim. During the 73rd Annual Emmy Awards the streaming giant, Netflix, took home 44 wins, topping all networks, cable providers, and premium cable providers. According to the LA Times, Netflix tied a record for most Emmy wins for a single platform set by CBS in 1974. The wins pushed Netflix well ahead of second-place HBO, which finished with 19 trophies, down from its platform-leading total of 30 in 2020. Each streaming platform has a list of specific requirements for its content, which includes format, resolution, and deliverables. Research the platforms you are interested in providing content for and make sure you are able to meet the standards of their submission requirements, many platforms require content to be shot at delivered in 4K resolution.



Figure 1.1.1: Remote Control with Netflix on TV (Pixaby License; Image by Afra32 via Pixabay)

Livestreaming is used for a variety of needs across many different platforms. Online video distribution platforms, such as YouTube and Vimeo, allow hosts to livestream content to their audiences and interact in near real-time. There are entire channels dedicated to livestreaming content, such as Twitch, which began as a livestream platform used widely by gamers. It expanded to other categories in 2020, including music, art, and IRL (In Real Life) streaming. which is basically livestreaming any activity that is not video gaming or business-related. Twitch has a very robust chat feature that allows livestreamers to manage audience participation, and receive subscriptions or gifts. There are several ways to monetize live videos on Twitch, including donations and ads. Understanding how users interact with different platforms can help you create content that is engaging and oftentimes profitable.

Podcasting continues to expand with more and more listeners each year. Advertising companies and marketers are allocating a greater amount of their media budgets to podcasting as the audience continues to grow. According to Forbes Magazine, 37% of Americans (age 12+) listen to at least one podcast each month, up from 32% in 2019, an estimated 100 million people; and that number is expected to jump to 125 million in 2022. Podcast listeners have a median age of 34, younger than broadcast radio (47) and network television (57). Although podcasting is primarily an audio-based platform, there are many podcasts that incorporate video production and livestreaming into their shows.

Social Media Networks each have their own streaming platform built into their app. Facebook Live, TikTok Live, Instagram Live, and Twitter all have livestream capabilities that allow their content creators to stream in real-time and interact with their audience through the chat feature, although each app has its own limitations. Currently, you can only go live on Instagram through a mobile device. On TikTok, only accounts with 1,000 or more followers have the capability to livestream on the TikTok platform. And TikTok Live videos aren't recorded, which can make your content have the appearance of being more exclusive.



Figure 1.1.2: Social Media Network Logos with splashes of color (Pixaby License; Image by Geralt via Pixabay)

Client-based videos are produced for a client who is paying for your services. This can range from wedding videography to corporate video, and everything in between. Client-based projects are a great way to start building your business and portfolio.

Make sure to have important conversations about development and distribution with your clients before you create a project estimate or sign any contracts.

Ask your clients these vital questions:

- Who will watch this video?
- How will they watch it?
- Will they need recurring access to the video?
- Do you need to make duplications or derivatives of the video?
- Does your video need subtitles or closed captions?

The answers to these questions will help you determine how you produce the video and how you will finalize the deliverables.

Film Festivals

Film Festivals are a great way to have your work viewed by a larger audience. If you are producing a documentary or narrative film you should research film festivals to which you may want to enter your video. Be sure to look at the specifications for prior distribution; many festivals will not accept submissions of video content that has already been posted on a video platform such as YouTube. You can view submission requirements and submit your film for festivals all over the world using FilmFreeway.com

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1.2: Understanding Your Audience

Defining your Target Audience

Your **target audience** refers to a specific group of consumers most likely to view your content or want your product or service, and that often indicates the group of people who would be most impacted by your ad campaigns. Understanding your target audience may also be useful in determining which online platforms to use to best reach your audience. If you don't know your target audience, start off by doing some brainstorming and research:

1. Create an ideal customer or viewer profile. Define the people who are most likely to view your content.
2. Conduct market research in the form of surveys or focus groups to gather interest.
3. Research your competition, see what is already being produced in this area.
4. Put out sample work or a teaser and use tools such as Google Analytics to see who is engaging with your content online.



Figure 1.2.1: Over the shoulder view of Man looking for streaming content (Pixaby License; Image by Mohamed_Hassan via Pixabay)

Demographics

Audience **demographics** are a way of categorizing statistical information about your viewers, such as age, gender, household income, education, location, etc.

Understanding these characteristics of your audience is critical for marketing campaigns. There are companies that specialize in gathering statistical data on audience demographics, such as Nielsen, which measures activity and engagement across a variety of platforms, from TV screens to smartphones. This data is used for determining who is engaging with the content and projecting which type of commercials will likely be most effective for this group of audience members. Social media networks are studied for their demographics to determine how many active monthly users are engaging with the platform and how often each day they are actively using the platforms.



Figure 1.2.2: Man and Woman looking for content on a laptop (Pixaby License; Image by OmarMedinaFilms via Pixabay)

Audience Gratification

After you have determined “who” your audience is, take a moment to think about “why” your audience wants to watch your video. What are they getting out of the experience? Are they being entertained, educated, informed, or escaping from reality? Do they connect with your message, talent, or does it build a sense of community?

According to Denis McQuail’s research on media consumption, the reasons people consume media use can be grouped into five uses, the audience wants to:

1. Be informed or educated
2. Identify with characters of the situation
3. Be entertained
4. Enhance social interaction
5. Escape from the stresses of daily life

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1.3: Production Styles

Production Styles

The type of video you are producing often dictates whether you will shoot single or multi-camera. **Single-camera production** refers to lighting and shooting one set up at a time. Documentary and Corporate videos often use single-camera shooting techniques when recording interviews with their subjects. Narrative short films and features use this technique when breaking down a script scene by scene, shot by shot. These types of productions rely heavily on editing and the post-production process to pull the entire story together for their audience. There are many single-camera productions that call for a second camera unit, referred to as “2nd Unit” or “B Cam”, which is not to be confused with multi-camera productions.

Multi-Camera Production

Live events recorded for broadcast, cablecast and live streaming, such as Local News, Sports, Music, and Talk Shows utilize **multi-camera production** techniques. This style of production has multiple cameras on set, or in a venue or arena, that send their feeds into a control room, where the director has the ability to view all camera angles simultaneously and cut between them live creating a “line cut” for the audience to view in real-time.

During multi-camera live productions the Director typically sits in the control room and calls the cuts for the **Technical Director (T.D.)** to perform on the Switcher. Graphics are added to the program live from a **Character Generator (C.G.)**. The **Audio Engineer (A1)** mixes the audio signals from the microphones, video roll in's, music and sound cues. Depending on the type of production, either a Producer or Assistant Director is responsible for relaying time cues to the talent and Stage Managers.



Figure 1.3.1: Multi-camera Control Room shows a student director watching the monitors

(Creative Commons License; Image by Jen Vaughn via Los Angeles City College)

Multi-camera content produced for Live Broadcast or Live Streams, such as Local News, Daytime Talk Shows, Late Night Talk Shows, and Awards Shows use **Two-Column Scripts** with the Visual Cues in the left column and Audio Cues in the right column.

These programs use **Rundowns** to break down the timing of each segment in the program, including graphics, video roll in’s, talent, and cameras. Scripts are written according to the information in the rundown. There are many software and hardware systems used for creating Rundowns and Scripts, such as *iNews* (which is used in broadcast news stations) and *Rundown Creator* (which can be used on a subscription-based service for independent productions).

Short-form content, such as Commercials, PSA's and Digital Content (programming produced for the web) also often use **Three-Column Scripts.** These concepts will be covered in more detail in **Chapter 3: Scripting and Formatting.**

Single Camera Production

As the name implies, single-camera productions typically only require one camera. The audio can be recorded directly to the video camera, however, it is often recorded separately to a digital audio recording device. Single-camera productions for narrative are set up shot-by-shot and the actors perform multiple takes of each shot until the director is satisfied. Camera set ups and shooting schedule are determined before production begins by the Director, Assistant Director and Director of Photography. The goal of creating an efficient shooting schedule is to maximize the coverage you can get for each setup and minimize the number of times you need to reposition the camera and lights. You can jump ahead to learn more about the duties of each production position in **Chapter 6.1 Who Does What.**



Figure **1.3.2**: Behind the scenes of a Single Camera Production shows an actor in a sword fight scene with smoke effects.

(Pixaby License; Image by Victoria_Borodinova via Pixabay)

Low budget vs. Big budget

The most important factor that determines how you will produce a video is how much money you have in your **budget** to accomplish your vision. Determining a realistic budget for your production is dependent on being as detailed and thorough as possible during pre-production.

Budgets are broken down into tiers for high budget productions and low budget productions. Using this system, lower-budget films can set the rates based on budget limitations without exploiting the worker's compensation. The DGA Low Budget Agreements are multi-level contracts that cover the production of narrative and documentary films intended for theatrical or home video/DVD release with budgets of up to $11 million and can be found on the DGA website.

The first thing to determine with any film or video project is if it is a signatory to a union or is a non-union production. The union has negotiated minimum rates for its members. If the production is not affiliated with a union, then using standard union rates can be a good guide to determine fair wages for your crew.

There are several unions that oversee the interests of the film industry crew. Research the links below to find out current union rates for your production.

- IATSE (International Alliance of Theatrical Stage Employees)
- DGA (Directors Guild of America)

To calculate a crew member's day rate, there are a few considerations to take into account:

1. Is the crew member union or non-union?
2. What tier does the budget fall under?
3. Is the production filming in a ‘Production City’?
4. What is the length of the shoot day? How many days?
5. Is transportation or lodging needed/covered?

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1.4: Video Formats

Video Formats

Another decision to consider in the development process is what format you are shooting your video in. Format refers to the **resolution** and **frame rate** of your video. **Full High Definition (FHD)** has been the standard for many years. Technology has advanced so much over the past decade, now content creators have the ability to shoot **Ultra High Definition (UHD)** video with a resolution of 4K or above on their mobile phones. There may be times when you need to convert your video to a lower resolution, perhaps even **Standard Definition (SD).** You can always convert your video to a lower resolution without concern for loss of video quality. Converting your video to higher resolution is a different story. You can transcode media to a higher resolution, but you run the risk of your video quality looking pixelated, grainy and low resolution.

Audiences are used to watching media displayed on their televisions, computers, and mobile devices in a landscape aspect ratio for High Definition Video (16X9). Theaters often project movies with wider aspect ratios, such as Cinemascope (1:235), Widescreen (1:185). Audiences that watch content on mobile devices are used to watching vertical videos and a variety of other formats, such as square (2:2).

The image below shows a chart of resolutions displaying the aspect ratios and pixels in a variety of formats. 8K UHD video requires at least 4320 pixels in height; 5K UHD video requires at least 2880 pixels in height, 4K UHD video requires at least 2160 pixels in height; Full HD video requires at least 1080 pixels in height; Standard Definition video requires at least 480 pixels in height.

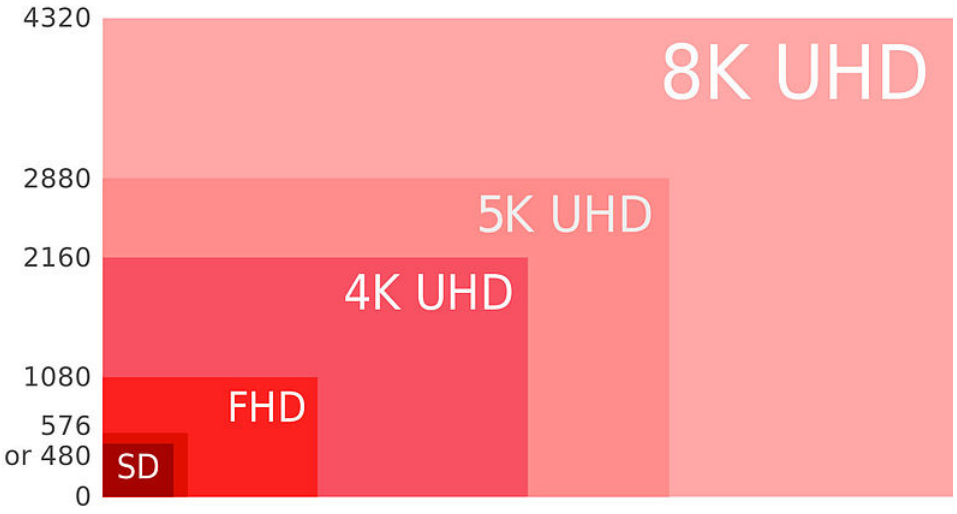


Figure 1.4.1: UHD, FHD and Standard Definition Resolution Comparison Chart (Creative Commons License; Wikimedia Commons)

High-resolution video files can be very large, take up a lot of storage and can be difficult to share remotely. Video codecs were developed to make them easier to store and share. You can learn more about video codecs in **Chapter 13 Formats & Compression.**

Do your research and find out what the current delivery requirements are for the platform you want to distribute your content. The requirements are constantly changing and may differ depending of the delivery. According to the requirements listed on **DPP Film Tech**, there are a range of formats that Netflix supports:

- SD / HD sources: Netflix accepts MPEG-2 transport stream or iTunes® package Apple ProRes files.
- HD and 2K sources can also be supplied as IMF Application 2 Extended files.
- 4K / UHD sources: Netflix accepted IMF Application 2 Extended files.

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CHAPTER OVERVIEW

2: Releases and Contracts

Learning Objectives

1. Become familiar with contracts, release forms, and confidentiality agreements.
2. Learn how to create a project estimate that clearly outlines the scope of work for your video production.
3. Gain an understanding of the complex world of image rights and music licensing

2.1: Legal Protections
2.2: Image Licensing
2.3: Music Licensing

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2.1: Legal Protections

Release Forms and Contracts

Contracts and release forms are legally binding documents that should be agreed upon, signed, and dated before any production work begins. These documents provide protections for the parties involved with requesting and funding the production, as well as the parties involved with creating the production. There are many resources online that can help you with registering copyrights and find templates for non-disclosure agreements, contracts, and legal documents. LegalZoom.com and RocketLawyer.com offer some free templates you can download and revise. Jump ahead to **Chapter 4: Production Preparation** to view sample release forms.

Copyright Laws

According to the U.S. Copyright Office, **copyright** is a form of protection grounded in the U.S. Constitution and granted by law for original works of authorship fixed in a tangible medium of expression. Copyright covers both published and unpublished works. Copyrights are different from **trademarks**, which protect words, phrases, symbols, or designs identifying the source of the goods or services of one party and distinguishing them from those of others.

If you own a copyright, you, or the person who commissioned the work from you, are the only ones who have the right to publish, reproduce, or use the video you created. You don't have to publish the video online or to the public. A recording on your hard drive is equally as protected as a video file you've made available publicly on YouTube.

Ideas and discoveries are not protected by the copyright law, although the way in which they are expressed may be. So if you have a great idea, be sure to write it down, because while you can copyright an outline or a script, you can't claim copyright on that great idea you shared with that so-called "friend" of yours. Before you share your great idea for a script, movie, short film, video or creative endeavor with a potential collaborator, it's a good idea to have both parties sign a non-disclosure agreement.

Non-Disclosure Agreements

NDA's are also referred to as Confidentiality Agreements, are legally binding contracts that establish a confidential relationship. The parties signing the agreement agree that sensitive information they may obtain will not be made available to any others. NDA's are also commonly used before discussions between a creative seeking funding from potential investors. NDA's can be customized to any degree, but these major elements are essential in a legally binding NDA:

- The names of the parties to the agreement
- A definition of what constitutes confidential information pertaining to this agreement
- Any exclusions from confidentiality
- A statement of the appropriate uses of the information to be revealed
- The length of time of the agreement

Talent Release Forms

A **talent release form** is a legal document designed to prevent the producer or content creator from being sued for the unauthorized use of someone's image or voice. Talent release forms should be signed before the start of production, and sometimes are included in a more comprehensive contract with the talent. If in the future you make plans to sell the content you created, any media company interested in buying your content will require signed talent releases. This is true even if the recording is not used for commercial purposes.

In video production, talent releases should be obtained from both primary actors and from extras. If the people in your recording are not identifiable, such as in a distant crowd scene, you do not need a talent release for those people. If the recording is for your personal use only, you don't need to get a talent release. However, a release should be obtained if there is any chance that the recording will be displayed in public, such as at a film festival, or via online distribution such as YouTube.

A standard talent release form is a relatively short and simple document, yet it's critical to complete such a release for any recording of individuals that you make so that issues do not arise later when your work is distributed. A standard talent release for an actor should include the use of the actor's name, voice, image and likeness, and performance. The talent release may contain additional

provisions, such as allowing copyright of the recording, waiving future compensation, allowing the person's image to be digitally altered, or allowing the use of the actor's biographical information in connection with promotions. Details of the talent release will vary depending upon the nature and intended use of the recording.

Liability Release Forms

Liability release forms are designed to protect your production against lawsuits by addressing potential personal injuries, property damage, or various commercial rights. This generally applies to injuries or damages that any person might incur in the normal course of the covered activity. A liability waiver or release, also called a hold-harmless agreement (HHA), can protect producers from lawsuits if an injury were to occur during production. However, the document generally does not absolve the releasee of liability for its own acts of negligence. Obtaining a Certificate of Liability insurance is often required when applying for a film permit in many counties, countries or states.

Contracts with Clients

When you take on the role of producer and agree to produce a video for a client, there are a few steps you should take to ensure you are in agreement about the scope of work. Creating a project estimate with the scope of work helps to clearly identify what is being produced, how long it will take, and who owns the rights to the footage and finished product. There should be a clear project description with a timeline of deliverables, and notice of how many revisions are included for each deliverable. Make sure you have agreed upon your script and shot list before you break down the budget for your equipment, crew, locations, and production design. Have a payment plan structured into the contract that states if a deposit is required, and what percentage of work is to be completed before invoicing on deliverables.

Contracts with Crews and Creatives

When you are hiring crew or creative team members to support your production it’s good practice to have them sign a subcontract that outlines the scope of work. If you are hiring an editor for your project, try to negotiate a rate for the project rather than an hourly rate. Have clear and reasonable deadlines for deliverables. Hiring a production crew for location shoots can have a wide range of rates, and contracts needed for each crew member. Production Assistants (PA) may not require any contracts and will work for an agreed-upon day rate. Hiring a Director of Photography (DP) may require you to sign a contract for his or her services and request liability insurance or workers compensation insurance to be provided on the production.

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2.2: Image Licensing

Image Licensing for Commercial Use

If you want to use an image to which you don't own a copyright, you will need a licensing agreement with the copyright holder. There are many different types of rights and terms of use that can be specified in a licensing agreement. Make sure you know exactly how you plan to use a licensed image so that you can specify these uses in your agreement.

Digital Rights

Digital rights refer to the digital version of an image, rather than a physical print of the image. Having the digital rights to a photo means that you can distribute it anywhere in the digital world; however, you can only use if for commercial purposes if you also have the commercial rights.

Commercial Rights

If you plan to profit in anyway from using a licencsed image, you'll need commercial rights to the image. Commercial rights are required for any uses that could result in monetary gain, including marketing, advertisements, or other promotions. Any image used to promote or sell for a brand should have commercial rights. This commercial designation also encompasses a broad scope of business uses, including blogs, email marketing campaigns, social media posts, and influencer-created content.

Retail Rights and Personal Use

Retail rights refer to any image or video content that is sold to the client or consumer. These include wedding photos, school yearbook pictures, and other pictures that are meant for personal use and circulation. With retail rights, you do not have the right to claim the work as your own, and, typically, you should attribute the work to the original photographer in some way. If you have the retail rights to an image and you'd like to use it commercially, you may be able to renegotiate with the photographer to obtain additional rights to the images.

Social Rights

Social rights are a combination of commercial and digital rights specific to images on social media platforms. With social rights, a brand/business has the right to repost a work on their social media; however, they do not necessarily have the right to alter the image or use it in paid ads. Images on social media are governed by the same copyright laws as everywhere else. However, social media users are accustomed to certain types of posting and sharing within the platform. This complicates how copyrights are enforced on social media. If you post an image that you own to social media, you still own the copyright to your image. Each social media platform is licensing the image when you post it on that site. By posting your photos on their site you are granting the right to display the image, in addition to any other rights that are specified in the user agreement for a social platform.

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2.3: Music Licensing

Types of Licenses

There are many ways to license music for your video production. You can subscribe to a music licensing library and browse thousands of songs that can be licensed for your video with a variety of rights to choose from. If you want to use a commercial song in your video, you must obtain two licenses, sync and master licenses. Alternatives to licensing music for your video production are to create all your own original music (either yourself or hiring a composer) or use music that's free or in the public domain.

- **Sync (synchronization) license** is from the music publisher. The publisher owns the right to the composition itself (that is, the words and melody) and may vary from a large publishing company to individual songwriters who manage their own work.
- **Master license** is from the recording label. The label controls the actual recording (that is, what you actually hear) of the composition. To license a recording not affiliated with a label (commonly referred to as independent or indie), you will need to contact the artist directly.

If you are looking to license music for use in film festivals most songs can be cleared at around $500 per side, which is $500 for the publishers for the sync rights, and $500 for the person who recorded it for the master rights. If you don't have enough money in your budget to pay for all the rights up front, you can clear only the film festival rights and add an option to get all media rights up to two years later. To determine who owns the rights to songs, the websites ASCAP and BMI are extremely helpful.

Public domain

Music and lyrics published in the United States before 1923 are in the **"public domain"** which means no one claims ownership and the music is free to use. A fantastic resource for public domain music and movies is the Internet Archive at ARCHIVE. And, you can check the public domain status of any song at: PD INFO

Royalty-free music does not necessarily mean FREE to use in your video. Many people get confused by this term. Royalty-free means "free of royalty" and simply describes a type of music licensing structure where you pay one price for a piece of music no matter how many times it's used. You can purchase individual music tracks, or subscribe to a service that allows you to use the music in their library for an annual or monthly fee. Be sure to read the licenses for each song, as they can vary from track to track. Some songs are available for free for non-commercial use, but then you have to pay a fee if you want to distribute your work publicly.

Creative Commons and Open Source

Look for the Creative Commons symbol for music that may be easier to use in your project with fewer restrictions, and maybe even free. Open source/community music sites like **DIG** and **FREE MUSIC** have filters you can select to choose "free music for commercial projects." Learn about the different types of **Creative Common Licenses** here.

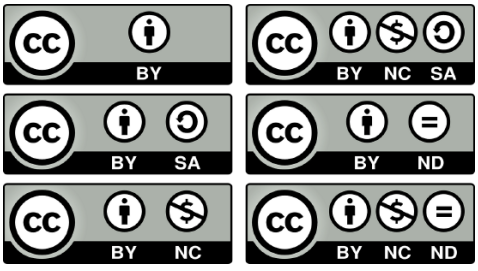


Figure 2.3.1: Creative Commons Logos depicting Attribution (BY), No Derivatives (ND), Non Commercial Use (NC), and Stand Alone (SA) (CC BY-NC 4.0; Wikimedia Commons)

Find resources for Music Release Forms, Talent and Location Release Forms, production planning templates and more at Freelance Video Collective.

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CHAPTER OVERVIEW

3: Scripting and Formats

Learning Objectives

1. Gain an understanding of single column and multi-column script formats used in video production.
2. Learn how to build a show by planning out segment timing and production elements using rundown.
3. Explore the different story formats used in broadcast news and digital productions.

3.1: Rundowns, Formats and Storyboards
3.2: Single-Column Scripts
3.3: Multi-Column Scripts
3.4: Three-Act Structure

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3.1: Rundowns, Formats and Storyboards

Television Formats

TV format is the overall concept and branding of a copyrighted television program. A format is licensed by TV networks, so that they may produce a version of the show tailored to their nationality and audience. Format purchasing is popular with broadcasters, due to the lower risk associated with an already-proven idea. TV formats are a form of intellectual property (IP), and are regularly bought and sold by TV producers, distribution companies, and broadcasters.

Rundowns

The scripts for multi-camera programs are based on **Rundowns,** which break down the timing of each segment in the program, including graphics, video roll in's, talent, and cameras. Rundowns are used to breaks the show into "blocks" split by commercial breaks, Scripts are written and timed according to the information in the rundown.

There are many software and hardware systems used for creating Rundowns and Scripts, such as *iNews*, which is a server-based system used in newsrooms across the world. *Rundown Creator* is a web-based rundown software with both a free version and a subscription-based version, and is an excellent pre-production tool for video producers. You can also use Microsoft Excel to get started on creating a rundown. Here are a few different examples of rundowns used for live multi-camera productions:

ITEM	Time of Day	Description	ERT	Talent	GFX FULL SCREEN	GFX Lwr 3rd
3a	10:45 AM	Welcome to OMF Day 2 Morning	1:00 min	Thomas		Thomas
3b	10:47 AM	LIVE INTERVIEW	10:00 min	Thomas & Dustin Donahue		Dustin Donahue
3c	10:55 AM	Overview of Attacca Quartet w/Riannon Giddens - PART 1	4:00 min	Thomas & Sarah	SAT - AM	Thomas & Sarah
3d	11:00 AM	Toss to Stage	15 sec	Thomas		
	11:00 AM	***Attacca Quartet w/Riannon Giddens - PART 1***	***36:00 min***			***Song Titles***
4a	11:36 AM	Break - Recap of Part 1	2:00 min	Thomas & Sarah		Thomas & Sarah
4b	11:38 AM	Toss to About Ojai VIDEO	25 sec	Sarah		
4c		ROLL IN - "About Ojai"	**4:05 min**			
4d	11:42 AM	Share Special Ojai Moment Tease Riannon Giddens Part 2	4-5:00 min	Thomas & Sarah		Thomas & Sarah
4e	11:46 AM	Toss to Stage	00:15 sec	Sarah		
	11:46 AM	***Attacca Quartet w/Riannon Giddens - PART 2***	***28:00 min***			***Song Titles***
5a	12:16 PM	Recap of Part 2	5:00 min	Thomas & Sarah		Thomas & Sarah
5b	12:21 PM	Tease Friday Evening Festival	3:00 min	Sarah	FRI - PM	
5c	12:24 PM	Sign Off	1:00 min	Thomas & Sarah		
5d	12:55 PM	End Card & Credit Roll	1:00 min		END CARD	

Figure **3.1.1**: Multi-camera Livestream Rundown with seven columns. The first column is item numbers. The second column is time of day. The third column shows a brief description of what happens in the segment. The fourth column shows the estimated run time for the segment. The fifth column shows the talent assigned to the segment. The sixth column shows full-screen graphics, and the last column shows lower third graphics.

(CC BY 4.0; Image by Jen Vaughn via Los Angeles City College)

AWARDS SHOW RUNDOWN

LIVE: Day, Month Date, Year • 4:59:55P - PDT • Network Name (:05 Delay)
LOC: Venue

Item#	Description		SEG	RUNNING	NOTES
	START		6:30:00		
	PRE-SHOW				
A.	**AUDIENCE LOAD-IN**	(A)	1:15:00	7:45:00	
	SCREENS: SHOW LOGO LOOP				
	MUSIC: LOAD-IN MUSIC (FOH)				
B.	**SPONSOR PROMO** (VTPB-SOT)	(B)	0:00:15	7:45:15	
	SCREENS: VTPB				
C.	**INTRO WARMUP HOST** (Announcer VO-LIVE)	(C)	0:00:15	7:45:30	
	SCREENS: SHOW LOGO LOOP				
	MUSIC: WARM-UP PLAYON (ATPB)				
	ENT: WARMUP HOST SL X TO CS				
D.	**AUDIENCE WARM UP / INTRO SHOW PRODUCER** (Warmup Host)	(D)	0:05:00	7:50:30	
	LOC: CS				
	SCREENS: SHOW LOGO LOOP				
E.	**SHOW PRODUCER TALK** (Show Producer)	(E)	0:05:00	7:55:30	
	LOC: CS				
	SCREENS: SHOW LOGO LOOP				
F.	**RESET FOR TOP OF SHOW**	(F)	0:04:25	7:59:55	
	MUSIC: LOAD-IN MUSIC (FOH)				
	SCREENS: SHOW LOGO LOOP				

Figure **3.1.2**: Multi-camera Awards Show Rundown shows four columns. The first column shows the item number or letter and a brief description of what happens in the segment. The second column shows the estimated time of the segment. The third column shows the cumulative time. The fourth column is for notes.

(CC BY-NC 4.0; Image by Jen Vaughn via Los Angeles City College)

Storyboards

Narrative productions, such as short films and feature films, often require an additional step in the development process to clearly convey the visual concept of the production. **Storyboards** are a shot-by-shot breakdown of the script with varying degrees of detail. Framing and camera movement are diagrammed on the storyboards so that camera shots can be clearly communicated to the crew.

Previsualization (also known as Previz, and Previs) is used for visualizing complex scenes in a movie before filming. These can include concept art and renderings of environments and camera movement. Creative decisions are made without incurring a large cost for shooting multiple takes. It allows the filmmaker to experiment with a variety of options, and see how those decisions affect the flow of the story.

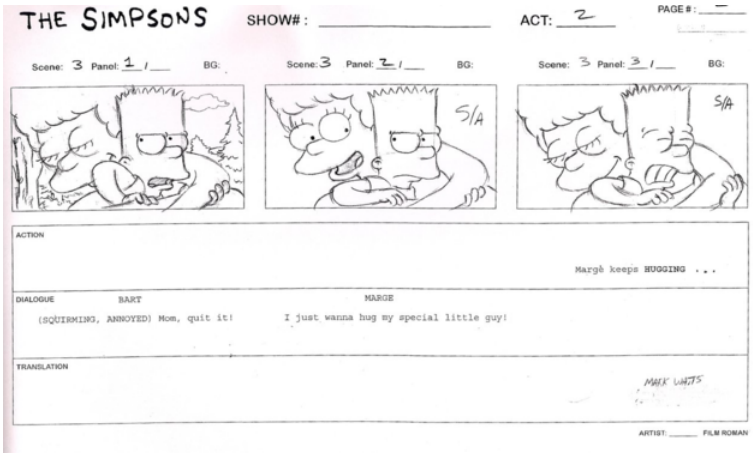


Figure **3.1.3**: Storyboard of "The Simpsons" shows Bart Simpson being hugged by Marge Simpson. Dialogue in the scene is underneath the image.

(CC BY-NC 4.0; Wikimedia Commons)

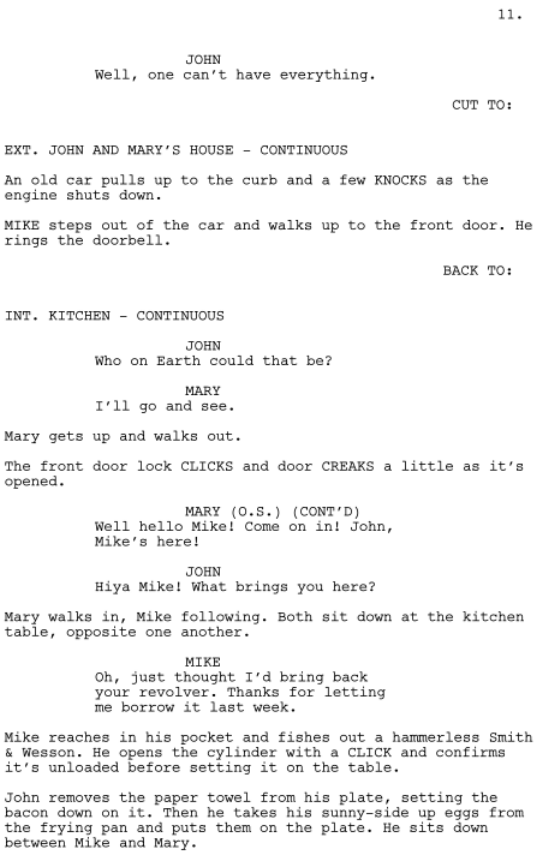
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3.2: Single-Column Scripts

Screenplays and Narrative Scripts

Short films and feature-length films are scripted with very specific standards for style and formatting, and there are many screenwriting programs that have been developed to assist the writer with proper formatting. **Final Draft** is a screenwriting program with many formatting features commonly used by many screenwriters. If you are just getting started with screenwriting, a free program such as **Celtx** Celtxis a great way to begin writing scripts for your short films.

There are many resources you can find online to help you learn proper formatting for screenplays, including dialogue, headers, sluglines, and parentheticals. Check out the resources available on **Studio Binder** to help you get a better understanding of screenplay formatting.



11.

JOHN
Well, one can't have everything.

CUT TO:

EXT. JOHN AND MARY'S HOUSE - CONTINUOUS

An old car pulls up to the curb and a few KNOCKS as the engine shuts down.

MIKE steps out of the car and walks up to the front door. He rings the doorbell.

BACK TO:

INT. KITCHEN - CONTINUOUS

JOHN
Who on Earth could that be?

MARY
I'll go and see.

Mary gets up and walks out.

The front door lock CLICKS and door CREAKS a little as it's opened.

MARY (O.S.) (CONT'D)
Well hello Mike! Come on in! John, Mike's here!

JOHN
Hiya Mike! What brings you here?

Mary walks in, Mike following. Both sit down at the kitchen table, opposite one another.

MIKE
Oh, just thought I'd bring back your revolver. Thanks for letting me borrow it last week.

Mike reaches in his pocket and fishes out a hammerless Smith & Wesson. He opens the cylinder with a CLICK and confirms it's unloaded before setting it on the table.

John removes the paper towel from his plate, setting the bacon down on it. Then he takes his sunny-side up eggs from the frying pan and puts them on the plate. He sits down between Mike and Mary.

Figure 3.2.1: Screenplay using the Single-Column Script format. The action/stage directions gives a description of the location and set the scene. The script shows dialogue between three characters.

(CC BY-NC 4.0; Wikimedia Commons)

Single-Camera Sitcoms

The "single-camera" sitcom has grown in popularity in the last few decades. Shows like *Modern Family*, *Black-ish*, and *The Last Man on Earth* are contemporary examples of sitcoms that are shot in the single-camera style of narrative films. While the "single-camera" label is misleading — such shows often use more than one *single* camera — the key element is that the show is shot much more like a film, without a live audience.

Single-camera sitcoms are formatted just like feature screenplays: one page of script equals roughly one minute of screen time (depending on how fast the dialogue is delivered). A broadcast-network single-camera sitcom script is usually 22 to 32 pages long, while single-camera sitcom scripts for basic and premium cable can go all the way up to 40 minutes. Television writers also take into account commercial breaks when structuring the script into acts. Most “30-minute” broadcast sitcom episodes are actually only around 22 minutes long because of ad breaks.

The main difference between the formatting of film screenplays and single-camera sitcom scripts (teleplays) is that the beginnings and ends of acts are labeled in sitcoms (such as ACT ONE and END OF ACT ONE), centered, underlined, and in caps, and new acts start on new pages.

Multi-Camera Sitcoms

Multi-camera sitcoms represent the more traditional approach to television comedy, classic sitcom programs such as *The Dick Van Dyke Show*, *The Mary Tyler Moore Show*, *Three's Company*, *Family Ties*, *Seinfeld*, and *Friends* all use similar production techniques of shooting four camera angles on a live soundstage in front of a studio audience.

Contemporary multi-camera sitcoms like *The Big Bang Theory* have taken the torch from those classics. They are typically filmed in front of a live studio audience and/or have a laugh track added. The humor presented in multi-cam sitcom production is much different because of the live audience factor.

While single-camera sitcom filming can be equated to feature film styles, multi-camera sitcoms are similar to live theater**.** The studio acts as a stage set before an audience and the “play” is captured on multiple cameras as actors walk from one set into another, often in just one take with multiple cameras capturing the necessary angles to create an otherwise seamless experience for television.

Multi-cam sitcom scripts are formatted differently from single-camera sitcom scripts, with much less description of the characters' actions in the bulk of the scene. Typically, the scene is described at the header and dialogue follows.

Multi-camera scripts have a more technical approach in their format, which takes an otherwise 22-32 page television script and turns it into a 52-58 page script (due to spacing and formatting).

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3.3: Multi-Column Scripts

Multi-Column Scripts (AV Scripts)

Content produced for live broadcast or livestream, such as local news, daytime talk shows, late-night talk shows, and awards shows use **Two-Column Scripts** or **Three Column Scripts,** with the dialogue and visual cues for each camera included.

Short-form content, such as commercials, public service announcements (PSA's), and digital content (programming produced for the web), documentaries, and multi-camera productions such as news and talk shows, also often use **Three-Column Scripts.**

- **Time Cues** - Left Column, Back times the script elements
- **Video Cues** - Center Column, includes Camera framing/numbers, Graphics (full screens and lower thirds) and Roll In's.
- **Audio Cues** - Dialogue for the Talent (USE ALL CAPS FOR TELEPROMPTER & VO SEGMENTS), Music cues, Sound Effects (stingers), etc.

Television Script ***Cinema/TV DEPARTMENT*** **(Final Draft)**

Los Angeles City College 855 N. Vermont Avenue, Los Angeles, CA. 90029 Phone: (323) 953-4000

STUDENT'S NAME:
CLASS: TV 4
PROJECT DATE:

TITLE: "TRAVEL SHOW"
LENGTH: 7:00 Minutes
STUDIO: B

TIME:	VIDEO:	AUDIO:
7:00 – 6:50	*Ready to fade up on CG with MUSIC* *Fade Up, Cue Music* **CG FULL: SHOW NAME** *Ready to Dissolve to Cam 3,*	**MUSIC: INSTRUMENTAL TRACK #1** Theme Song (Fade out)
6:50 – 6:30	*Fade Music Out, Dissolve to 3, Open Mics, Cue Talent* **CAM 3 (MS HOST)** *KEY IN (HOST NAME)*	**HOST:** HELLO AND WELCOME TO LEAVING LOS ANGELES! A TRAVEL SHOW THAT INSPIRES YOU TO GET OUT OF LA FOR A DAY… A WEEK… OR EVEN A MONTH! I'M YOUR HOST_____ WE HAVE A GREAT SHOW LINED UP FOR YOU TONIGHT, SHOWCASING SOME AMAZING TRAVEL DESITNATIONS. WE HAVE A WORLD TRAVELER JOINING US TO DISCUSS SOME TOP TRAVEL TIPS FOR FIRST TIME TRAVELERS.
6:30 – 6:25	**CAM 2 (WIDE SHOT, GUEST ENTERS)**	**HOST:** PLEASE WELCOME OUR FIRST GUEST… *GUEST #1 ENTERS FROM _____*
6:25 – 6:15	**CAM 3 (MS HOST)**	**HOST:** WELCOME TO THE SHOW. WE'RE SO GLAD YOU COULD TAKE TIME OUT OF YOUR BUSY SCHEDULE TO JOIN US. ***QUESTION #1*** I HEARD THAT… YOU ARE ALSO INTERESTED IN... TELL US HOW YOU GOT STARTED IN THAT FIELD?

Figure **3.3.1**: Multi-column Talk Show Script with three columns. The first column shows the time of each segment. The second column shows the camera number, camera framing, and graphics. The third column includes dialogue for each character and sound

cues.

(CC BY-NC 4.0; Image by Jen Vaughn via Los Angeles City College)

Digital Content & News Story Formats

News broadcasts and digital content created for the web have many different types of stories included in each program to keep the audience engaged. Anchors read scripts live on the air, toss to reporters live in the field, and set up the context for pre-recorded video packages. Each of these elements of the program has terminology associated with how the story is produced. Here's a list of common story forms and the shorthand used in broadcast news scripting and rundowns:

- **RDR** = **Reader** (a.k.a. short story), 15 - 20 seconds maximum, often uses graphics or images to enhance the story.
- **OTS** = **Over the Shoulder Graphics** (box on the top right or left of the screen with graphics and a short title).
- **VO** = **Voice-Over** (we hear the anchor commentary over graphics or video)
- **SOT** = **Sound on Tape** (footage includes music, pre-recorded voice over, or snippets of pre-recorded interviews called “sound bites”).
- **VO/SOT** = **Voice-Over and Sound on Tape** combined into one video roll-in.
- **VO/SOT/VO (VSV)** = Video bookends the soundbite with footage for live V.O. commentary before & after.
- **TEASE:** Written to hook the audience for later.
- **LEAD:** Beginning of the story, often shot with a live reporter or pre-recorded stand up on location.
- **TOSS:** Sets up the next story or person reporting, also used as a transitional element back to the studio.
- **TAG:** Closes the story, call to action, or sign off with station identification, "*Reporting for KCAL9, I'm Jen Vaughn*"
- **BRIDGE:** Used in the middle of the package as a transitional element.
- **WALK & TALK:** Reporter walks as they deliver their lines; adding movement, making the shot more dynamic.
- **PAN/VO**: The camera starts with a reporter on screen, then the camera pans to reveal as the report continues VO (or vice versa).

Documentary and Reality TV story formats

Documentaries, reality TV, and “DocuReal” programs are often produced by interviewing a subject (or multiple subjects) about a topic. These interviews are transcribed and a story producer decides which parts of the interview will be included in the edit. The interview footage is edited together with “B-roll” footage that provides visual context about the story.

Client-Based Work

Public Service Announcements (PSA’s), commercials, promotional videos, and short-format videos use multi-column scripts to easily convey the visual cues and dialogue of the script. When working as a freelance producer or videographer you might encounter work in the field of real estate or corporate training videos. Client-based work always includes a script, often many drafts and reiterations of a script, before the project estimate is finalized and production begins.

Producing digital content for social media often has a very quick turnaround time. Producers that have the luxury of working with an editor rely on multi-column scripting to convey important information about graphics and b-roll to include. Many digital content producers have to edit their own content, and sometimes skip this step and create the story on the timeline.

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3.4: Three-Act Structure

Three-act structure

The way acts are laid out in a television script and allow time for commercial breaks differs slightly from the traditional three-act dramatic structure: some broadcast and basic-cable sitcoms have only two acts. The concept of dramatic structure refers to a story based on action that falls into one of three acts, with plot points (or reversals) used to connect each act, and/or send the narrative into a different direction than it had previously been headed. The first and third acts cover roughly a third of the story each, and the second act is typically the longest, including a complication (an event or character that complicates the protagonist's path to complete his or her goal) and a B-story (sub-plot).

In the first act, the characters, themes, setting, and central conflict are established. At some point in the first act an inciting incident or catalyst occurs to set the story in motion. In the second act, the protagonist attempts to solve the central conflict but obstacles (often, the antagonist) get in their way. During the third act, the protagonist is able to resolve the central conflict of the story, defeat the antagonist, and achieve personal growth.

Narrative Structure

In the first act, the characters, themes, setting, and central conflict are established. At some point in the first act an inciting incident occurs to set the plot of the story in motion. In the second act, the protagonist attempts to solve the central conflict but obstacles (often the antagonist) gets in their way. During the third act, the protagonist is able to resolve the central conflict of the story, achieve personal growth, and defeat the antagonist.

Documentary Structure

The subject matter of the film often determines how a documentary will be structured. The common storytelling techniques of a three-act structure applies to the beginning, middle and end of a story. The beginning of the documentary should grab the audience's attention. This is where you want to hook the audience and create a relationship with the subject. Documentaries often set up some kind of conflict or problem that needs to be resolved, which hooks the audience and keeps them wanting to know more about the conflict. The middle act is divided into numerous scenes that build on each other to reveal more details about the conflict. This is often where the protagonist of the documentary attempts to resolve the conflict and faces numerous obstacles, which builds tension for the audience. The final act is where all the tensions come to a head and the main question posed at the beginning of the film is either answered or left unresolved, prompting a call to action from the audience.

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CHAPTER OVERVIEW

4: Production Preparation

Learning Objectives

1. Learn what items go into a Production Plan and and why a Production Plan it is necessary.
2. Learn how to create a Production Bible.
3. Gain an understanding of the the business side of filmmaking.

4.1: Planning to Shoot

4.2: The Production Bible

4.3: The Business of Filmmaking

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4.1: Planning to Shoot

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Production is a Real Time Event

Production is a real-time event. Actual content is created as a camera rolls - one minute of actors saying lines will equal one minute of real time. Finding an efficient use of production time requires meticulous planning to make sure the equipment, crew, actors, sets and legal documents arrive at a specific time on the right set. Careful production preparation will not solve every production issue. It does prepare the filmmaker to execute their vision rather continually fix preproduction oversights.

Preproduction progresses slower than real time. You cannot write a script to a two-hour movie in two hours. This luxury of writing dialogue and action over weeks and months does not exist in production. The weeks it took to write a script takes mere hours to shoot on the set. Those hours spent on the set are when all the pieces should come together. A great cost to a feature is the time spent with trucking equipment, cast, crew, food, and costumes, to the set. Production needs efficiency.

This issue is more obvious in documentary films. Whereas fictional projects can re-shoot scenes to a certain perfection, documentarians often have one chance to shoot coverage, such as, rioters flipping cars and breaking windows. Filmmakers need to have resources in place to capture the action as it happens.

To prepare for **real time** events, production crews need an intricate plan to make sure equipment, crew, permits and other filmmaking resources are at the right place during filming.



Figure **4.1.1**: String of Lights. **Pixabay License; Free-Photos via Pixabay**

Narrative vs Documentary Production

Video production lays out across two broad classifications: Narratives and Documentaries. Generally narratives are fiction-based scripted productions while documentaries are filmed interviews and live events. It might seem that documentaries are unscripted and lacking the level of preproduction of a scripted show, modern documentaries often draw as much preplanning as a narrative. In fact narratives and documentaries have borrowed so many techniques from each other that the planning of both kinds of features have great similarities. Narratives employ vérité, or hand-held camera techniques, borrowed from documentary production to make their features seem more realistic. While documentaries utilize storytelling narrative techniques, like story boarding and recreations to cover their edited interviews and narrations. Much of this chapter focuses on professional production techniques shared by both Narratives and Documentaries.

The “Aha!” Moment

Preparing for preproduction also has a second advantage. It sets up sudden spurts of creativity on the film set. Actors ad lib, the weather gets in the way and in the real world, real life gets in the way. Good filmmakers can take advantage this because they are prepared and open. Often called the Eureka Effect (I like “Aha!” better – a word I do utter on the set), these are moments of sudden inspirations which improve storytelling. Many times cool unexpected things happen on a movie set during production.

On “Jaws,” the large mechanical shark (named “Bruce”) often broke down and never really looked like a credible shark onscreen. Director Steven Spielberg abandoned much of this footage and, at times, set the camera from the point-of-view of the shark. By

omitting the villainous beast onscreen, the final effect for audiences were more ominous and scarier. Roy Scheider's iconic "You're gonna need a bigger boat" line was never in the script but was inspired on the spot.

Sudden inspirations are possible when films are meticulously planned out. Plans that the crew follows until a cooler idea surfaces. The great scientist Louis Pasteur said, "Chance favors only the prepared mind." He believed greater insights arise due to preparation. These are "Aha!" moments.

Despite detailed planning, filmmakers are open to unplanned occurrences on their sets. Sometimes magic happens when directors let cameras roll beyond the scripted lines. The classic scene in "Taxi Driver" where Travis Bickle stares into the mirror asking, "You talking to me.? was actually triggered by an on-camera conversation between screenwriter Paul Schrader and Robert de Niro. Warning, the following video has adult language.



Good filmmakers find that balance between good planning and being open to real-time events as they come along. Harrison Ford suffered from food poisoning on the day he was supposed to shoot a fight scene with a sword wielding-assassin in "Raiders of the Lost Ark." He was too sick to shoot the scene the way Steven Spielberg wanted. Someone on the set suggested Indy should take out a gun and shoot him. They reblocked the scene this way and it became possibly the funniest bit in the film. The humorous bit made possible by a film crew willing to break away from their plan, problem-solve around it, and come up with an inspired solution. Read the article for a more detailed explanation of the scene.

The Shot List

One strategy to production efficiency is to imagine what your shoot day(s) will be like. It helps to visit your location(s) a few days before your shoot and at the approximate time of production. This way you can assess the light, noise, and other factors affecting filming. This is known as the **site survey** and it allows an accurate assessment of any issues which may come up. This also allows you to make an accurate **shot list** based on your script demands. A list of needed shots and ordered shot schedule creates production efficiency. StudioBinder produces many informative videos and does a good job breaking down the many aspects of shot sizes and composition. This thirteen-minute video breaks down some of the basics:



(StudioBinder is a subscription-based company but has many free downloads and forms needed for production.)

A shot list contains more than a compilation of the kinds of clips needed. The list also orders the shots. Features are not generally shot in story order because in many films, shooting in script order would be overly cumbersome. Shoot days must be planned efficiently. Let's say, for example, restaurant scenes bookend a scene in a house. You would not want to shoot in the cafe, then move onto a house then back to the cafe.

Further, individual scenes will likely not be shot in script order. If two scenes in a kitchen surround a scene in the bedroom, it makes sense to shoot in one location first then move onto the next. Breaking down a scene further, each scene will be shot from multiple angles. So a shot list takes the shot, location, angle into consideration as well as the time of day the scene takes place.

For a simple 2-actor setup, this is my five-shot go-to for a scene:

1. Master Shot; Long Shot or Establishing Shot
2. Over-the-Shoulder (OTS) Actor 1; Medium Shot (MS)
3. Close-up (CU) Actor 1
4. OTS Actor 2; MS
5. CU Actor 2



Figure **4.1.2**: Two Person Scene (from "Disbelief", Laney College 2021). (Creative Commons License; Image by Susan A Bradley via Laney College)

I may add shots to this basic list as appropriate. For instance, if one actor pulls something from their pocket, I would add that to the shot list (CU Man pulls out knife). The reason for this is that each shot setup requires resetting lights and camera positions. The OTS and CU are shot from about the same angle and require minimal repositioning of people, set pieces and equipment. With the technology shifts, shooting an HD project using 4K, 6K or 8K files may allow you to shorten your list. These larger files with greater metadata allow you to zoom into an OTS shot to get your close-up in post production.

Crossing the Line

Extensive preplanning helps avoiding the dreaded violation of the 180 rule, also known as "Crossing the Line". The **180 degree rule** endeavors to keep two characters or objects spatially relevant to each other as you cut from scene to scene. If this spatial relationship is broken, it may confuse an audience. Whether it is a subtle distraction or longer lasting disorientation, crossing the line can be avoided.

Keeping track of which side of the screen your actors are on from one shot to another is important, especially if those two shots appear next to each other in the final edit. It is easy to screen what you have already shot; I will generally do this before setting up the next shot to make sure my characters stay on their own sides of the screen. Pay close attention if your characters move around during the scene. A person starting on the right side of the screen may end up on the left by the end of the shot. The 180 rule comes into play when the shots are edited together.

Since rules can be broken, if your goal is to disorient the audience (e.g. a fight or chase scene) then by all means break the 180 rule but only break this rule for a purpose.

Mitigating Chaos

Creating a shot list is one way to mitigate the chaos that sneaks into productions. Organized filmmakers work to minimize last minute and unforeseen issues. Detailing all the production and collateral information in one place keeps the film cast and crew moving in the same direction. Creating a binder of information is essential and is called a **Production Bible.** Check out the next section for detailed information.

This page titled 4.1: Planning to Shoot is shared under a CC BY-NC 4.0 license and was authored, remixed, and/or curated by Steve Shlisky (ASCCC Open Educational Resources Initiative (OERI)) .

4.2: The Production Bible

What is Included in a Production Bible

Every film is unique. No two **Production Bibles** are alike. Making a complete list that will satisfy every feature would be difficult. Here are some important aspects to consider:

- Scenes broken down by day, setup, required actors and crew
- Cast and crew contact info
- Site maps
- Directions to locations
- Equipment needed for each setup
- Catering, crowd control, and parking
- Production timeline(s)
- Call Sheets
- Permits
- Blank Releases

Creating Production Templates

There are many companies which sell templates for the above topics. The templates allow you to easily fill in production data. I find it simpler to create spreadsheets in Word or Excel and adapt it to the production. Cast and crew contact lists are essential because production details change not just daily but hourly. Production personnel need to be ready on a moment's notice.

Sample Crew Contact List

Crew Member	Cell Phone Number	Email	Job Function
Abby Able	(xxx) xxx-xxxx	Xxxxx	Lighting
Bill E. Tee	(xxx) xxx-xxxx	Xxxx	Audio
Justun Tyme	(xxx) xxx-xxxx	Xxxx	Transportation

Cast and Crew Sheets

To make sure that the right people are in the right place at the right time, each team member will need a Call Sheet for each day of a production. Like the contact lists, there are many companies that will charge for templates. You can build your own Actor and Crew Call Sheet:

Sample Actor Call List

Actor	Scene 1	Scene 2	Scene 3	Scene 4	Scene 5
Elizabeth	Yes	Yes	No	Yes	Yes
Juan	No	No	Yes	Yes	Yes
Eva	No	Yes	Yes	No	No
Hoppy (Rabbit and Animal Wrangler)	No	No	Yes	No	No

These spreadsheets, maps, equipment lists, and other production information will eventually be bound and/or assembled into a digital file and distributed to everyone involved with the day-to-day job of production. The more detailed the guidebook, the smoother the production and the better chance for those **Aha!** Moments!

Call Sheets

Call Sheets are organized instructions sent to each crew and cast member about the nature of the next day's shoot. Generally this is the responsibility of the Assistant Director or whoever is coordinating the production. It lists who needs to be where, wardrobe (if a cast member), equipment expected (if it is a crew member), what time each member needs to be where, where to park, even what weather will be and when the food truck is expected. Basically everything that everyone needs to know about one day's shoot.

Call Sheet Example

A call sheet from a short film called "Last Hawaiian Sugar" (Last Hawaiian Sugar-Call Sheet Day 2.pdf) includes not only which cast and crew members are expected but each individual location needed that day. You need a separate call sheet for each day of your shoot. This one is from day 2 of the production. Notice that it includes not only which cast and crew members are expected but each individual location needed that day. You need a separate call sheet for each day of your shoot. This one is from day 2 of the production.

Call Sheet for "Last Hawaiian Sugar" (Used Under Fair Use Guidelines; Gerard Elmore via NMG Network

Blank Releases

This bible needs to contain plenty of blank releases. The three main ones are cast, crew, and location releases. These need to be signed and stored as legal documents should any legal issues arise with using the video and audio footage. Releases were covered in Chapter 2 - it is just important to know that you should have plenty of blank forms for participants to sign and that the bible keeps track of everyone who has signed agreements to film. Here is a sample of a cast and crew release form, and a location release form, used by San Francisco State University. Your forms should look professional and contain your production company branding and contact information.

San Francisco State University
1600 Holloway Avenue
San Francisco, CA 94132

Broadcast & Electronic Communication Arts
415 / 338-1787
415 / 338-1168 FAX

TALENT & LABOR RELEASE FORM

I, (PRINT NAME) _____ hereby assign to the Broadcast and Electronic Communication Arts Department, San Francisco State University, all rights in and to any photographs, motion pictures, video tapes and / or audio recordings taken in the production of

_____ at any time. I hereby authorize the Broadcast and Electronic Communication Arts Department, San Francisco State University, to reproduce, copy, exhibit, publish, or distribute any and all such photographs, motion pictures, video tapes and / or audio tapes.

I understand and agree that the Broadcast and Electronic Communication Arts Department, San Francisco State University, will be held free and clear of any responsibility or claim for personal liability during the production of

_____

I certify that I am over the age of eighteen (18).

_____	_____
Signed	Witness
_____	_____
Address	Parent / Guardian (if under age of 18)
_____	_____
Phone	Date
_____	
Place	

Figure 4.2.2: Sample Talent & Labor Release. (CC-BY BECA @ SFSU; Download the BECA Talent Release)

San Francisco State University
Broadcast & Electronic Communication Arts Department
1600 Holloway Avenue
San Francisco, CA 94132

LOCATION RELEASE

Date:_____

Name of Program:_____

Description of Premises: _____

Shooting Date(s): _____

For good and valuable consideration, receipt of which is hereby acknowledged, I hereby agree that representatives of the Broadcast & Electronic Communication Arts Department ("BECA"), San Francisco State University ("SFSU") and all production equipment required by SFSU representatives may be in and around the Premises on the above Shooting Date(s) for the purpose of recording (by tape, film or otherwise) the Premises in connection with the Program. I agree that the BECA Department may incorporate such recordings, in whole or in part, into the Program. The foregoing shall include the right to use likenesses of the Premises for Program packaging, promotion and publicity purposes.

I represent and warrant that I have the legal right and power to grant to the BECA Department, San Francisco State University, the rights granted above.

Accepted and Agreed:

Name: _____

Signature:_____

Address: _____

_____

_____

Figure 4.2.3: Sample Location Release. (CC-BY BECA @ SFSU; Download the BECA Location Form)

Permits

As you navigate through the production aspects of your Production Bible, you will want to include the necessary permits you have been issued. Many municipalities have a permitting structure in place when you shoot on public property. City property includes sidewalks, parks, roads, city-owned parking lots, and city buildings. City park shoots may require permits from both the parks department and the Film Office. If you block a sidewalk or make a section of the park unusable while you are shooting scenes, then you need to let the city know. There may also be a need to hire security or off-duty police to cordon off the space being used by the production. Cities issue the permits and help with hiring off-duty police for crowd control if they require it. All permit and permission documents need to be on the set in case there is any question about the film.

Permits may be required on private property if public access is impacted by the film shoot (e.g. sidewalks or parking) or a city's services are required for your private property shoot, such as reserved street parking (metered and/or unmetered). You will also need a permit if you are using a drone.

For more information about permits in your town, contact the city or county's film office where the production will happen. Make sure that you start the permit process well ahead of your production because it could take a few weeks for you to secure a location. Here is a planning guide offered based on my city's (Oakland, California) Film Office:

Production Planner Checklist

- Confirm that you need a film permit
- Review your Film Office's Terms & Conditions
- Review insurance requirements for film shoots
- Fill out the Film Permit Application (online form or via PDF)
- Submit the Film Permit Application to the Film Office via film@oaklandca.gov
- Answer any follow up questions from the Film Office; submit any needed additional documents
- Receive your Film Permit

No permit is required to film on City property: if they are news stories and you have press credentials; if you are taking a photograph or video for personal use (vacation photos, family portraits, selfies for social media); If the entirety of your shoot is on private property and will not be taking any exterior shots of that private space. You will need permits, however, if you shoot from the public sidewalk or a public parking space in front of your location.

Other Permitting Considerations

Depending on your jurisdiction there may be other permitting hoops to jump through:

- If you decide to film on city property you will need to notify the businesses and residents in the area at least a week ahead of time. Your film office will help with who needs notification and what needs to be in the notice. My Oakland California Film Office provides a boilerplate notification letter which needs minimal information from the filmmaker.
- You may be required to provide insurance information.
- You may be limited to the time of day you can shoot - in Oakland you can only film on public property between 7a.m. & 10p.m.
- All production vehicles need a visible city parking permit while on location. These permits allow for parking for extended times.
- A Fire Permit is required to film special effects and stunts using pyrotechnics and/or materials deemed hazardous (including fireworks explosives and open flames). A Fire Department representative needs to be present (and paid an hourly rate determined by the city) while pyrotechnics are on location.
- If you are using drones you will need: a detailed flight plan, drone insurance, drone pilots license or a Remote Pilot Drone Registration Certificate.

What Will Your Permit Cost?

Good news if this is a student production many communities charge nothing to complete your class assignment. Here is a breakdown of fees for filming in Oakland, CA (as of July 21, 2021):

- Feature $216
- Television $270
- Commercial $270
- Industrial or Web $216
- Music Video $108
- Short Subject $54
- Still Photography $81
- Student Projects Fee Waived - Letter from school required
- PSA (Public Service Announcement) Fee Waived - Letter from organization required

These fees are charged for each day your shoot is on public property.

Note

Television news crews using expensive camera equipment have been susceptible to robberies when shooting on public property. Camera teams and reporters have regularly added security officers, usually off-duty police, to stand watch over a production. This is not a requirement or part of the permitting process but something to consider. Paying the overtime hourly wages to an experienced guard can offer some peace of mind from loss of equipment and personal injury.

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4.3: The Business of Filmmaking

Be Professional

Yes, filmmaking is a craft and an art. It is also a business. There are advantages to being a business. First consider yourself a business owner. The moves you make should be professional ones. You need to budget your expenses, find professionals to help you, study, purchase or rent the right equipment, and maybe try to earn some income for future projects. You need to market your current project and find investors for future ones. Take yourself seriously and you will attract serious filmmakers.

If you take a job for a client, you should be paid a wage comparable to your skill set(s). If you pay workers for shooting, editing and crewing your project, you should pay them for their skill set(s). Even if you only feed your crew lunch, keep track of that expense. If you receive grants, win money or camera equipment from film festivals, that is income and will all be reflected in your tax returns.

Be Legal

There is a tendency to skip the legal requirements surrounding your film company. There are really good reasons to get a business license however. The city you live in will issue you a permit which will need to be renewed every year. This is not expensive. In my community the initial registration fee was under $100 and the yearly fee is under $70, as long as the gross income (money you make before any deductions for expenses) from the business is under $50,000. Your community will have a different set of fees, so do some research.

A license will allow you to deduct expenses from filmmaking and to write off the cost of your tools, equipment, and expenses (like gasoline as you go from home to set) against the income. If your city discovers that you lack a proper license, you may get fined, have to register for the permit, and pay the back fees anyway. Consult a CPA or tax attorney for specific rules in your community - each city and state will handle tax rules differently.

Check with your city about how to apply for a license. Many cities allow you to do it online. There are categories for different businesses. Find the one which closely matches "Motion Picture Production".

Account for Expenses

When you complete a yearly tax return, you will need to have a clear idea of your profit and expenses. This can be as simple as keeping a monthly list on paper, or an Excel or Word document. Keep evidence of your profits (as invoices) and expenses (as receipts for purchases or statements from utilities) in case you are audited. Here is a partial list of possible expenses:

- Travel, fuel and parking costs to and from work
- Office costs, stationery, phone bills, office rent
- Equipment, hardware, rent or purchases
- Clothing expenses, any specialist clothing
- Advertising and Marketing, website costs
- Training courses related to your business
- Work from home expenses
- Business and filmmaking software
- Crew and cast salaries

You can deduct your expenses from your income from production work. This will lower your tax liability.

Your Tax Return

When you are self-employed you only need to complete a tax return once a year. If you have a different job and freelance video work, everything you earn from both will be counted as your income for the year.

Usually your tax year will be the calender year from January 1st to December 31st. For each year you need to complete your tax return as part of your regular taxes by the 15th of April. Your state may allow an extension to this deadline - you will need to research the rules in your area. You have a lot of time to file your tax return, but if you fail to do this, there will be penalties.

Since you are the proprietor of your film company there is no automatic withholding of income. Try keeping aside at least 20% of any profits from film jobs. This is the simplest way to make sure you can afford to pay your tax.

If all this sounds too complicated you could always hire an accountant to do this for you. Taxes do not have to be complicated or stressful. Make this process as easy as possible, by taking the time every month to calculate your profits and expenses in advance.

Invoices

When you complete a job, you will need to send off an invoice to get paid.

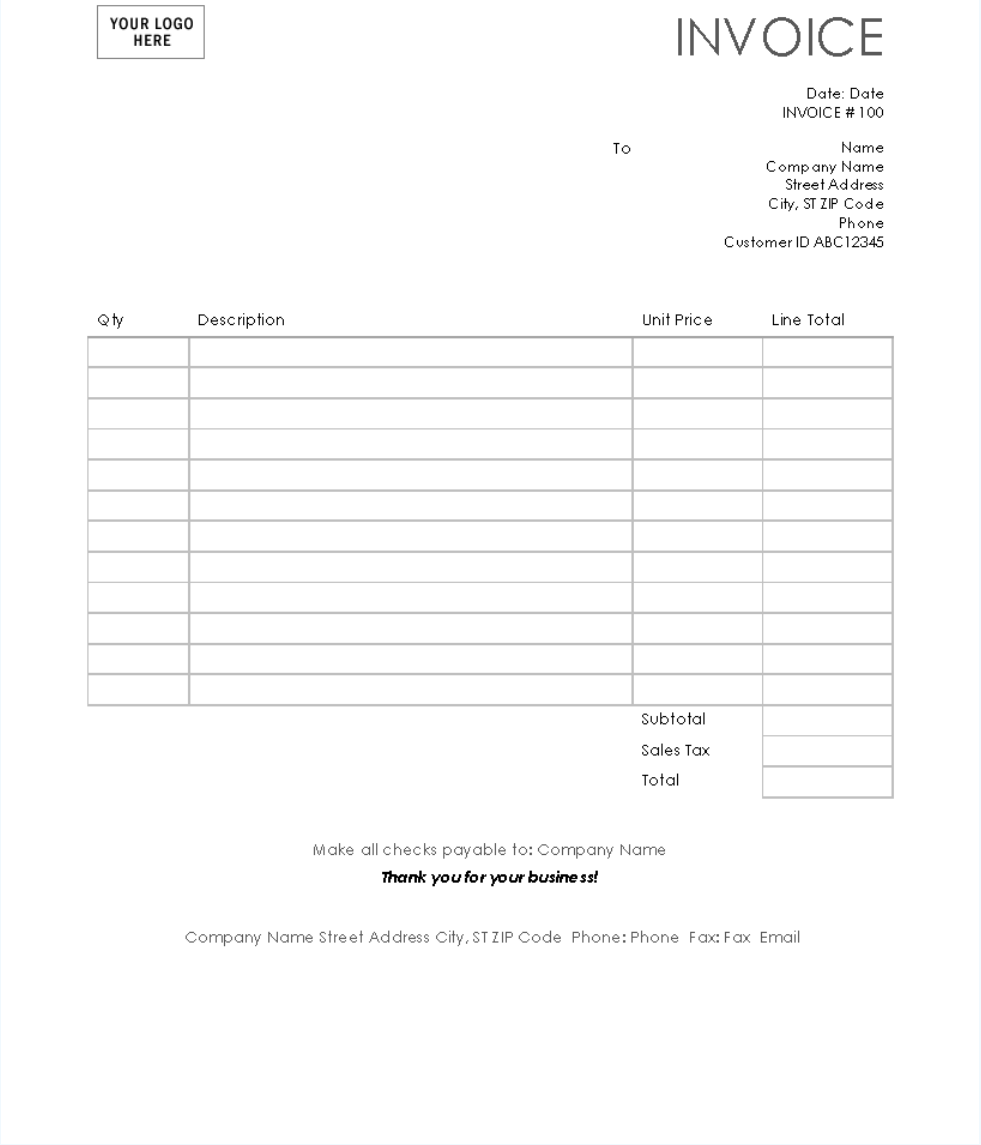
This is simply a document stating what work you have done, how much you will get paid, and maybe your bank details if you elect a direct deposit. You will get paid typically within 30 days of sending your invoice; however, some people or companies pay much later. Therefore you should negotiate payment terms before you start work.

An invoice is a single page long and must contain the following basic information.

- The word '**Invoice**'
- The date of the invoice
- Your employer's name, address, and contact information
- Your name, address, and contact information
- A brief description of the work you have done, including date(s)
- The total amount you are charging, and how you should receive the payment (i.e. check to mailing address, Direct deposit details)
- Payment terms (e.g. **within 30 days**)
- Payment Penalty statement (i.e. Due and payable upon receipt. A service fee of 1.5% monthly will be added to all unpaid accounts 30 days from due date)

Basic Invoice

Here is a simple invoice I made from a template in Microsoft Word:



YOUR LOGO HERE

INVOICE

Date: Date
INVOICE # 100

To

Name
Company Name
Street Address
City, ST ZIP Code
Phone
Customer ID ABC12345

Qty	Description	Unit Price	Line Total
		Subtotal	
		Sales Tax	
		Total	

Make all checks payable to: Company Name

Thank you for your business!

Company Name Street Address City, ST ZIP Code Phone: Phone Fax: Fax Email

Figure **4.3.1**: Simple Invoice (CC-BY Steve Shlisky; Download the Sample Invoice).

Branding

Branding is one way to show that your film company exists and looks professional. You should think about designing a logo, having a company name and creating a website or a Social Media page. You will want to create a positive impression of the kinds of work you provide, such as, filming weddings, or just making films for an audience. You will want to promote or market your product so clients or investors can find you.

Thinking about **Branding:**

- What is the unique persona you want to promote. You might be the low budget alternative to big crew productions. A "Dirt Cheap Videos" company name promotes that idea and would be appealing to some customers. Maybe you only want to do music videos or science documentaries. Your brand may suggest the kinds of projects you will take on.
- Brands add a sense of professionalism in your ability. Brands often bring first impressions to a client. It may be the first thing people see before they meet you.

- If a brand icon looks clean and appealing, it will color a client's first impression of you. Since you are in a visual medium, a pleasant visual avatar only helps.
- A catchy brand will make it easier to remember your name.
- Since you and your brand are different entities, you can promote the brand any way you want. You might be many things to different people (a daughter, father, friend, lover). Your production brand only concerns filmmaking.

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CHAPTER OVERVIEW

5: Funding

Learning Objectives

1. Gain an understanding of your feature's Business and Production Plan.
2. Learn how to create a Film Proposal for your feature.
3. Explore ways to finance your film.

5.1: The Business Plan and The Production Plan

5.2: The Film Proposal

5.3: Grants

5.4: Fellowships

5.5: Other Funding Avenues

5.6: Film Festivals

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5.1: The Business Plan and The Production Plan

The Need for Plans

The way films are financed differ greatly depending on the size of your budget. Pulling out your cell phone and following your dog around the neighborhood on his adventures is something that you can self-finance. If you want your film to play in movie houses, get selected for film festivals, or to demonstrate skills sets that will catch the eye of Spike Lee, you will need larger budgets.

Despite the size of your budget, you will want a **Business Plan,** a **Production Plan,** and an overall **Film Proposal** for each film you make. If you seek investors for your project, they will also need to see a project **Production Plan** as well.

The Business Plan

Your film production is the product of your production company. Think of your filmmaking skill sets as a product of your company. This company has an owner, management people, and other employed individuals. You may even wear all the hats as a sole proprietor. In smaller video productions, each individual takes on more than one role. At the top are the producers, those individuals who supply or find the financing. As producers go out and try to secure production financing, they will need a detailed explanation of your company and the feature they will be making. Even if you are just completing a project for a film class, it helps to think of yourself as a business. You need people skills to interest your fellow students to act as crew or cast, negotiating skills with your parents, neighbors and investors, or maybe bartering skills with sandwich shops to cater the production shoots.

Start with a business plan:

- Name your production company
- Apply for a business license
- Prepare the production bible
- Create talent releases
- Have everyone sign a Non-Disclosure Agreement

We have covered some of these items in the previous chapter. Your **business plan** has similar elements found in your **production bible.** The difference is that your production bible reflects your current project and a business plan covers present and future projects. You may want to think about creating a **mission statement** reflecting on the kinds of projects your business will be creating. Mission statements identify your business strategy and help define your activity in a concise manner. If you do not write an actual mission statement then at least think about the kinds of projects you will produce and why you want to do them.

A Non-Disclosure Agreement (NDA) protects your valuable story ideas while they are still just ideas and not yet produced into features. It is a legal document that your crew sign to keep confidential the nature of your productions. This allows you to pitch your ideas to actors, directors, financiers, and anyone you talk to about your projects and not have your ideas appropriated by someone else. A producer would have to disclose their story idea to a potential director - without an NDA, that director could make the film on their own or may disclose to others what you plan. Like many of the other documents in this chapter and the previous one, there are many samples of these agreements found online.

Investors in your project will want to see a professional-looking business plan. If you apply for financing - whether from friends, investors, or seeking grants - they will want to know that you are prepared and that you have long-term goals. Having all of your blank forms, documents, and strategies in one place helps to look professional.

The Production Plan

The **production plan** is a separate document. It deals more with the logistics of filmmaking rather than the business side. A production plan explains what will happen when your project actually starts filming. It will give specific dates, from the first take to the wrap party. It will disclose the post-production activities and how the film will be distributed.

One of the roles of the assistant director is to create a roadmap of the entire production. This includes dates and locations as well as necessary equipment needs on each individual shoot day. This plan enables the video production to progress smoothly. It breaks down the scenes, crew needed, times, cast, set pieces, and meal periods across all the days of the production shoot.

Your business plan and your production plan are just two elements of your **film proposal**. The next section details the proposal, which clarifies specific details of your overall production.

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5.2: The Film Proposal

The Film Proposal is The Mega Document

The **business plan** and the **production plan** are often combined into one mega document which is the **film proposal**. The film proposal will give an actor, crew member, or potential investor the full scope of the project. For the serious video project you could include:

- Proposed budget
- Synopsis (logline, pitch, treatment)
- Screenplay
- Mood Board
- Storyboard
- Cast list
- Crew list
- Target audience
- Marketing
- List of investors
- Distribution
- Return on investment (ROI) statement

Much of these points have been covered in previous chapters so I will define a couple of the new terms.

Mood Board

Most of preproduction involves many printed words on many pages. Video, though, is a visual medium. Your film proposal will need to address the visual elements for others to understand your vision. This is where the **mood board** comes in. The mood board conveys the look of your film. It can help define what the characters look like, where the locations are, what kinds of props and wardrobes are needed. Producers can go to locations and compile images to populate the film proposal, or they can simply cut out pictures from magazines that will give someone the look you are trying for.

There are also online tools, many free, that can simply be utilized. As an example (this is not a real movie), here is an image I created in under 10 minutes from a free account of Adobe Express:



Figure **5.2.1**: An example of a Mood Board. (Unsplash License; Sai De Silva via Unsplash; unsplash.com/@scoutthecity)

This quick picture says much in a very little space. It gives others an idea of what my characters will look like, a bit of the kind of story, and the contemporary space where the film takes place.

To get a sense of the other characters, possibly the male lead:

Maybe there is a scene in a bookstore with an older gentleman:



Figure 5.2.3:(Old man reading surrounded by many books) (Pixabay License; Pixabay via Pixabay; pixabay.com/images/id-1246520/)



Figure 5.2.2: Example of Male Lead (Pixaby License; Image by StartupStockPhotos via Pixabay)

As you put these pictures together, potential actors, investors, and crew get a better idea of your vision for the final look.

The same thing works for locations. Find free images or go out and shoot the actual locations:



Figure 5.2.4: Exterior, front of apartment (Pixaby License; Image by Gosia K. via Pixabay)

Designing "Apollo 13" on Actual Apollo flights

Rob Legato creates movie effects so good they (sometimes) trump the real thing. In this warm and funny talk, he shares his vision for enhancing reality on-screen in movies like Apollo 13, Titanic and Hugo.



Read a transcript of this TED Talk.

Note

Mood boards help a creative team to work on unifying their ideas. They can transmit the producer's intent and mood of the film to their creative partners. The following summary paragraph comes from a scholarly article about the use of mood boards in perfume development. It is easy to imagine the same process in film production. A study in the scientific journal Science Direct* shows that mood boards were effective in establishing a point of reference between creative partners.

"The mood board is created in the first month of the process, beginning with the creative director's initial insight into the product's theme. It supports *coordination* via processes of a.) setting the scene, b.) directing activities & aligning sub-products, and c.) establishing a point of reference. It provides *creative freedom* via a.) leaving room for interpretation, b.) providing a source of inspiration, and c.) allowing self-expression and signature style." (CC BY-NC-ND 4.0; Visual organizing: Balancing coordination and creative freedom via mood boards - ScienceDirect)

Early in a production the mood board sets the scene, introduces character types, and helps to establish a point of reference of the elements of production. The film creatives can begin to mold the look of a picture based on these initial visualized ideas of the director or producer.

Target Audience

Identifying the audience which will be most interested in your film helps to focus the film proposal. Your horror film may not appeal to a couple on a romantic date. Your film will fit in a niche and so you need to seek out that audience. When made, your film will be marketed to your target audience. It connects your viewers to your message.
You need a niched-dedicated and excited group of film fans. Your mailing list needs to be interactive so that fans can start a conversation with you.

Once your script is written, try and define the best audience to bring it to. There are people who consume many different genres of film, but will your film mostly appeal to:

- Men, women, or other gender
- A particular age group
- Their level of education
- The subject matter of your film

Marketing

Once your film is made, how will you promote it? In preproduction, you may have had an idea of why you were making the film: to satisfy a school project, enter it in film competitions, or try and get a distribution deal with a movie company. Interested parties in your film will want to know what kind of support you plan for the film's distribution. A good place to start is creating a movie

poster. This is mandatory if you will enter film festivals (discussed in section 5.7), and will need to be in a portrait style format and not the usual film landscape format. Social Media, websites, and trailers all will help market your film in an inexpensive way.

Distribution

Distribution defines how your film will get out to an audience. Likely it will be on-line as well as shown in film festivals. Few low budget films make it to commercial theaters or on television but even this distribution is possible. Later is this chapter we will cover film festivals - other forms of distribution will be covered in Chapter 17.

Return on Investment

Part of the reason someone invested in your film was to see it succeed in some fashion. Many times there is a financial gain. Independent films rarely make any money and usually lose money. On Hollywood big-budgeted films, the **Return on Investment (ROI)** is referred to as “box office”. The true returns on these features are difficult, if not impossible, to decipher because of an opaque studio system. Some studios will pump up the profit they make on films to help their marketing (if a movie makes a zillion dollars, then maybe I should see it too) - or a feature will seem to lose money so there are seemingly less profits to split with investors.

Another kind of return on investment is the filmmaker’s reputation. When a director makes a successful film, people will want to follow their career. For the beginning film student, getting the technical details right will position them for future features with increased backing from investors.

*(CC BY-NC-ND 4.0; Visual organizing: Balancing coordination and creative freedom via mood boards - ScienceDirect)

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5.3: Grants

Finding Grants

Student filmmakers have an advantage that they can use their school's audio and video recording equipment. They often utilize their fellow students as cast and crew members. Generally, a student will spend next to nothing (or indeed nothing) on their assigned school project. Once a student graduates, this all changes. Films take a lot of money to make well - a director making their first non-school project may not be able to finance their next project themselves. Many established directors do not put any of their own money into their projects. So, filmmakers need to find other money.

You have spent a lot of time creating your business and production plans, and creating your film proposal, now you can put that effort to work for you.

Example 5.3.1: Caveat on Film Funding

Grant funding is an ever-changing landscape. "It can be difficult to know who to trust" according to one of my former students and a current independent filmmaker. Companies funding filmmakers often change. It is best to research a number of different options and ask questions from other filmmakers of their experiences.

Some funders offer classes in pursuing grants and some charge for helping you to develop your proposals. Go this route with careful research.

Filmmakers I have talked to have followed up with their applications only to find the companies have disappeared. It is best to go with companies with good reputations, usually associated with well known companies.

Grants

Grants will give you money, that is “give” and not “loan”. There are detailed application procedures and you may find some stiff competition for the larger subsidies. The nice thing about grants is they invest in the filmmaker and do not expect a cash return on their investments. These organizations help filmmakers advance their careers and help to recognize their accomplishments. Donors of the grants know they are providing a needed resource and contribute to a dynamic industry.

There are literally hundreds of grants available and each one will have a different application procedure. Some may only want to see your screenplay, while others will want to see a trailer or an already shot scene.

Most of the work you have put into creating your **Production Bible, Film Proposal, Business and Production Plans** can be cut-and-pasted into the applications.

A particular film grant is generally for a specific amount of money and for a particular kind of genre of film. You can apply for more than one grant for your film as well.

Without recommending a particular company, here are some places to check out:

Student Films

- Student Academy Awards - The academy established the student Academy Awards to support and encourage excellence in filmmaking at the collegiate level.
- SF Film - Creates grant programs that directly fund and support films in various stages of production.
- Panavision's New Filmmaker Program - Panavision offers the New Filmmaker Program Equipment Grant, which provides the use of Panavision film or digital camera packages to aspiring filmmakers of all kinds at little to no cost. There may be a fee for applying for this grant.

Documentary

- SHIFT Creative Fund - Funds for narrative short films, not documentary or feature-length projects.
- The Paley DocPitch Competition - Offers a $5000 grant for an unfinished or work-in-progress production. Directors must have directed 2 or less documentaries

Short Films

- Sundance Institute - The Sundance Documentary Film Program supports nonfiction filmmakers worldwide in the production of cinematic documentaries on contemporary themes.
- Claims Conference Film Grant - Grants for films dealing with an aspect of the Holocaust

New Media

- Filmmakers Without Borders - Supports independent filmmakers around the world via grants and other funding initiatives. Focus is on narrative films, documentary films, and new media projects that align with themes of social justice, empowerment, and cultural exchange.
- Virtual Reality Venture Capital Alliance (VRVCA) - Invests in Virtual Reality Media startups.
- Alfred P Sloane Foundation - Very selective in what they fund - make sure to check this section to see if you qualify.
- Ford Foundation - Funds social justice storytelling and the 21st-century arts infrastructure that supports it.

Specialty Grants

Funding by Women

Specialty Grants focus money and support resources to a narrow range of projects. Actor and activist Naomi McDougall Jones outlines her four-point plan for a total representation revolution in Hollywood. She says: "What we see in movies matters: it affects our hobbies, our career choices, our emotions and even our identities. Right now, we don't see enough women on screen or behind the camera."



Read a transcript of this TED Talk.

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5.4: Fellowships

Scholarships for Filmmakers

Fellowships are like scholarships for filmmakers who are well on their way to completing their college degree. Many fellowship awardees have undergraduate, graduate, or are pursuing a post-graduate degree. Fellowships differ from grants in that they may require a service aspect tied to your project or a residency. A residency means that you would live and work for a period of time as defined by the particular award. A fellowship helps with funds for creating specific works. Applicants will compete for these prestigious positions and the end results are often very meaningful and important works.

A Small Sampling of Fellowships

The following, mostly documentary offerings, are a few of the opportunities available:

Airbnb Creative Fellowship:

PEN America's Writing for Justice Fellowship commissions six writers—emerging or established—to create written works of lasting merit that illuminate critical issues related to mass incarceration and catalyze public debate. Proposed projects may include —but are not limited to—fictional stories; works of literary or long-form journalism; theatrical, television or film scripts; memoirs; poetry collections; or multimedia projects. Fellows will receive mentoring, an honorarium of $10,000 and may request up to $5,000 in additional funding for travel and research. Writers 21 and up are invited to apply.

American Library in Paris Visiting Fellowship:

A $5,000 stipend will be paid before start of a Fellowship period. The award, to be spent at the discretion of the Fellow, is designed to cover travel to Paris, accommodation, and expenses associated with the month in Paris. In addition to the stipend, the Library will connect the fellow to resources and people in Paris that could be helpful to his or her project.

The Bill Lane Center for the American West:

This Western Journalism and Media Fellowships provide opportunities for journalists working in all kinds of media — newspapers, magazines, radio, television, online, multimedia, video, film, data visualization and mapping, and books. The fellowship enables journalists to visit Stanford and interact with researchers, scholars, and students; develop or work on a project of their own design; and spur new coverage and understanding of the American West.

Boehm Media Fellowship:

The Boehm Media Fellowships provides opportunities for communication, media, and storytelling experts who are committed to social impact and sustainable solutions to poverty and injustice to participate as delegates at Opportunity Collaboration. They seek individuals who, on their own or through their organizational roles, utilize the media in creative and innovative ways to influence culture, collaborate with communities and interface with new paradigms and ideas to catalyze change.

Brave New Fellows Program:

Offers activist storytellers from communities of color and/or economically marginalized communities a one-year, paid opportunity to work with Brave New Films and learn how to create and distribute media that makes a difference. As compensation, each fellow receives $800/week for the duration of the fellowship, medical and dental insurance, and paid time off.

Creative Capital Awards:

A long-term partnership between Creative Capital, artists, and a broader artistic community. Creative Capital supports projects in the long term, offering connections to expert advice on everything from the law to finances, and to the perspectives and expertise of other artists. The goal is not just the successful development of groundbreaking work, but more stable and sustainable practices, on which artists can build.

CBA Resident Fellowship Program:

The CBA Fellowship Program awards residencies to artists and scholars across disciplines to work on projects that expand the way we think about the history, practice, and performance of dance. Fellows are not required to be experts in ballet or dance, but must

have an interest in engaging with the art. The fellowship provides space, a stipend, and time to pursue rigorous work. Fellows also gain new colleagues and a broad community of artists and scholars, two communities that do not often meet.

Fulbright/National Geographic Digital Storytelling Fellowship:

This fellowship accepts proposals to undertake an in-depth examination of a globally relevant issue as an enhancement to their Fulbright research or arts project. The National Geographic Society's focus areas are: Oceans, Land, Wildlife, Human History & Cultures, and Human Ingenuity. Storytellers may use a variety of storytelling tools—including, but not limited to writing, photography, video, audio/podcasts, maps, or graphic illustrations to share their stories.

SFFILM/Rainin Filmmaking Grants:

Awards are made to multiple projects once a year in the fall, for screenwriting, development, and post-production. In addition to a cash grant of up to $25,000, recipients secure a two month residency at FilmHouse and benefit from SFFILM's comprehensive and dynamic artist development programs. The program is open to filmmakers in the US and internationally who can commit to spending time developing the film in San Francisco.

The Sundance Institute Comedy Fellowship:

Provides targeted support to the next generation of diverse, culturally relevant comedic voices. The fellowship supports one artist/project that will participate in either the January Screenwriters Lab or March Screenwriters Intensive and includes an unrestricted grant and customized mentorship from FFP staff. Writers or writer/directors developing their first or second fiction feature film are eligible for the fellowship.

Soros Justice Fellowships in Media:

The Soros Justice Media Fellowships support writers, print and broadcast journalists, bloggers, filmmakers, and other individuals with distinctive voices proposing to complete media projects that engage and inform, spur debate and conversation, and catalyze change on important U.S. criminal justice issues.

Writing for Justice Fellowship:

PEN America's Writing for Justice Fellowship commissions writers—emerging or established—to create written works (including screenplays) of lasting merit that illuminate critical issues related to mass incarceration and catalyze public debate.

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5.5: Other Funding Avenues

Self-Financing

Many young filmmakers start by self-funding their own films. Students completing school assignments have the luxury of utilizing their classroom equipment and fellow students to grip and act in their screenplays. This exercise in self-funding wears thin as filmmakers evolve to more sophisticated productions. Seeking crew with better skill sets and actors with experience will cost more than a director wants to spend out of pocket.

Private Investors

When a filmmaker needs to find other financing, the first place to look may be friends and family, but Christmas and birthday gifts or a stray dollar here or there do little to improve equipment costs. Private investors will want to see a track record of past work but also some development of new film ideas. The strategy is to position yourself in places where people are passionate about films. We have talked about grants and fellowships in previous chapters. The next chapter explores film festivals.

Fiscal Sponsorships

Fiscal sponsorship is an arrangement between an existing 501(c)(3) nonprofit organization and an individual or entity lacking the legal status needed to receive grants from foundations, individual donors, and government agencies. There are companies which will match filmmakers with nonprofit organizations for a fee.

There are a number of advantages and disadvantages to consider when deciding whether to enter into a fiscal sponsorship in addition to the considerations mentioned above. First, there are several obvious advantages to this type of a relationship for both the sponsor and the sponsee. The fiscal sponsee benefits from the resources, infrastructure, and expertise of an established nonprofit organization. The fiscal sponsor gets a new project to start expanding the support it provides to the community. The fiscal sponsor can better serve its mission faster with little work. Additionally, the fiscal sponsor can hire the sponsee to help run the project to gain the benefit of their intimate knowledge with the project.

On the other hand, there are a number of disadvantages or cons that come along with a fiscal sponsorship relationship that may outweigh the advantages. These include the loss of total control of a project and the administrative fees paid to the fiscal sponsor. In order to create a valid fiscal sponsorship relationship, the fiscal sponsor must have control over the funds being given to the fiscal sponsee and be able to direct large parts of its operations. For some, this loss of control makes a fiscal sponsorship unworkable; but if the fiscal sponsee can bear the loss, then the sponsorship can still be beneficial to both parties.

Product Placement

Product placement is a form of advertising in which branded goods and services are featured in a production that targets a large audience. Also known as "embedded marketing" or "embedded advertising," product placements are typically found in movies, television shows, personal videos, radio, and—less commonly—live performances. In exchange for product placement rights, companies may pay a production company or studio in cash, goods, or services. You can contact local companies like restaurants for a trade of food or scene locations in exchange for an exterior shot of the business but generally you will need to find a product placement service to help you land national sponsors.

Film Studio

In the preface of this chapter, Nick Chapman found himself seduced by a studio system. It would have been easy for him to make the movie he pitched but he struggled with the changes the studio was demanding.

This is the tradeoff with teaming up with a big company. The financing part is simpler because the studio has many of the mechanisms and industry relationships already at hand. Studios handle production through marketing and distribution. In exchange, the filmmaker yields some creative control to the studio. The studio could even decide to kill the film project altogether.

Crowdsourcing

Crowdsourcing uses an online company to match many small investors with filmmakers. Depending on the size of the investment, these individuals are promised mentions in the credits, invitations to film openings, and even parts in the film or producer credits.

Two of the most popular crowd sourcing sites are "Go Fund Me" and "Kickstarter".

Some have turned to crowdsourcing to complete projects that have run out of funds or to help in development and preproduction. The most successful projects have a video pitch component or trailer to give the those browsing through the listings an idea of the project.

Basically the filmmaker will set a goal as a dollar amount and a timetable for that goal to be reached.

Two Main Types of Crowdfunding

Crowdfunding sites charge a fee for their service. You will only pay the fee when your particular goal is reached. There are two types of goals: fixed and flexible. If you use a fixed funding plan and raise the dollar amount targeted, you will pay your platform fee and collect the funds. If you do not meet the target, you will receive no funds, pay no fee, and the earmarked donations are returned to the investors. In this case you will not have to keep your promises to investors, such as producer credits or tickets to openings.

In flexible crowdfunding, you will receive all the donations and pay the fees regardless of the goal. You will also have to keep your promises to investors even if your goal falls short.

Fixed Funding is the Safer Option

Since most small films are strapped for cash, fixed funding would seem the better option. There is no out-of-pocket expense if the goal is not met - then there are no promises to keep if you only get a handful of investors. The advantage is that people browse these sites, specifically people interested in films, come across your particular project and become interested in your film. You will have access to a certain population geared toward making small investments in films which you can get no place else.

Another Kind of Crowdsourcing

Filmmaker Deborah Scranton talks about and shows clips from her documentary "The War Tapes," which puts cameras in the hands of soldiers fighting in Iraq in this seventeen-and-a-half minute Ted Talk.



Read a transcript of this TED Talk.

Networking

Networking is about building relationships. For many of my students this starts in my classroom. This has mutual benefits - you help in their features, they help in yours. As students leave our program they team up with other talented students and start projects on their own.

Much of filmmaking is freelance work. Connecting with other filmmakers expands one's circle of peers. For the successful filmmaker, this process continues beyond their school studies and throughout their careers. Put yourself in situations to capitalize on new relationships with industry professionals. Here are some hints to expand your reach:

- Streamline your pitch
- Create a company name, logo, website and business cards

- Stay connected to your talented classmates. This has mutual benefits - you help in their features they help in yours.
- Follow and be followed on social media

Probably the best way to network is to enter **film festivals**. There are many dozens of festivals across the country. They do a great job of matching people who have a passion for films and filmmakers. The next section goes into greater detail.

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5.6: Film Festivals

Finding Distribution

Film festivals match filmmakers to film distributors. If your film winds its way to a screening, it enters into an arena filled with distributors, filmmakers, and film enthusiasts, those people who may want to promote your film to a bigger world. This is where deals are made to find your audience. Similar to finding film grants, there are many pitfalls so the same caveats apply to finding reputable festivals like finding reputable grant foundations.

Finding an Audience

For the student filmmaker, finishing a film is a milestone. As a class assignment, there is a ready audience of fellow students watching your progress. You will eventually want a bigger world to enjoy your movie. Many students find it scary to place their film out for possible criticism. A filmmaker needs an audience to further learn their craft. Submitting to film festivals is a logical next step.

A film goes through multiple tiers of acceptance as it winds through a particular festival. At each level of acceptance, the film has a laurel attached to it. There are laurels for Semi Finalist, Finalist, Official Selections, and laurels for making it to the screenings. There are other awards at the screenings. The laurel recognitions are energizing to filmmakers who have only enjoyed an audience of their friends and family.



Figure 5.6.1: Semi Finalist Laurel for the Film "Rejoice Abyssinnia". (San Francisco Indie Short Festival; author via source)

These laurels add up and help to advertise you film.



Figure 5.6.2: Producer Gail Simpson in Front of Laurel-filled Poster of Her Film (CC-BY Gail Simpson; Opera Frontier)

The Film Festival

Reputable festivals encourage filmmakers; that is their primary purpose. They connect audiences to unknown talent. Not every film submitted to festivals gets an actual screening in front of an audience. There are figurative gates they must pass through. Each gate a has title like: “Semi Finalist - "Finalist" - "Official Selective". The epitome of these gates is the one where your film is screened

in front of an audience. In 2019, there were 14,000 films submitted to the Sundance Film Festival; only 100 were shown to an audience. Those selected films ran the gauntlet of screening levels to get to the final screening with a paid audience of film distributors and other film lovers.

Plan to attend the film festival you enter. Even if your film is not selected, filmmakers should travel to the screenings. Many showings have question and answer sessions, where one can meet and network about experiences.

The screenings are also where the deals are made for distributing the film to a wide audience. These relationships provide filmmakers with important contacts for future projects.

The Heat Check

Many filmmakers who get screenings find distributions for their films., A relationship forms and distributors will “heat check” these filmmakers. This means that they stay in contact with them and are interested in their newest projects. The heat check only works if filmmakers are well on their way working on another film. Since film development takes a long time, distributors are interested in films nearing completion. Once a distributor buys and circulates your film, they will be looking build future relationships.

Film Festival Checklist

If you are not antsy about when your film gets screened, try to enter the big film festivals first. Much of the bigger names like Sundance & Tribeca will only take films which have not premiered anywhere else first.

Once you have exhausted this first step, then look for a festival which matches the genre of your film. Just like with film grants, some festivals are specifically themed.

This is a small portion of just the documentary film festivals in the United States:

The 10 Under 10 Festival:

Showcases short, high-quality, low-budget documentaries.

AFI Docs:

An American international film festival created by the American Film Institute and the Discovery Channel.

The Big Sky Documentary Festival:

The festival presents an average of 150 non-fiction films annually at the historic Wilma Theater, The Top Hat, The Roxy Theater, and Crystal Theater in downtown Missoula, Montana.

Doc NYC:

the festival is the country's largest documentary film festival with over 300 films and events and 250 special guests.

· Doc LA – Los Angeles Documentary Film Festival:

While its primary focus is documentary and short films, DocLA selects and awards films of all genres.

Full Frame Documentary Film Festival:

The festival is a program of the Center for Documentary Studies at Duke University

United Nations Association Film Festival:

Every year the festival has a theme which emphasizes a particular topic including Education, Globalization, Health, Environment, Sustainability, Refugees, War and Peace.

Other Film Festivals

Science Fiction Film Festivals

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CHAPTER OVERVIEW

6: Set Etiquette

Learning Objectives

1. Learn who does what on the set?
2. Become familiar with the job hierarchy - who reports to whom?
3. Understand the director commands during shot takes - what happens between "Places Everyone" and "Cut".

6.1: Who Does What

6.2: The Director's Commands

6.3: When the Shooting Stops

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6.1: Who Does What

...And Finally on the Set

The long preproduction has come to this, actually putting to action all of the careful planning. Think of production as two main bodies of consideration: the actions of the talent (actors or interviewees if a documentary); and the actions of the crew. These positions are controlled by the Director and Director of Photography (DP) respectively. A single person crew would be tasked to fill every production position.



Figure **6.1.1**: Director (seated) Camera, and 1st Assistant Camera on Set). (Creative Commons License; Susan A. Bradley via Laney College)

As the crews sizes grow, video production jobs on the set get more defined: those affecting the talent directed by the director; and those of the more technical cameras, lights, and sound supervised by the DP. Since producers overview everything on a production, two-person crews would also split up the duties of the producer.

It is best to determine job functions before getting to the set, especially if there is talent or interviews to be done. The more organized the approach to production the smoother things will go. If the actors are comfortable with the actions of the crew then their performances will be better. This is especially true with first-time interviewees nervous before a camera. All those in front of the camera want to be seen in a good light and depend on the crew to protect their images and reputations.

A good strategy for a two-person crew has the director working with talent, blocking the scenes, going over lines, going over interview questions for documentaries, and making sure all the talent releases have been signed. While the director of is involved with on-camera talent, the DP can light the scene, prepare the mikes, and set up the camera.

At some point the director and DP come together to make sure the talent blocking and camera angles make sense. There may be a rehearsal before an actual take which may be filmed as well. This way the director-DP team can see a playback before doing a real take.

As crew are added they would be deployed to assist either the director or DP. As the number of crew increases, the jobs get more specialized.

A Final Note About the Director and DP Relationship

By splitting the duties between directing the talent and directing the technical crew, the director and DP should not be considered equal in responsibility. The overall control of productions belongs to the director. The DP still reports to the picture director whose decision is final.



Figure 6.1.2: Director's Chair (Pixaby License; Image by Clker-Free-Vector-Images via Pixabay)

The Director's Role

The Director is the orchestra leader, responsible to show superior images on screen. The director coaxes the best performances of the actors, automobiles and animals while making sure the cameras record these scenes. The director works closely with the DP to set up the best angles that support the film's themes.

Since the actors, interviewees, animals, and sets are what an audience will see on screen, the performance behind the camera needs to be organized and professional. An actor's image is how they get future rolls - how they look onscreen is important. Actors need to trust that the crew is looking to support the best performance. A person being interviewed on camera needs to have confidence that what they say is being translated to an audience.

Crew may be hired to assist the director. They are credited as the first and second assistant directors or **production assistants**.

The First Assistant Director (1st AD)

The 1st AD is responsible for breaking down the script and putting in into a shooting schedule. This involves looking at the script and breaking it down to individual scenes and shots, and creating a labeling convention for the scenes. The 1st AD keeps track of the schedule making sure the shoots run efficiently.

The Second Assistant Director (2nd AD)

The 2nd AD assists the 1st AD on set. They are also responsible for the paperwork such as the call sheets and production reports. They are the conduit to the cast, getting them to the set at the proper time, and delivering information about changes to the shooting schedule.

Production Assistants

Production assistants assist the 1st and 2nd ADs, generally doing all the odd jobs so no details slip by.



Figure 6.1.3: Production Assistant readying a camera. (Unsplash License; Photo by Lina Kraftsoff via Unsplash)

The Director or Photography (DP or DoP)

Obviously, the DP supervises the camera shots - they also manage the lighting department, audio recording, grips, gaffers and electricians.

The director of photography, sometimes called the cinematographer, partners with but generally works for the director. This person is responsible for realizing the director's vision onto the film, TV program or whatever the filmed production needs. The cinematographer heads the camera, lights, electrician and set crews. Pretty much anything having to do with the image, from selecting the camera and lenses to the look of the lighting.

There is a close bond between the director and DP, but the director's decisions are where the proverbial buck stops. A director can let the cinematographer freely make image decisions. While some directors take charge of camera placement, these two roles need to have the best working relationship to keep productions orderly and efficient.

The First Assistant Camera (1st AC, sometimes referred to as the Focus Puller)

The 1st AC main job is to keep the image in focus. On a lock down shot when the subject does not move, they can simply set focus, then check focus before the camera rolls. For more complex shots, the 1st AC needs a strategy that follows the focus as the subject moves closer and further away from the camera. There are specialized equipment either attached to the camera (like a focus ring) or by remote that can assist this **focus puller** in their job.

Keeping a moving shot in focus is a tough job and may take a rehearsal or two before a live take. Once the camera rolls, the focus puller needs to stay alert to the action. No two takes are exactly alike. The 1st AC must concentrate on keeping the talent sharp in focus or ruin an otherwise good take.

The 1st AC is responsible for the care and maintenance of the camera equipment. This involves assembling camera rigs, setting tripods, cleaning camera lenses, and striking and boxing up the equipment at the end of the day.

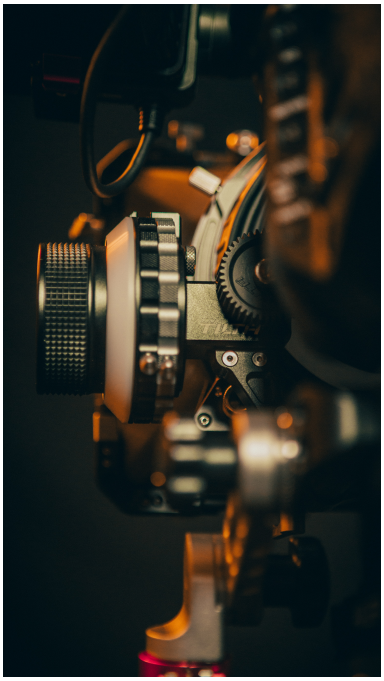


Figure **6.1.4**: Focusing Knob on Camera (Unsplash License; Image by Billy Freeman via Unsplash)

The Second Assistant Camera (2nd AC)

The main role of the 2nd AC is to run the clapper board or **slate.** Slates mark the beginning and sometimes the end of each shot. Words and numbers on the slate change from each take and identifies the scene for the post production team. To keep things straight there needs to be a naming convention (generally which rolls, scenes, and takes) that relates back to the script, and a way to distinguish good takes from bad ones. So there is usually a written or digital record that keeps track of this information when the shot has stopped. The slate is called a "clapper board" because a section of the top is hinged and can be raised and "clapped down" to make a one-frame sound. This one frame assists the post production editor sync audio recorded on an external device with picture. There is a short video demonstration in the final section of this chapter which shows the clapper board in action.

Additional tasks that the second AC owns on set include:

- During talent blocking, creating floor marks which assist the 1st AC with beginning and end marks for focus pulls.
- Keeping a database of every shot with notes about camera settings and whether all or part of the shot is usable.
- Assisting the 1st AC in maintaining and organizing camera gear.

The Lighting Director

On smaller crews, the cinematographer acts as the lighting director. They are responsible for the look of the shots and overall cinematic look of the picture. They need to make the actors look good, create a mood to the sets and scenery, and to support the features themes.

Where there is a separate crew member, the lighting director works closely with and reports to the Director of Photography.

The Digital Imaging Technician (DIT)

This relatively new position in production is the result of the complex demands of moving the digital production files created on a shoot to the editor. DITs support the camera and audio teams with technical and creative tasks such as making SD card and hard drive backups and quality checks of the footage. DITs keep track of shooting formats, file exports, color grading (providing LUT information to the editor), and they create the working copies for the directors and producers.

Other Positions under the DP

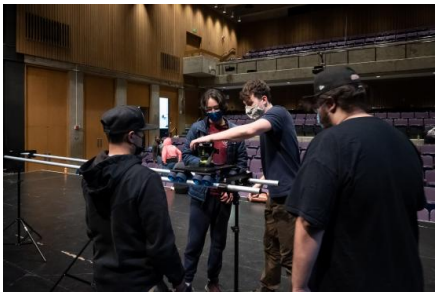


Figure **6.1.5**: Camera Assistant and Dolly Grip Prepare Dolly for Camera. (Creative Commons License; Susan A. Bradley via Laney College)

- **Camera operator**: Sometimes a separate person other than the DP operates the camera. In these cases the DP watches the take on a separate monitor.
- **Dolly grip**: Cameras are not always handheld or on tripods. There are other methods of camera support and some, like dollys, need crew to push and pull the supports during takes. A dolly grip moves these devices.
- **Grip:** Extra persons assigned to the camera crew for hauling, setting up, and striking equipment. Usually an entry level position.

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6.2: The Director's Commands

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Let's Go for a Take

We know that the director is in charge on a movie set. It does not matter if there are two people in a scene or dozens, there needs to be a set of established commands so everyone moves in a choreographed way. These simple commands insure everyone and every piece of equipment is ready to shoot at the right moment and keep shooting until the director is satisfied.

I find this version works well with small crews:

The director calls for "Ready" and "Quiet on the set".

Once everyone has settled down the director says "Roll Camera".

Camera operator makes sure the camera is in record and rolling a few seconds then says "Rolling" or "Speed" or "Camera Speed".

If sound is being recorded on a separate device, the director will call "Roll sound".

Sound recorder says "Sound Speed" or "Rolling" once the audio has recorded for a few seconds.

Director calls for the clapper board by saying "Slate" or "Slate it".



Figure 6.2.1: Screen Grab from Scene 22 (from "Disbelief", Laney College 2021). (Creative Commons; Theater Department via Laney College)

In two-crew operations the director will have to slate the scene; with a third crew member, they would take over this usual 2nd AC role. The person operating the slate will recite the text marked on the clapper board. This is a coordinated set of labels based on the script, usually depicted in naming the scene number, short description of the scene and take. Then the slate operator will clap using the hinged section at the top of the the clap board. This aids the editor in syncing up the camera shot with the separately recorded audio. The image of the clapper striking and the one frame of sound click on the track makes this an easy operation. Many of the modern non-linear edit systems can perform this operation automatically.

If this clapper board step was skipped, slates can be added at the end of shots before the director yells "cut". In these cases, the slates held upside down to mark the end of the shot.

Once the scene is slated, the director waits for the slate operator to settle back into their position. The director then calls for "Action". It is best to have the actors wait a beat or two before they start their scene. Editors can easily roll off any unnecessary footage from the beginning of the scene.

Only the Director says "Cut" Unless...

This is the most important part of the process - cast and crew need to heed exactly to the directors commands. At this point they are in character and should not break from their roles. The director can talk actors through a scene which has no dialogue. In post production, editors can eliminate the director's audio cues and replace them with room or other set sounds. Directors will let scenes run through mistakes by the actors because the scenes may still have something to offer in post production. The only commands

available at this point comes from the director. Sometimes a director will let scenes run past their expected ends because they see something interesting is happening. Actors must stay in their parts until...

...the director calls "Cut". At this point the actors can stop acting, camera and audio recorder then stop filming. The Director will ask the camera and audio recorders to check if they have recordings. Most directors like to have at least two good takes of a scene before they move on. Once the director is satisfied they have a good take and a good backup take, they may ask the actors to play out the scene once more. This request will become an alternative choice in post production. A director may change some lines, add some blocking, or even ask the actors to overplay some lines and actions to add emphasis to a scene.

Exception to the "Only Director Says 'Cut' Rule"

A camera person may say we have to stop because the camera has ran out of power, the SD card is full, the lighting has changed, or some other technical issue. In this case the DP may say "cut". This procedure though should be worked out ahead of time between the director and DP. A director may want to establish that only his commands be followed so the actors know when it is okay to break their character. A director may still want to run the scene as a rehearsal while the technical issues are worked out.

This short one-minute video demonstrates the Director's Commands on the set.



Figure **6.2.2**: Cast and Crew watch the rough edited footage from the previous shooting day (Creative Commons License; Susan A Bradley via Laney College)

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https://human.libretexts.org/@go/page/164533

6.3: When the Shooting Stops

Transitioning to Post Production

Technology is rapidly blurring the line between production and post production. In some cases, post production starts the same time as production. Most features are shot digitally so they can be viewed immediately. Gone is the time that films shot on film had to be processed, viewed and then sent to editors. This can all happen immediately after the director yells "Cut".

Some features actually have the editors working on the set along side the actors to get an immediate review of the scene being shot.

Example 6.3.1

Here is a five-minute example of the value of having the editors on a shooting set:



Backing up the Digital Master Files

Most features are shot digitally to an SD card, hard drive or cloud-based system. Each day these cards need to be backed up to multiple sources. All the hard work that has come before is now come to this, a small piece of technology which can be held in one hand. It is important to make immediate and multiple backups of your footage. There will be one main receptacle or **master** for all the scenes and a copy of that for the post production team of editors, special effects and graphic designers - each may have their own copies. It is important to have one more copy stored in a separate location from the master drive. If the master drive location were compromised because of a fire, flood, or other disaster like a drive failure, there needs to be another exactly duplicated master to continue on with the movie. As each post production activity is accomplished these will need a backup to the master footage as well. There needs to be a strategy in place that keeps track of this daily workflow so that the loss of a drive does not set back the production.

DIT's Role in Post Production

The Digital Imaging Technician (DIT) is in charge of this process of transitioning the footage from the production set to the post production crew. The DIT makes daily backups, labels the footage, and relates the production information about scenes, camera settings and LUTs to the ones who will be finishing the film. The DIT may continue this role long after production ends and all the way through post production.



Figure **6.3.1**: Scene as seen in camera's LCD screen (from "Disbelief", Laney College 2021). (Creative Commons License; Susan A Bradley via Laney College)

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CHAPTER OVERVIEW

7: Camera Functions

Learning Objectives

- Examine how to find the right memory card for your camera and production.
- Define the functions of DSLR and video cameras.
- Describe how to control video images using the iris, shutter speed, and frame rate.

7.1: White Balance
7.2: Lenses
7.3: DSLR vs. Mirrorless vs. Camcorders
7.4: Memory Cards
7.4.1: Formatting the SD (Memory) Card
7.5: Manual Mode
7.6: Iris/Aperture
7.7: Depth of Field
7.8: Neutral Density Filters
7.9: Gain and ISO
7.10: Focus
7.11: Frame Rate and Shutter Speed

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7.1: White Balance

Color Temperature and White Balance

Every light we use has a different color temperature, depending on the source. We measure color temperature in Kelvin (K) degrees. The two most important temperatures for video producers are Daylight at around 5600K and Tungsten light (indoor light) at about 3200K.

Our eyes naturally adjust to different color temperatures, but cameras do not have this ability naturally. This is why a video recorded outside appears blue (See Figure 7.10.1 below) if it has not been properly white balanced (See figure 7.10.2 below). The color temperature of the sun (5600K) is closer to blue than indoor lighting, but our eyes adjust to make it appear closer to white.



Figure **7.1.1**: Image not white balanced (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)



Figure **7.1.2**: Image properly white balanced. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

It is important to note that color temperature has nothing to do with light intensity. As demonstrated in Figure 7.10.3 below, the lights are at the same light intensity, but they each have different color temperatures.



Figure **7.1.3**: At 2700K the light in the top left has an orange tint; At 3500 the second light on the right has a yellow tint; at 5500K the light on the bottom left has a blue tint. (Public Domain; Yurocus via Wikimedia)

To fix this, we show the camera the color white, based on the lighting used in the shot, and the camera will adjust all the other colors to their natural color. Going back to our example, if we conduct a white balance on a bright sunny day, we are telling the camera what the color white is, and the camera will adjust everything that looked blue earlier to their natural colors.

Camera Functions for White Balance

Auto White Balance

Digital cameras are able to make adjustments automatically and continuously, using Auto White Balance. If during the production the color temperature changes (the sun moves, you add a light), you might have mixed different color temperatures in your image and the camera will not be able to adjust correctly.

If you have ever seen someone on a video conference call who uses both lamp lights and light coming in their window from the sun, you might notice that their image changes color frequently. This happens because the cameras in our computers, tablets, and cell phones use the automatic white balance. The lamplight (a warmer color) and the sunlight (a cooler color) require different color adjustments, which the camera cannot decide which is correct. Instead, it continuously adjusts the white balance whenever the majority of the image is one color temperature. Something as simple as gesturing could cause the light temperature to change.

Preset



Figure **7.1.4**: Preset white balance symbols from a DSLR camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Cameras with manual white balance will either have symbols that represent different lighting conditions to choose from (See figure 7.10.4 above) or allow you to choose between two color temperatures you have pre-selected in the menu function. The options in the menu range from 2800K to 7500K. The most common temperatures used in presets are 3200K to represent the color temperature of indoor lighting and 5600K to represent sunlight. They are estimates of the actual temperature of the lighting in a specific setting, but if you do not have time to perform a manual white balance, using a preset is the next best thing.

Manual White Balance

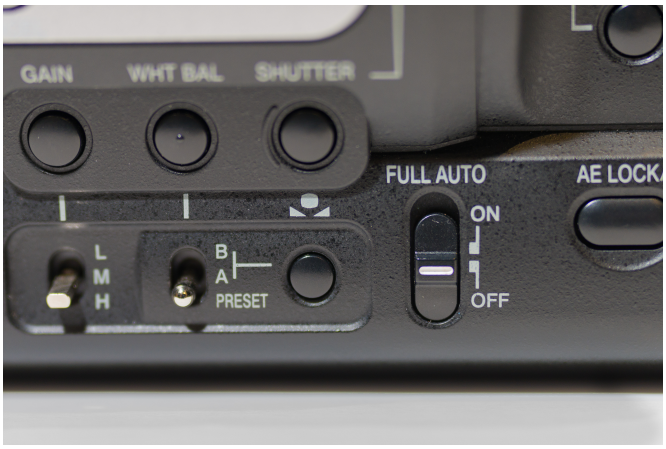


Figure **7.1.5**: Manual White Balance Button on a Video camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

In Manual White Balance mode, you can set the white balance to your lighting conditions. You'll need something that is completely white, like a piece of blank printer paper or a white tee shirt. Place it in front of the camera where your talent will be standing and zoom in all the way on the white object. With video cameras, there should be a set button, sometimes it is marked by a

symbol with two right triangles with a square in between (See figure 7.10.5 above). Once you hit the white balance set button, the camera will adjust the colors to make the white object appear white. You'll need to do this whenever you change locations or if you are shooting outside when the sun moves into golden or blue hour.

With DSLR and Mirrorless cameras, you place the white object in front of the camera where your talent will be and zoom in all the way. Take a picture of the white object and then go into the menu function for white balance and choose custom white balance with that photo as the reference. Some cameras may have a different process, so make sure to check your user manual for how to set the manual white balance for your specific camera.

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7.2: Lenses

Built-in or Interchangeable Lenses

When it comes to lenses, cameras will either have a built-in zoom lens or will have the ability to change lenses. If you have a camera that has interchangeable lenses, it is important to understand that there are two different kinds of lenses, prime and zoom. We'll go over those here.

Prime Lens

Prime lenses are lenses that have one focal length (See figure 7.11.1). There is no zooming in or out. Depending on the lens you buy, they can be almost any focal length, like 15mm, which has a very wide field of view, or 300mm which has a very narrow field of view. Each one has its own advantages depending on your production needs. One of the advantages of a prime lens is that their f-stops can usually go lower than those of zoom lenses. Some prime lenses can go down to f-1.4 or even 1.2. This is good for increasing your depth of field (which we will go over in the next chapter) and being able to get quality images in lower lighting situations. Another advantage of using prime lenses is that they produce sharper and higher-quality images. With fewer lens components there is less distortion and less chromatic aberration.



Figure **7.2.1**: 50mm Prime Lens (CC BY 2.0; Ivan Radic via flickr)

A disadvantage of using a prime lens with one focal length is having to change lenses if you want to change the focal length. If you want to get closer to an object and not change lenses, you will have to move your body closer to the image. It can also be expensive to buy all the focal lengths you will need for different production situations.

Zoom Lens



Figure **7.2.2**: Zoom lens. (CC BY 2.0; Håkan Dahlström via flickr)

Zoom lenses have variable focal lengths that can be changed with the turn of a ring (See figure 7.11.2 above) or the use of a zoom control called a servo zoom (See figure 7.11.4 below). Some of the most common zoom lenses are: 24-105mm; 24-70mm, 70-200mm. These lenses offer great variability when in the field to get shots of different sizes without needing to move the camera itself. This comes in handy when there is a lot of movement in the shot. One of the disadvantages of using a zoom lens is there may be more distortion and chromatic aberration due to the number of components in the lens itself.

Zoom Controls



Figure **7.2.3**: Manual/Servo Zoom Switch on Video Camera.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

There are two ways to control a zoom lens, either manually, by using the zoom ring on the lens itself, or by using the zoom servo. Figure 7.11.3 shows the switch to allow the camera to be set for manual zoom or zoom servo. You cannot use both at the same time.

Zoom Servo

Video cameras most commonly have electronic zoom servo buttons on the camera that are touch-sensitive, which means that if you push the button down lightly, the zoom will be slow, but if you push it down harder, the zoom will be faster. In figure 7.11.4 below, W on the Zoom servo button stands for wide, which means zoom out, and T stands for tight, which means zoom in.

Figure **7.2.4**: Zoom servo button on a video camera.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Zoom Ring

Figure 7.11.5 below shows where the zoom ring is on a video camera lens. DSLRs and mirrorless cameras do not have a servo zoom built-in. This means you have to be very careful with live zooms and practice having a steady hand as you zoom. Zooms should be at a steady and consistent pace throughout the zoom and the image and the movement must not be jumpy. There are

attachments you can buy to put on the Zoom ring to help with making a zoom smoother. Whether you use the attachment or not, there needs to be practice and rehearsals before you record the shot to make sure the movement is steady and smooth.



Figure **7.2.5**: Zoom Ring.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

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7.3: DSLR vs. Mirrorless vs. Camcorders

DSLR

DSLR stands for Digital Single Lens Reflex. "Single lens" refers to the ability of the user to see through the same lens as the image sensor using the viewfinder (See Figure 7.1.1 below). Previous cameras did not have this ability, which caused the viewfinder and image sensor to see at slightly different angles. With a DSLR, seeing through the same lens as the image sensor allows the user to see exactly what will be captured. "Reflex" refers to the mirror mechanism that lifts when a picture is taken. When the user takes a picture, the shutter opens and the mirror lifts up to expose the image sensor to light.

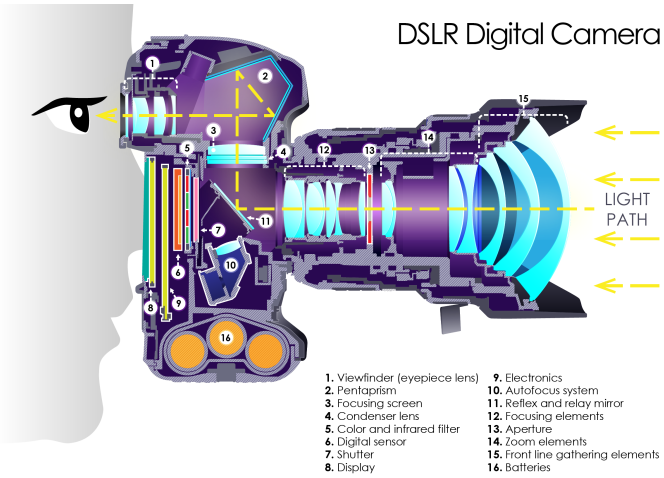


Figure **7.3.1**: When the mirror mechanism is down, light bounces inside the camera from mirror to mirror, allowing the user to see the image from the lens. (CC BY 2.0; gurucamera via flickr)

DSLR cameras are built to take pictures but now have video functions. The image sensor is a bit larger than many camcorders, which makes the image quality for video excellent and you can get high-quality video in lower light. DSLRs are smaller than camcorders, which makes them easy to pack away. Good image quality can come at a cheaper cost with a DSLR. A video camera of the same image quality is much more expensive. Lastly, you can change lenses, which gives you more options.

Since the primary function of a DSLR is to take pictures, there are reasons why a videographer would choose a camcorder over a DSLR for their production. To start, audio recording controls are minimal on most DSLRs. The input for audio is a mini plug, which is not standard for professional productions. When you want to zoom live, it has to be manual or an exterior mechanism hooked up to the DSLR. Also, recording times are shorter with DSLR, which is around 30 minutes depending on the camera itself. Some will just start a new file and continue recording, but others will just stop recording after 30 minutes. DSLRs also run the risk of overheating. Lastly, the body of the DSLR was not made for video, which can make hand-held video shots more difficult.

Mirrorless

As the name suggests, Mirrorless cameras do not have the mirror mechanism that DSLRs have. Instead, the image sensor is closer to the lens, which may produce higher image quality than a DSLR. The viewfinder (Electronic View Find or EVF) produces a digital image instead of being able to see directly out of the camera lens.



Figure 7.3.2: The DSLR (left) is taller, wider, and thicker than the Mirrorless camera (right). (CC BY-NC-ND 2.0; jbkalla via flickr)

The benefits of a Mirrorless camera versus a camcorder are the same as the DSLR. There are some benefits that make a Mirrorless a better option than a DSLR camera. First, Mirrorless cameras are lighter and smaller in size than DSLRs (See Figure 7.1.2 above), making them even easier to store. The electronic viewfinder (EVF) allows the user to see exposure in real-time, which is not possible when looking directly out of the lens in a DSLR. Also, because there is no mirror mechanism, the Mirrorless cameras have a silent shutter.

The drawbacks to a Mirrorless compared to a camcorder are the same as a DSLR. Compared to a DSLR, a Mirrorless camera can have shorter battery life. Also, electronic viewfinders may have lower image quality than needed, especially in lower light. The EVF quality issue is getting better with newer generations of Mirrorless cameras.

Camcorder

Camcorders are specifically built for recording video and many have a function to take still images. In figure 7.1.3, you can see that the shape of the camcorder is much longer than a DSLR or Mirrorless camera for ease of handling while recording motion. The handle on top makes it easier to carry. Most of the functions you will need are placed on the side of the camera for easy access, like ND filters and controls for white balance, audio, iris, and shutter. The camcorder functions much like DSLR and Mirrorless cameras by allowing light in through the lens to hit an image senor. There is an EVF and a small screen on the side of the camera that are digital images of what is being seen through the lens.



Figure 7.3.3: Video Camcorders are longer than DSLR and Mirrorless cameras with many of the needed functions placed on the side. (Public Domain Mark 1.0; Teixeira, Paulo via flickr)

Camcorders are great for long recording times for events or interviews. Most current camcorders have dual card slots with continuous recording, which will switch from one card to the second when memory runs out on the first card. Also, the zoom servo allows you to execute smooth zooms quickly. The built-in XLR connectors and external manual audio recording controls make capturing quality audio easier. The built-in zoom lenses, ND filters, and gain control make switching to different environments fast. Lastly, there are more options for power with camcorders. In addition to batteries, camcorders can use AC plugs to run during longer recordings.

One of the drawbacks of choosing a camcorder is the size. They are bigger than DSLR and Mirrorless and require more physical space for storage. Although camcorders have options for taking still images, they are not built for taking quality stills. With only one zoom lens for the camera, there are no other options for changing lenses. DSLR and Mirrorless image sensors are larger than most camcorder image sensors, which makes the image quality for DSLR and Mirrorless closer to cinema cameras. Lastly, high-end camcorders have a higher ticket price than similar quality DSLR or Mirrorless cameras.

There are advantages and drawbacks to each camera reviewed, but understanding them will help you decide which camera is best for your production and your budget.

7.3: DSLR vs. Mirrorless vs. Camcorders is shared under a not declared license and was authored, remixed, and/or curated by LibreTexts.

SECTION OVERVIEW

7.4: Memory Cards

Choosing the Right Memory Card

When planning to record video, it is important to know what memory card to choose for your camera. The instruction manual for your camera will tell you what memory cards are compatible, but it is good to know the most common types of memory cards on the market and to make sure you get the right one for your production. Choosing the wrong card can hinder or completely stop production.

Memory Card Form Factor

The most common types of memory cards for DSLRs and prosumer video cameras are:

- Secure Digital (SD)
- Compact Flash (CF)
- MicroSD



Figure 7.4.1: Size comparison of CF, SD, and MicroSD cards. (Public Domain; Evan-Amos via Wikimedia Commons)

When you start working with high-end professional cameras, you will have to use solid-state flash drives created for specific cameras or CFast cards, which are not interchangeable with the CF cards listed above.

Card Capacity for Video Recording

Not all memory cards are the same. For example, SD and MicroSD cards come in four different formats:

1. SD has a storage maximum of 2 GB
2. SD HC (High Capacity) has a storage maximum of 32 GB.
3. SD XC (Extended Capacity) has a storage maximum of 2 TB
4. SD UC (Ultra Capacity) has a storage maximum of 128 TB



Figure **7.4.2**: SD card memory format label. (Unsplash License; by Manuel Chinchilla on Unsplash)

The memory capacity needed for a memory card will depend on the video format size you choose and the file size. You can look for bit rate and file size in the user manual for your camera. For example, the Canon T8i DSLR can record in 4K UHD at 24 or 25 frames per second with a bit rate of approximately 120 Megabits per second (Mbps) or approximately 861 Megabytes per minute. For every minute of video recorded, you will use about 861 MB of memory. To choose the right memory card capacity for your production, you need to decide how much recording room you need. For the Canon T8i:

- A 32GB SD card can record about 35 minutes of video
- A 64GB SD card can record about 70 minutes of video
- A 128GB SD card can record about 2 hours and 20 minutes of video

Keep in mind that these are approximate times for the Canon T8i DSLR. Also, these calculations do not account for the audio being recorded.

It is in your best interest to carry more than one memory card with you on a video shoot. If one card breaks or stops working, you will have a backup. This will prevent delays in production and provide plenty of memory.

Read/Write Speed

Every memory card has different read/writes speeds. This indicates how fast information is read from the card and how fast information is written onto the memory card. SD cards display reading and writing speeds using Megabytes per second (MB/s).

We need to convert Megabits per second (Mbps) to Megabytes per second (MB/s). Megabits and Megabytes are not the same; for every 1 megabyte, there are 8 megabits. Using the example from the previous section of the Canon T8i, we need to convert 120 Mbps to MB/s by dividing 120 by 8, which is 15 MB/s. This means for every second of video recording, 15 MB of memory will be used. The card we choose to use with the Canon T8i will need to have a write speed of at least 15 MB/s. If the card does not have that write speed, the video will not be recorded properly and we will have useless footage.

There are several indicators of write speeds on SD cards and we will go over each one.

UHS Rating



Figure **7.4.3**: UHS rating on an SD card. (Unsplash License; by Manuel Chinchilla on Unsplash)

UHS (Ultra High Speed) Rating defines bus-interface speeds. The interface is the gold-plated electrical contacts on the back of the SD card. These contacts connect the memory card to the camera to read and write information. On the SD card, they are indicated by a Roman Numeral or the word “Express”:

- I for speeds up to 104MB/s
- II for speeds up to 312MB/s
- III for speeds up to 624MB/s
- Express for speeds up to 3940MB/s

Speed Class



Figure **7.4.4**: Speed Class rating on an SD card. (Unsplash License; by Manuel Chinchilla on Unsplash)

Speed Class will let you know the write speed for the card. The numbers are shown surrounded by the letter C. Here are the numbers and their meaning:

- 2 = 2MB/s
- 4 = 4MB/s
- 6 = 6MB/s
- 10 = 10 MB/s

UHS Speed Class



Figure **7.4.5**: UHS Speed Class on an SD card. (Unsplash License; by Manuel Chinchilla on Unsplash)

UHS Speed Class also indicates the write speed for the memory card. The numbers are shown inside the letter U:

- 1 = 10MB/s
- 3 = 30MB/s

Video Speed Class



Figure **7.4.6**: Video Speed Class on an SD card. (Unsplash License; by Manuel Chinchilla on Unsplash)

Video Speed Class indicates writes speed for the memory card for videos that measures up to 90MB/s. These ratings are V ratings and the speeds are as follows:

- V6 = 6MB/s
- V10 = 10MB/s
- V30 = 30MB/s
- V60 = 60MB/s
- V90 = 90MB/s

For most prosumer cameras, a 64 GB U3 (or V30) UHS-I SDXC should work well for beginners. Once again, check your camera manual to see which SD cards are compatible with your camera and decide how much memory you need for a specific production.

7.4.1: Formatting the SD (Memory) Card

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7.4.1: Formatting the SD (Memory) Card

Purpose of Formatting

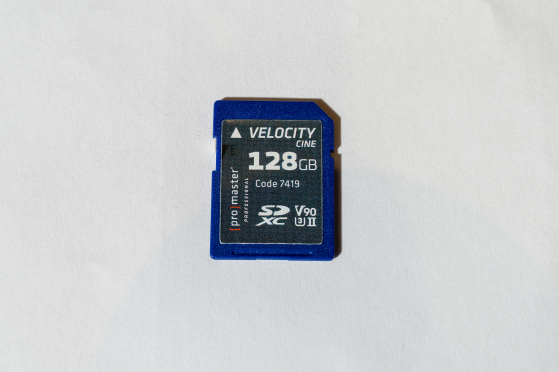


Figure **7.4.1.1**: SD Card. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

The purpose of formatting the SD card is to erase everything on the card and to prepare the card to record the media from this specific camera. If the SD card has been formatted in a different brand of camera, you may get an error message when you hit record that says you cannot record on the SD card. If this happens, format the SD card for the camera you are using. Make sure to save any files you need on the SD card to a computer or hard drive before formatting the card because formatting the card will erase everything.



Figure **7.4.1.2**: Using the internal menu in a video camera to format an SD card. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

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7.5: Manual Mode

Why Use Manual Mode?

Putting your camera into Manual mode will allow you to have maximum control over your video. There are times that being in auto mode is necessary, like when you do not have time to set the functions on your camera or you'll miss recording something important. For example, if you were shooting news and an event was happening immediately, you would not have time to set all the functions on the camera, which is where full auto will be a lifesaver. In most other situations, you will have time to set up your camera and that is why we will focus on controlling our camera in Manual mode.



Figure 7.5.1: DSLR Settings Dial Set to Manual

(CC BY-NC 4.0; Sebastian Jimenez

via San Francisco State University)



Figure 7.5.2: Video Camera Full Auto Switch Set to On.

(CC BY-NC 4.0; Sebastian Jimenez

via San Francisco State University)

In order to control the functions of the camera, the camera must be in Manual mode. For DSLR and mirrorless, it is as simple as turning a dial to “M” or Manual. For video cameras, there may be a switch labeled “Full Auto”. Make sure to switch this function to the off position. If the Full Auto switch is turned on, the letter “A” will appear next to all the functions on the video camera screen.

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7.6: Iris/Aperture

Defining Iris & Aperture

The Iris of the camera is very much like the iris in the human eye because it controls how much light passes through it. In the eye, the iris controls how much light hits the retina, and in the camera, the iris controls how much light hits the image sensor. The iris is the physical blades that open and close, blocking or allowing light into the camera. The Aperture is the opening of the iris, like the pupil of the human eye. The term iris is most commonly used when using camcorders or television cameras, but DSLR and mirrorless cameras usually refer to aperture. When referring to how much light is let into the camera, f-stops are the typical measure. The higher the f-stop number, the less light is let in and the image appears darker. Conversely, the lower the f-stop number, the more light is allowed in and the image appears brighter.



Figure **7.6.1**: Apertures get smaller as the and f-stops increase (CC BY-SA 4.0 International; KoeppiK via Wikimedia)

F-Stops

There is a range of f-stops, which halves or doubles the amount of light let into the camera. The range is f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22, f/32, f/64, but you may see a narrower or wider range depending on the camera and lens. When you close the iris down from f/2.8 to f/4, you are reducing the amount of light let into the camera by half. This remains true when you go from f/5.6 to f/8. When you open the iris, it doubles the amount of light. Opening the iris from f/22 to f/16 doubles the amount of light allowed into the camera. When a director says to “stop down one stop”, they mean to increase the f-stop, for example from f/5.6 to f/8.

Depth of Field

Depth of field is the area going from the front of the camera lens to the furthest point away from the camera lens in which objects appear in sharp focus. You can have a large depth of field (also called deep focus) where everything in the image is in focus (See the right image in Figure 7.4.2) and you can have a narrow depth of field (also called shallow focus) where only part of the image is in focus (See the left image in Figure 7.4.2). When you adjust your f-stop, you are also controlling your depth of field. When you have an f-stop of 1.4, you will have shallow focus. When you have a larger f-stop of f-22, you will have deep focus where everything appears in focus. Here are some images of different f-stops and the effect on depth of field:



Figure **7.6.2**: f/1.4 (left) f/4 (middle) f/22 (right). The higher the f-stop, the larger the depth of field. (CC BY-SA 4.0 International; Alex1ruff via Wikimedia)

Camera Functions for the Iris

Auto Iris

The Auto Iris function gives the camera control over exposure. It uses an internal reflective light meter to measure the average brightness of the screen and continuously chooses the best f-stop for the image. This may cause issues in two ways: 1) If the image has high contrast, the camera will set the exposure for the brightest parts of the screen, leaving anything darker looking almost black. 2) The camera will continuously adjust the exposure when you pan, tilt, or zoom, or if movement within the shot changes the exposure.

Leave the auto iris off unless you are in a situation where you do not have time to adjust and the lighting continuously changes, like in a breaking news situation. To see whether the auto iris function is on or off, check the information overlays on the camera screen. If there is an “A” next to the f-stop, then the auto iris is on.

Push Auto Iris



Figure **7.6.3**: Push Auto Iris Button on Video Camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Some video cameras have “Push Auto Iris” button (See Figure 7.4.3). The push auto iris function is a combination of Auto Iris and Manual Iris. The iris stays in manual mode until you push down on the Push Auto Iris button. When you press the Push Auto Iris, you give the camera temporary control over the iris. When you let go of the button, the iris goes back into manual mode. This is good to use if you don’t have a lot of time to do a complete manual iris setup and the lighting will remain relatively the same.

Manual Iris

Once the iris is set to manual, you can control how much light is let in without the camera changing it. You can open and close the iris by turning the iris ring on the lens (See Figure 7.4.4 below). When you turn the ring, you’ll notice the f-stop indicator on the screen changes with the size of the iris.



Figure **7.6.4**: Iris Ring on Video Camera (left) Turning the Iris Ring (center) The effect of turning the Iris Ring on the camera image (right). (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

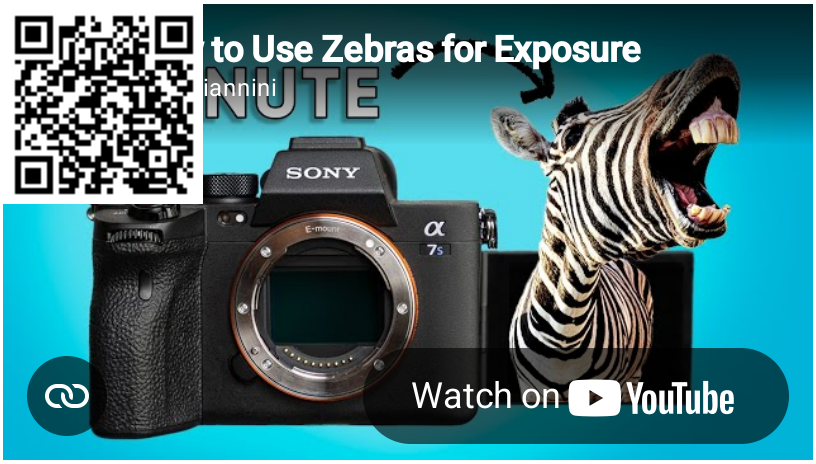
Zebra Stripes

Video cameras are commonly equipped with Zebra Stripes. Zebra stripes warn you when the objects in a shot are too bright. Having objects too bright could cause image distortion. If your image is too dark, you will not see any Zebra stripes. One way to make sure the zebra stripes are on is to use the iris ring to open the iris. When the image gets brighter, zebra stripes should appear on the screen, if you have enough light in your shot (See Figure 7.4.5 below).



Figure **7.6.5**: Zebra stripes appear on the video camera screen when a person in a white shirt walks in. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Check your user manual to see where the Zebra Stripes settings are in the menu. If you set them at 100% brightness, it will warn you when a portion of your image will be distorted because it is too bright. The video below will explain how zebra stripes work and offer examples of how different zebra stripe settings will help create a well-exposed image.



To watch this video with Closed Captions: https://amara.org/en/videos/j66H7kfZ5RJv/info/how-to-use-zebras-for-exposure/

When you are done setting your exposure with the iris ring, you can leave the zebra stripes on or turn them off. If you leave them on, they will not be recorded onto the SD card when you record your video. Zebra stripes only appear on the screens on the camera and will not alter your final image.

Histogram



Figure **7.6.6**: Histogram on a DSLR. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

A histogram, when it comes to cameras, is a graphic representation of the distribution of shadows, midtones, and highlights within a given image (See Figure 7.4.6 above). The height of each section represents the number of pixels that fall into that category. When a shot is too dark, the pixels will be bunched to the left side of the histogram. The opposite is true of shots that are too bright, the pixels will be bunched on the right side of the histogram. When a shot is too bright or too dark, it is considered clipped because the image has lost details in the shadows or highlights. What most people aim for is an ideal histogram, which has a good distribution of pixels where most land within midtones. This may not be possible with some images depending on what you are shooting, but it is a good rule of thumb.

The video below will explain what a histogram is, how it works, and give examples of what the histogram will look like in different lighting conditions.



To watch this video with Closed Captions: https://amara.org/en/videos/OJMFI6pi5TQL/info/how-to-read-a-camera-histogram/

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7.7: Depth of Field

What is Depth of Field?

Depth of Field is the area in which objects appear in focus. A shot can have a wide depth of field where everything in the frame is in focus, like a beautiful landscape, or you can have a shallow depth of field where the subject appears in focus while everything in front or behind the subject is out of focus (See Figure 7.5.1). There are three things that control the depth of field, the aperture/iris, the focal length of the lens, and the distance of the subject to the camera. We will discuss each control individually.

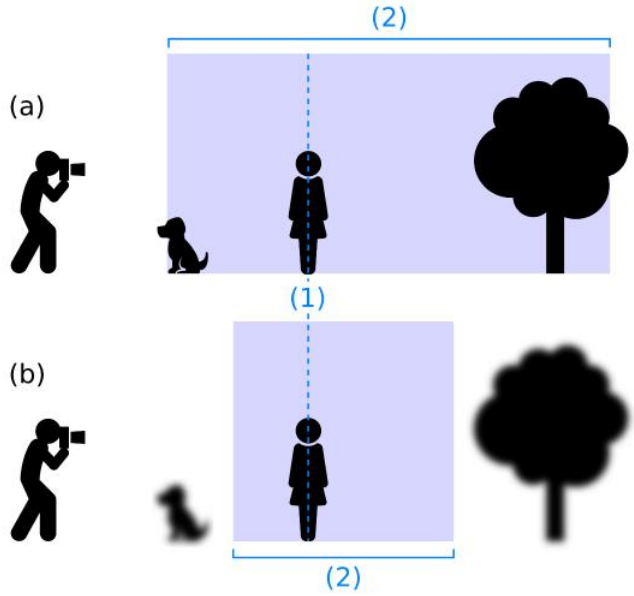


Figure **7.7.1**: (a) represents a wide depth of field and (b) represents a narrower depth of field. Notice the subject (1) has not moved, but the depth of field (2) has changed. (CC BY-SA 4.0; MikeRun via Wikimedia Commons)

Aperture/Iris

In the previous section, we went over f-stops, which is the measurement of the opening of the iris in the camera. When you have a low f-stop, like F2.8, you will have a narrower depth of field. Conversely, when you have a higher f-stop, like F16, you will have a wider depth of field.

Focal Length

Using a zoom lens, the more you are zoomed into a shot (longer focal length), the narrower your depth of field. The more zoomed out you are (shorter focal length), the narrower the depth of field. The same is true of prime lenses. When you use a 100mm lens, it will have a narrower depth of field. A 15mm lens will have a wider depth of field.

Distance of Subject to Camera

This refers to the distance between the camera and the subject in focus. When the subject is closer to the camera, you will have a narrower depth of field and things behind it will appear out of focus. When the subject is further away from the camera, you will have a wider depth of field.

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7.8: Neutral Density Filters

What are Neutral Density Filters?

In addition to closing the iris, Neutral Density (ND) Filters allow you to further reduce how much light is let into the camera. ND filters are the equivalent of sunglasses but do not alter the colors in your shot. When people put on sunglasses, the image they see changes color in addition to making things darker. ND filters will make the video image darker, but will not change any colors in your image. ND filters will come in handy when you want to shoot outside on a bright day but want a low f-stop. Additionally, ND filters are useful when you have to go from indoors to outdoors without affecting any of your already established settings.



Figure **7.8.1**: ND Filter Settings on a Video Camera.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

On the video cameras, ND filters may be internal. On the side of the camera will be the settings for ND filters (See Figure 7.6.1 above). The manufacturers may label them as 1/4, 1/16, 1/64, or just use numbers 1, 2, and 3 to indicate the weakest to strongest filter. The first ND filter (1/4) is equivalent to shutting the iris down two stops, the second ND filter (1/16) is equivalent to shutting down four stops, and the third ND filter (1/64) is equivalent to shutting down six stops. The fractions represent how much light is let in at your pre-determined camera settings. For example, 1/4 means that a quarter of the amount of light is let in when the filter is on the lens.



Figure **7.8.2**: Partial covered lens with ND filter.

(CC BY-SA 2.0; star5112 via flickr)

With DSLR and mirrorless cameras, you have to place ND filters on the lens (See figure 7.6.2 above). You can get different strength ND filters. In the examples below (See figure 7.6.3) ND2 is equivalent to 1/2 or one f-stop, ND4 is equivalent to 1/4 or 2 f-stops, and ND8 is equivalent to 1/8 or 3 f-stops.



Figure 7.8.3: ND filters get darker as the ND number increases: ND2, ND4, ND8. (CC BY 2.0; wuestenigel via flickr)

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7.9: Gain and ISO

Gain

Gain is an amplification of the electrical signal sent from the image sensor, which is measured in decibels (db.). Although the image will appear brighter, the image quality will be reduced. This means the more gain you use, the grainier and lower-quality your image becomes. To preserve image quality, gain should not be used unless it is unavoidable like shooting a performance in a bar at night with no way to add lights. On the viewfinder, you will see the indicator for gain near the f-stop. If there is an “A” highlighted next to numbers measured in db, then auto gain is on. Make sure the gain is off.

ISO

This function is a bit different for DSLR/mirrorless cameras. On these cameras, there is a setting for ISO. ISO (International Organization for Standardization) refers to the sensitivity of film to light. Since moving to digital sensors, it now refers to the boost in the signal received by the image sensor. Some interpret this to mean it makes the image sensor more sensitive to light, but in reality, it is boosting the image signal to make the image brighter.

In digital cameras, gain and ISO are very similar in that they are boosts to image signals to make the image appear brighter. They differ in how they are measured. Gain is measured in db., ISO is its own measurement, usually measured in numbers ranging from 100 to 6400. ISO is linear in that ISO 200 is twice as bright as ISO 100. ISO 3200 is half as bright as ISO 6400. The higher the ISO, though, the more graininess you will see in the image.

The video below will demonstrate how ISO works using examples at different ISO levels.



To watch this video with closed captions: https://amara.org/en/videos/yuPAi3pJUn4k/info/what-is-iso-video-production-training/

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7.10: Focus

Camera Functions For Focus

Focus is when objects in the image appear sharp and clear. Having your image in focus allows the viewer to see crisp images without anything appearing fuzzy. There are several ways to achieve focus, which we will explore in more detail.

Auto Focus

Auto Focus gives the camera control to determine what appears in focus (See figure 7.8.1). The camera will usually focus on what is centered in the image unless settings inside the menu of the camera have been set to something else. This is useful for news standups where the talent does not move often, but if there is movement in the camera or the subject moves out of the center of the frame, the camera then searches for what should be in focus. Having this continuous change of focus can cause many issues, especially when the subject of the image ends up out of focus.

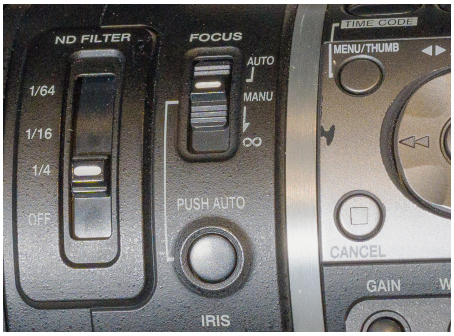


Figure **7.10.1**: Focus Functions on the side of a Video Camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Push Auto Focus

Push Auto Focus is a combination of Manual Focus and Auto Focus. When you push the “Push Auto” focus button (See figure 10.8.1), the camera takes temporary control over the image to focus on the middle of the image. When you let go of the button, the camera goes back into manual focus. This is handy when you need to find focus quickly and do not have time to manually focus.

Manual Focus

When the camera is in manual focus mode, you have control over what appears in focus. To find focus manually, you will need to turn the focus ring (See figure 7.8.2), which is the last ring on the lens moving away from the camera. You can look into the viewfinder and see when things are in focus when turning the focus ring slowly.



Figure **7.10.2**: Focus Ring on a Video Camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Focus Assist & Focus Peaking

With video cameras, it can be difficult to find focus because the screens are so small and have fewer pixels than larger screens. This is where Focus Assist and Focus Peaking come to the rescue. Your camera will have either Focus Assist or Focus Peaking, but they both do the same thing. Both functions perform as an overlay that helps you find focus by placing colors on the edges of things in sharp focus. When Focus Assist is on, the image will suddenly appear in black and white and objects in focus will have edges in color (See figure 7.8.3). With Focus Peaking, the image stays in color and you can choose which color will appear on edges that are in focus.

When you are done finding focus with Focus Assist, press the Focus Assist button again to return the image back to color. If you forget to do this before you record, there is no need to worry because focus assist is an overlay function, meaning it shows up on the monitors in the camera, but not on the footage recorded.



Figure **7.10.3**: When the Focus Assist is in use, the image turns black and white, and blue lines appear around objects in focus. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

There is a myth that using autofocus means that you are a beginner. Although giving focus control to your camera is not always ideal, there are situations when using auto or push focus is in your best interest. For example, if you were recording athletes running a 110m hurdles race, you will not have time to change your focus as the race progresses. In this instance, using autofocus is the right call to make sure the athletes are in focus.

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7.11: Frame Rate and Shutter Speed

Frame Rate

The Frame Rate in video dictates how many individual frames of still images are captured to produce the illusion of motion. Frame rate is measured in Frames Per Second (fps). The higher the frame rate, the slower motion will appear. The lower the frame rate, the faster things will appear to move. The two common frame rates in video are 24fps (really 23.976 fps) and 30fps (really 29.97). Both frame rates make motion happen at a natural speed, but 24fps will give the video more of a film feel because film is typically shot at 24fps (See figure 7.9.1 below), and video is shot at 30fps. When you want to slow motion down and have it look more natural than slowing a video down in editing software, you can increase the frame rate to 60fps or (on some cameras) 120fps (See figure 7.9.2 below).



Figure **7.11.1**: Motion at 24 frames per second

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)



Figure **7.11.2**: Motion at 120 frames per second

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Shutter Speed

In film photography cameras, there is a shutter inside the body that ensures film is not exposed to light before you hit the shutter release button. When you capture an image by hitting the shutter release, the shutter opens to expose the film to light, thus capturing the image in front of it. The same is true of DSLR cameras, except film has been replaced with an image sensor that is sensitive to light.

Video also has a shutter function, but instead of being a physical shutter that opens and closes many times per second, it is a digital replication of a shutter. The speed at which the shutter opens and closes controls motion blur, the blur we see when an object is moving in a video image if we were to stop on a single frame. The lower the shutter speed, the more light is let in and motion blur becomes more prominent in the video. The higher the shutter speed, the less light is let in and motion blur disappears. It may seem like having less motion blur is ideal, but high shutter speeds make motion look jumpy because each frame has stopped motion. If you wave your hand in front of your face, you'll notice that the quick motion does not appear crisp and clear, which is why motion blur is natural in video.

The video below will provide examples of the effects of Shutter Speed on recorded movement as discussed above.



To watch this video with closed captions: https://amara.org/en/videos/2ArGEGfc...or-dslr-video/.

180 Degree Rule for Shutter Speed & Frame Rate

The 180 Degree Rule says that if you want your video to look natural, then your shutter speed should be set to double your frame rate. This means that if you are shooting video at 24fps, then your shutter speed should be double that at 1/48 (of a second), but most cameras do not have a 1/48 setting, but 1/50 will do just fine because it is close enough. When you are shooting at 30fps, then you'll need the shutter speed to be 1/60. The same remains true when you are shooting at 60fps and need a shutter speed of 1/120, and shooting at 120 fps and need a shutter speed of 1/240.

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CHAPTER OVERVIEW

8: Video Aesthetics

Learning Objectives

- Explore shot sizes and camera positioning.
- Identify camera and lens movements and how to execute them.
- Illustrate principles of video composition, critical focus, and depth of field to create dynamic images.

8.1: Basic Shot Sizes

8.2: Camera Position

8.3: Camera Movements

8.4: Lens Movements

8.5: Video Composition

8.6: Critical Focus

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8.1: Basic Shot Sizes

Framing Basic Shots Sizes

Knowing how to communicate your vision for a shot is important both on set and when writing a script. Sometimes shots sizes have multiple names, but they mean the same thing and can be used interchangeably, some of which were described in a video in Chapter 4.1. The following are all the basic shot sizes and how to frame each one. The human body is used to demonstrate shot sizes because it is easy to remember and demonstrate.

When you frame a person in a shot, it is important to remember to not cut them off at a natural joint in the body, like the knees or elbows. It will give the illusion on camera that the person has been amputated. You will notice in the following descriptions that when an image requires cutting out body parts near a joint, it is either above or below a natural joint in the body.

Extreme Long Shot/Extreme Wide Shot



Figure **8.1.1**: Extreme Long Shot. (Unsplash license; Justin W via Unsplash)

ELS is an Extreme Long Shot. Sometimes you will also see EWS, which stands for Extreme Wide Shot. To frame this kind of shot, you can have the full person in the frame along with a lot of the surrounding area (See Figure 8.1.1). ELSs are also commonly used in establishing shots and do not always need to have a person in the frame.

Long Shot/Wide Shot/Full Shot



Figure **8.1.2**: Long Shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

LS is a Long Shot. Sometimes you will also see WS or FS, which stands for Wide Shot or Full Shot. They all mean the same thing. A Long Shot has the full body of the person in the frame, but not as much surrounding (See figure 8.1.2).

Medium Long Shot/Medium Wide Shot



Figure **8.1.3**: Medium Long Shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

MLS is a Medium Long Shot. Sometimes you will also hear it referred to as an MWS, which is a Medium Wide Shot. Once again, there are two concepts that mean the same thing. In a Medium Wide Shot, we usually see a person from just above the knee to the top of their head (See figure 8.1.3).

Medium Shot



Figure **8.1.4**: Medium Shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

A Medium Shot (MS) shows a person from their waist to the top of their head (See figure 8.1.4). Make sure not to cut a person off at the hip because, as was mentioned earlier, we want to avoid cutting someone off at a natural joint in the body.

Medium Close Up



Figure **8.1.5**: Medium Close Up. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

A Medium Close Up (MCU) is usually shot from the bottom of the sternum (the bone in the middle of the rib cage) to the top of the head (See figure 8.1.5).

Close Up



Figure **8.1.6**: Close Up. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

A Close Up (CU) is a shot of a person from the tops of their shoulders to the top of their head (See figure 8.1.6). A CU can also be of different body parts, like hands, arms, legs, and feet.

Extreme Close Up



Figure **8.1.7**: Extreme Close Up. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

An Extreme Close Up (ECU) is so close to the person that it only shows a specific detail of their body, like their eyes or mouth (See figure 8.1.7). ECU can be even closer than shown above to show one eye or another small detail.

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8.2: Camera Position

What are Camera Positions?

Camera Position refers to the height of the camera in relation to the subject of the shot. Each level gives a different aesthetic feel based on the context of the shot and the story.

Eye Level



Figure **8.2.1**: Eye-level shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

At the Eye Level, the camera is around the same height as the subject's eyes (See figure 8.2.1). This gives the viewer the impression they are equal to the subject in the shot.

High Angle



Figure **8.2.2**: High Angle Shots. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

From a High Angle, the viewer is looking down at the subject (See figure 8.2.2). The subject in the shot can appear small and weak. Sometimes it can also give the impression that the subject is lonely.

Low Angle



Figure **8.2.3**: Low Angle Shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

As opposed to a High Angle, a Low Angle shot looks up at a subject (See figure 8.2.3). This makes the subject seem powerful and dominant.

Aerial



Figure 8.2.4: Aerial Shot. (Pexels License; The Lazy Artist via Pexels)

Aerial shots use helicopters or drones to get shots from directly above the subject of the shot (See figure 8.2.4). These shots are commonly used in shots where the subject is falling, like jumping out of a plane and falling to the ground below. They are also used to show the subject in relation to the ground itself, like being stuck in traffic. This shot is also known as a god's eye view shot, birds-eye view shot, aerial view, raised shot, elevated shot, or overhead shot.

Dutch/Canted



Figure 8.2.5: Canted Shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Canted/Dutch angle are shots where the camera is tilted right or left on its axis to make it look like one side of the frame is going up while the other side is going down (See figure 8.2.5). This shot is used to make a shot more dynamic and interesting.

Over The Shoulder



Figure 8.2.6: Over the shoulder shot. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

In an Over the Shoulder (OTS) shot the viewer sees one subject from the back with only the side of the head and shoulder showing (See figure 8.2.6). The second subject is facing the first subject and we see their face and part of their body. This shot is used most often when two subjects in a shot are having a conversation. It is also usually the first shot you try before you do a Point of View (POV) shot.

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8.3: Camera Movements

Why use Camera Movements?

Camera movements are different ways to move the camera itself when put on a tripod or other camera support system. Moving the camera while recording allows for keeping up with the movement of a shot, can reveal details, or just make a shot more dynamic. We will review the most common terms you will hear on a production set. Although these movements will be discussed individually, they can be combined when the shot calls for it.

Pan

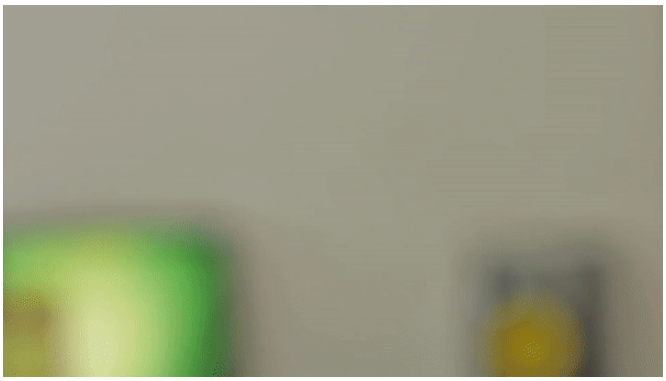


Figure **8.3.1**: Pan left. (Pixabay License; MilanWulf via Pixabay)

A pan is when a camera is turned left or right on its axis (See figure 8.3.1). The camera stays in the same spot but simply turns left or right. The top of a camera tripod, called the head, will allow the operator to turn the camera left or right with a smooth and controlled motion.

Tilt



Figure **8.3.2**: Tilt up and Tilt down. (Pexels License; KoolShooters via Pexels)

A tilt is when a camera is turned up or down on its axis (See figure 8.3.2). The camera stays in the same spot but is simply turned up or down. A tripod head allows for this movement to be controlled and smooth.

Dolly



Figure **8.3.3**: Dolly In and Out (Pexels License; RODNAE Productions via Pexels)

A dolly is when the camera is literally moved closer or further away from the subject (See figure 8.3.3). You can dolly in or dolly out. The camera tripod will either be on wheels or the camera person uses a support system that allows them to move closer or away from the subject. In film production a dolly is sometimes referred to as a push in and pull out.

Truck



Figure **8.3.4**: Truck left. (Pexels License; Tima Miroshnichenko via Pexels)

A truck movement, as opposed to the dolly, is moving the whole camera to the left or to the right (See figure 8.3.4). Cameras will need to be on a support system that is mobile, like wheels, or attached to a camera person with a sled and vest system.

Pedestal



Figure **8.3.5**: Pedestal up to reveal the person. (Pexels License; RODNAE Productions via Pexels)

The pedestal is the movement of the height of the camera itself. In a truck, the camera moves left to right, but with a pedestal, the camera moves up or down (See figure 8.3.5). Some camera tripods allow for vertical movement, or it can be done using a sled and vest system.

Arc



Figure **8.3.6**: Arc right. (Pexels License; cottonbro via Pexels)

An Arc moves around a subject in a circle (See figure 8.3.6). The circle does not need to be complete, but the camera needs to move around the subject. Cameras will need to be on a support system that is mobile, like wheels, or attached to a camera person with a sled and vest system.

Combination Shots

Although we discussed camera movements as individual movements, you can combine different types of movements to fit the feel of your shot and production. Each shot you take needs to be rehearsed and each shot needs to have a purpose. Ask yourself what you are trying to do in the shot and how it fits in with the story you are telling. Make sure to have a predetermined beginning point and end point for the shot. Avoid aimless camera movements. Here are a couple of examples.

Tracking Shot



Figure **8.3.7**: Tracking movement in a scene. (Pexels License; tugay aydın via Pexels)

A tracking shot is as it sounds, the camera person follows the movement of the subject no matter which direction they go (See figure 8.3.7). If working with actors, you will want to work out the blocking ahead of time and rehearse the shot multiple times.

Dolly Zoom



To view this video with Closed Captions: https://amara.org/en/videos/blE7RYYrYHAV/info/the-dolly-zoom-more-than-a-cheap-trick/

The Dolly Zoom shot is when you combine a dolly with a zoom. The two most common combinations are zoom in/dolly out and zoom out/dolly. Each combination has its own effect and will need to be rehearsed many times. The video above cuts together scenes from Hollywood films that use the Dolly Zoom movement.

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8.4: Lens Movements

What is a Lens Movement?

Lens movements happen when individual pieces of glass within a lens move, making objects in the image appear closer or further away. Most video cameras have zoom lenses, but if you are using a cinema camera, DSLR, or mirrorless camera, you will need to make sure the lens you are using is a zoom lens, which allows for variable focal length. You can learn more about zoom lenses in Chapter 7.10.

Zoom



Figure 8.4.1: Zoom in to person's face. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

A Zoom gives the appearance of moving closer or further away from the subject without moving the camera itself (See figure 8.4.1). It differs from a dolly in that instead of moving the camera itself, you are moving the glass in a lens to change the field of view. You can zoom in to get a closer detail of a subject or zoom out to reveal details of a room or a landscape, for example.

Rack Focus



Figure 8.4.2: Rack focus from one person to another. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Rack focus is a change in the focus of the camera. This requires the manipulation of the depth of field, which we will discuss later in this chapter. This movement is another glass movement inside of a lens, but a much smaller glass movement than a zoom. If person A is in focus and closer to the camera, person B can be placed further away from the camera and will appear out of focus. When you change the focus from person A to person B, that is a rack focus (See figure 8.4.2). After this movement, person B will be in focus while person A is out of focus. Any time you change which subjects are in focus it is called a rack focus.

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8.5: Video Composition

Rules of Visual Composition

Learning the rules of video composition will allow you to frame your shots to make them look professional and dynamic. Also, by understanding the rules, you can become a better visual storyteller.

Rule of Thirds

The rule of thirds breaks the video image into three both vertically and horizontally. Essentially, it looks like Tic Tac Toe lines overlayed on the screen. Some cameras will allow you to put these grid lines over the image, but they will not show the lines in your recording.



Figure **8.5.1**: Rule of thirds used to position talent.

(Public domain; Chaky via Wikimedia Commons

Where the vertical and horizontal lines intersect are considered to be the most interesting areas to place a subject (See figure 8.5.1). If you are conducting an interview, placing the interviewee's eyes on the top right or left line intersections will create a more interesting shot instead of simply placing them in the center of the frame.

Headroom



Figure **8.5.2**: Too much headroom (left), Not enough headroom (middle), Correct headroom (right). (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Headroom is the area from the top of the subject's head to the top of the frame. Having too much headroom can make the subject appear too low in the frame and makes them appear not as important. Too little headroom can cut off the person's head if they move or make the shot seem too cramped (See figure 8.5.2).

Nose Room



Figure 8.5.3: Not enough nose room (left), Correct nose room (right). (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Nose room is the area in front of the subject of the shot. If you are conducting an interview, you can place the subject's eyes on the top right intersection of the horizontal and vertical lines following the rule of thirds. You will need to frame the shot so the subject's nose is facing toward the left side of the frame to give them enough nose room. Having too little nose room makes the frame feel unbalanced because of the amount of room behind them (See figure 8.5.2).

Lead Room



Figure 8.5.4: Not enough lead room (left), Correct lead room (right). (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Lead room is very similar to nose room but refers to a subject in motion. When a subject is in motion, the viewers want to see what is coming up in front of them, not what is behind them. Give the subject more room in front of their motion than behind them to give proper lead room (See figure 8.5.4).

180 Degree Rule

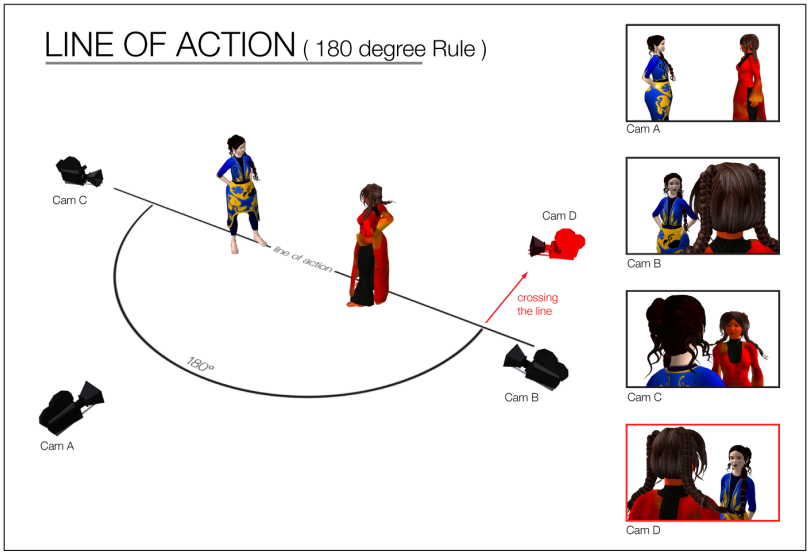


Figure **8.5.5**: 180 degree rule diagram.

(CC BY-NC-SA 2.0; AngryBeth via flickr)

The 180-degree rule is a guideline for continuity. When you have two characters speaking in a scene and facing each other, there is an imaginary line of action that runs through both of them. When you choose which side of that line to shoot on, you cannot go over that line or you will break the continuity. It may look as if both actors are looking in the same direction. In Figure 8.5.5, Cam A and Cam C follow the 180-degree rule, but Cam D breaks the rule. Cam D looks as if the lady in red is facing the same direction as the lady in blue on Cam C. This could disorient the audience.

The same line of action guideline is true when characters or vehicles are in motion. When a character is running from left to right in shot one. In shot two the actor needs to either continue to run left to right, or the angle of shot two needs to be neutral. A neutral shot would be the character running toward or away from the audience. If we use the neutral for shot two, then in shot three the character can be moving in any direction.

The video below demonstrates the 180-degree rule with two people, three people, and when a person is walking. Knowing how the line of action changes is important to adhere to the 180-degree rule and not confuse the audience.



Watch this video with Closed Captions: https://amara.org/en/videos/2T3ARTZhelPT/info/breaking-down-the-180-degree-rule/?team=

Layering/Creating Depth

Video is a two-dimensional medium, meaning our screens have height and width, but no depth. Good video creates the illusion of depth by layering objects from front to back. There are three layers to depth, foreground, middle ground, and background. By placing objects on all three layers, your image will provide depth and a more immersive experience for the viewer.



Figure **8.5.6**: Creating Depth in a Cityscape.

(Unsplash License, Mauro Mora via Unsplash



Figure **8.5.7**: Creating Depth in a Landscape.

(Unsplash License; Bailey Zindel via Unsplash

The foreground is the area closest to the camera. In the foreground, everything can be seen unobstructed from other objects in the shot. The middle ground is behind the foreground and this area will be obstructed by objects in the foreground. Lastly, the background is the furthest area from the camera and is obstructed by objects in the foreground and the middle ground. The obstructed view of objects in the middle ground and background gives the illusion of depth within the frame (See figure 8.5.6).

Conclusion

There are many streaming shows that break these composition rules, but it is done with a clear intention. When you are starting out, follow the composition rules above. Once you have mastered the rules of composition, then you can begin to explore when they can be broken.

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8.6: Critical Focus

A Critical Focus is performed to ensure that the subject is in focus. Once you have executed a cricital focus, if the distance between the subject and the camera does not change, your focus should hold. You can zoom in and zoom out and your subject should remain in focus.



Figure **8.6.1**: Performing a critical focus on the eyes. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Steps to Perform a Critical Focus

1. Zoom all the way in on your subject. If the subject is human, focus on the eyes
2. Use the focus ring to achieve focus
3. Zoom back out and compose your shot

You can see an example of a critical focus in figure 8.6.1.

Focus Assist and Focus Peaking

In chapter 7, we discussed Focus Assist and Focus Peaking, which is an overlay guide to show where things are in focus. You can turn that function on to assist with your critical focus.

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CHAPTER OVERVIEW

9: Lighting

Learning Objectives

- Review the lamps and lighting instruments that are commonly used in video production.
- Examine the qualities of light and how we can manipulate light to get the look for any production.
- Explore light placement and illustrate different lighting designs.

9.1: Measuring Light
9.2: Types of Lamps
9.3: Qualities of Light
9.4: Common Lights
9.5: Light Modification and Control
9.6: Lighting Design

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9.1: Measuring Light

Measures of Light

Light intensity (the brightness of light) hitting an object is measured in Footcandles or Lux. Footcandles (fc) is commonly used in the United States but is conforming more to the rest of the world that uses Lux, which is based in the metric system. One Footcandle is equal to 10.8 Lux. When starting with lighting, you want to try to aim for 150 to 200fc, which will allow you to have some flexibility with your camera settings instead of having to open your iris completely. It is much easier to reduce light when you have too much than to increase light when you do not have enough.

Light meters

To measure the intensity of light, there are two meters that are most common in video production, the incident light meter, and the reflected light meter.

Incident Light Meter



Figure **9.1.1**: Incident Light Meter.

(CC BY-NC 4.0; Shelley Ho via San Francisco State University)

An Incident Light Meter (See figure 9.1.1) measures the intensity of lighting hitting an object. If you have talent standing on a lit set, then you can use this light meter to measure the light hitting your talent or any other objects on the set.

Some incident light meters will show you the intensity of the light in Footcandles or Lux. Many other incident light meters measure the light hitting the sensor and they display the camera settings you need for proper exposure. To explain this further, the video below will talk about how incident light meters measure light for proper exposure.



To watch this video with Closed Captions: https://amara.org/en/videos/dzWzA1H9mzYs/info/the-light-meter-a-simple-explanation/

Reflected Light Meter

A Reflective Light Meter measures the light reflecting off of a set. Most cameras are built with a reflective light meter inside, which gives us the ability to use Zebra Stripes or a Histogram to measure the exposure.

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9.2: Types of Lamps

Lamps

Lamps are the types of bulbs that are used in a given lighting instrument. There are four major types of lights which we will discuss below.

Incandescent

Incandescent lights are sturdy and powerful lights that are most commonly used for video production (See Figure 9.2.1). If the light is too bright, you can use one of the many light modifiers we will discuss later in this section. Dimming rarely works on these lamps because their color temperature will change. If you attach a dimmer to these lights, you will only be able to dim them at 20% maximum before the color temperature changes noticeably.



Figure **9.2.1**: Incandescent bulbs. (CC BY 3.0; Hannes Grobe via Wikimedia Commons)

Although these lights are reliable and powerful, they can be electricity hogs, which means care must be taken to not blow a fuse on set. Most homes can handle two of these lights on a 15-amp circuit or three lights on a 20-amp circuit. The other safety consideration for these lights is their temperature during use. After a minute or two of being on, these lights get very hot. Thick working gloves must be worn to focus these lights when they are in use and to break them down.

Fluorescent



Figure **9.2.2**: Florescent light bulbs in two shapes and thicknesses. (CC BY-SA 2.0 DE; Christian Taube via Wikimedia Commons)

Fluorescent lights are great lights that give off general illumination over a wide area because they are tube lights (See figure 9.2.2). Not all fluorescent lights are made the same. There are consumer-grade fluorescent lights and professional-grade fluorescent lights. Consumer-grade lights are common in office buildings and in classrooms, but are not usually bright enough and have variable color

temperatures. Professional grade fluorescent lights are very bright and have a consistent color temperature. The only downside to these lights is their weight. They can be very heavy.

LED (Light-Emitting Diode)

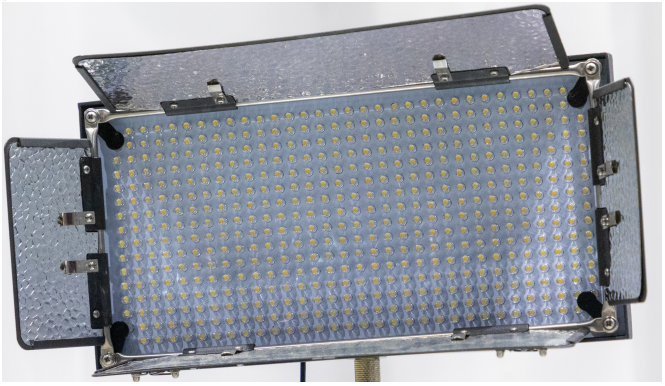


Figure **9.2.3**: LED bulbs. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

LED lamps have recently become very popular in many kinds of lights because they use less electricity, are usually easier to carry, and do not get as hot as other lamps (See figure 9.2.3). These lamps can be dimmed without affecting the color temperature and the color temperature itself can be changed on many lights. You can find cheap LED lights online and it may be tempting to buy them, but you have to be careful about how bright they are and whether their color temperature is accurate. Students have taken LED lights to sets because they were lighter and could run on batteries, but found out that they were not powerful enough to light what they needed.

HMI (Hydrargyrum Medium-Arc Iodide)



Figure **9.2.4**: HMI light bulb. (CC BY-SA 4.0; Daniel*D via Wikimedia Commons)

HMI lamps are a sub-set of high-intensity discharge lamps (See figure 9.2.4). They are commonly used by professional productions because cinematographers like the quality of light they give off. A benefit of them is that they use less electricity and run cooler than incandescent bulbs, but they are very expensive and usually out of the price range of anyone without a large budget.

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9.3: Qualities of Light

Hard light vs. Soft light

There are a few differences between hard light and soft light. One of those differences has to do with the transition from light to shadow. Hard light has a very drastic transition from light to shadow (See figure 9.3.1). On the other hand, soft light transitions slowly and softly from light to dark (See figure 9.3.2).



Figure **9.3.1**: Hard light.

(Unsplash License; James Timothy on Unsplash)



Figure **9.3.2**: Soft light.

(Unsplash License; Huston Wilson on Unsplash)

Hard light is a direct beam of light from a lamp, which is harsh and unforgiving on people's skin. Soft light is flattering on people's skin. Soft light can make a person's imperfections less noticeable and it softens features. Soft light is diffused light, meaning that the light has been bounced off something or has gone through a diffuser. Most interviews in documentaries will most likely have soft light on the person being interviewed.

Another important aspect of hard light is its adaptability. Hard light can be turned into a soft light using a light modifier or simply bouncing the light off a ceiling or floor. Soft light is unable to be turned into a hard light because of the way there are built to be soft. This makes hard lights appealing for independent video creators who want to get the best bang for their buck by buying one type of light that can be either hard or soft.

Theory of Three-Dimensional Contrast

Dean Collins created the Theory of Three-Dimensional Contrast to demonstrate how light creates three dimensions on a two-dimensional plane, like a screen. One light hitting an object will create three densities: the Diffused Value where the object is lit softly and evenly, the Specular Highlight is a reflection of the light source, and the Shadow is where the least amount or no light hits the subject. Together these reveal the depth, shape, density, texture, and form of the object.

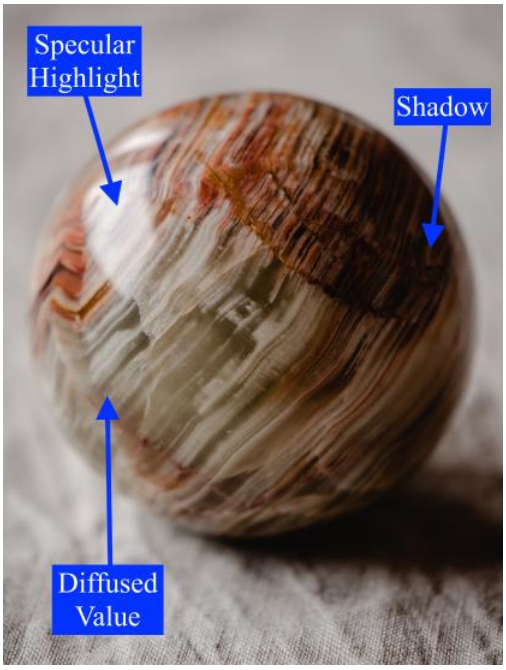


Figure **9.3.3**: Three densities of three-dimensional contrast: Specular Highlight, Diffused Value, and Shadow. (Pexels License; Eva Elijas via Pexels)

Spot light vs. Flood light

A spot light has a narrower beam of light, which can focus on a specific subject (See figure 9.3.4). You have probably seen these lights used during stage performances where a singer or comedian has a single circle of light that follows them

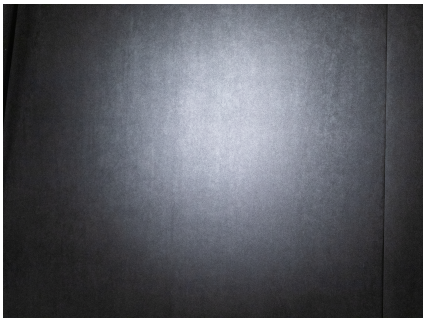


Figure **9.3.4**: Spot light.

(CC BY-NC 4.0; Shelley Ho via San Francisco State University)



Figure **9.3.5**: Flood light.

(CC BY-NC 4.0; Shelley Ho via San Francisco State University)

The opposite of the Spot light is the Flood light. Flood lights give off a wider beam of light and can be used to give general illumination to a wider portion of a set (See figure 9.3.5). Many late-night talk shows use Flood lights to light their sets.

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9.4: Common Lights

Fresnel

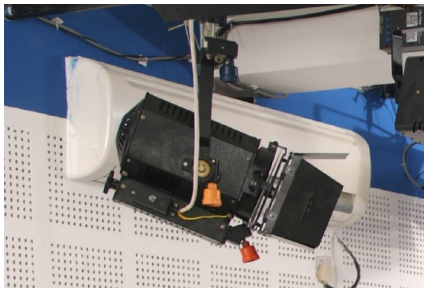


Figure **9.4.1**: Fresnel Light.

(CC BY-SA 3.0; Krish Dulal via Wikimedia Commons)

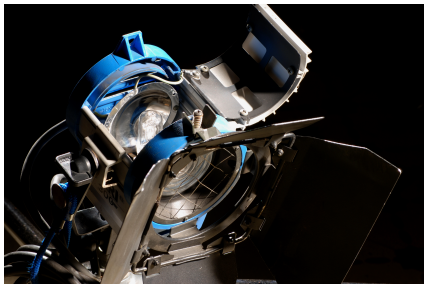


Figure **9.4.2**: Fresnel light open.

(Public Domain; Santiago Martín via Wikimedia Commons)

Fresnel lights are built with a lens and a mechanism that allows the lamp to move backward and forward to focus the light (See figures 9.4.1 and 9.4.2). This enables the Fresnel to either have a flood light or a spotlight. These lights are powerful and versatile with what you can do with them. With LED Fresnels that do not get as nearly as hot as Fresnels with incandescent lamps, you can add an umbrella or softbox to soften the light. The more advanced LED Fresnels can change color temperatures and light colors.

Panel Light

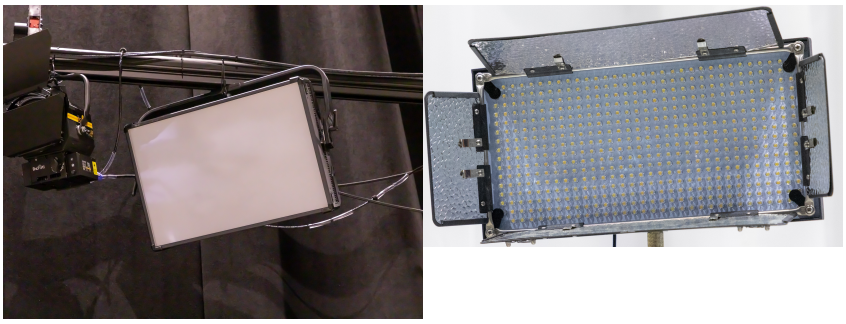


Figure **9.4.3**: Examples of panel lights. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Panel lights, sometimes called pan lights, are as they are named. The light is usually in a rectangular shape of various sizes (See figure 9.4.3). The most common lamps used in these lights are LEDs and fluorescents. Panel lights are used to illuminate a general area and are not likely able to be focused on a specific subject.

Source 4/Spot/Ellipsoidal

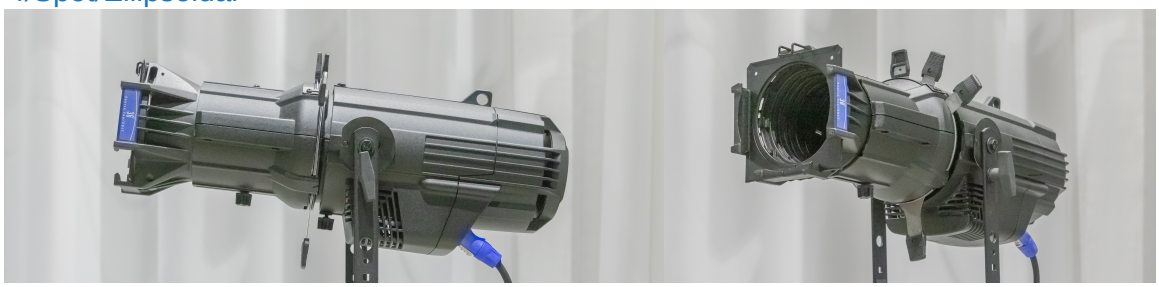


Figure **9.4.4**: Source four light. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Source 4 lights are powerful lights that can create a narrow circular beam of light due to their long body and lens (See figure 9.4.4). The barn doors for these lights are internal and on some of the lights, the lenses can be changed to make the circle of light larger or narrower. The lights are focused enough to be able to add gobos or cookies that change the shape of the light into whatever you

want. The light can look like lightning or show words that can be beamed onto a wall or curtain. Source 4s are most commonly used as spotlights on specific subjects.

New Types of Lights

LED technology is quickly advancing and new lights are put on the market all the time. For example, there are foldable, flat LED lights that are put on frames to use on a light stand. When the shoot is over, you fold or roll up the light and it stores away using very little space and weighs very little. Additionally, there are cylindrical lights that look similar to light sabers that are quite powerful and easy to transport. The sizes of lighting instruments are changing, too. You can get professional-grade lights that fit in your pocket, although most professionals use these as additional lights, not their key lights. Many of these lights, like the advanced LED Fresnels, can change color temperature and the color of the light.

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9.5: Light Modification and Control

What Do Light Modifiers Do?

It is easier to reduce the intensity of light than it is to increase it. With these modifiers, you can reduce the intensity of light, block light, change the shape or color of light, or turn hard light into soft light.

Barn Doors

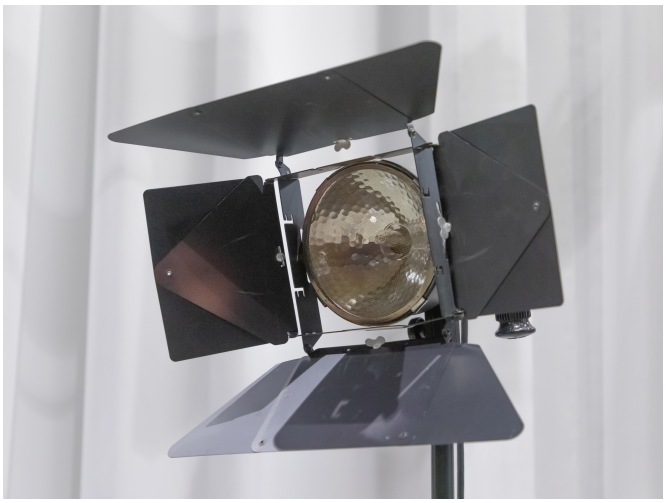


Figure **9.5.1**: Barn doors on a light. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Barn doors allow users to control the beam of light coming out of the lamp. They are most commonly associated with Fresnel lights but can be put on a number of other lights. Barn doors are four flaps on all sides of the light (See figure 9.5.1). You can narrow the light into a sliver or use them to make sure one light does not affect the cast beam of another light. This overlapping of light is called bleeding, which is something lighting directors want to avoid.

Umbrellas & Softboxes

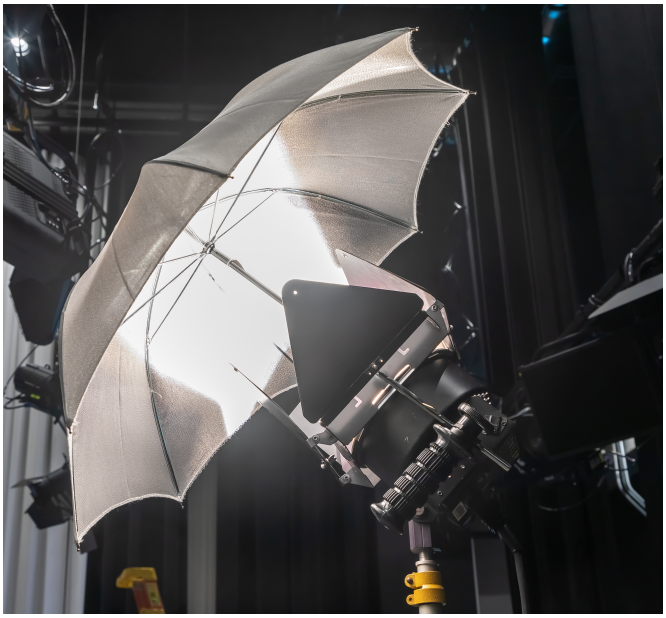


Figure **9.5.2**: Light with reflective umbrella. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Umbrellas are built like a typical umbrella, except the material used on top is either made of a white diffusion material or a silver or gold reflective surface. You can attach an umbrella to a hard light to turn it into a soft light (See figure 9.5.2). When the umbrella is

made of diffusion material, you shine the light through it. If the umbrella is made with reflective material, then you point the light away from the subject and use the umbrella to bounce the light back onto the subject.



Figure **9.5.3**: Softbox with and without diffusion cover. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

A softbox is almost a combination of both types of umbrellas. In a softbox, the light is in the middle of a square (hence box) or circle made to collapse for storage or open similar to an umbrella. The inside of the softbox is made with silver reflective material to bounce the light. A diffusion material that softens the light is placed on the front of the box (See figure 9.5.3).

Reflectors

Reflectors have circular frames that can be folded for storage. The frame stretches out different reflective materials, like silver or gold, or it can have a white diffusion surface that softens the light being bounced back (See figure 9.5.4). Reflectors are commonly used outdoors when working with sunlight to use the sun to illuminate the subject or to soften the sunlight hitting the subject. They can also be used with production lights to reflect light already on the set back to fill in shadows on the subject.



Figure **9.5.4**: Small round reflector. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Flags

Professional flags are black rectangles of various sizes that can be attached to a light or a stand to block light (See figure 9.5.5). This is useful when you have lots of lights and do not want them to bleed into each other or narrow the beam to not hit a specific part of the set. A flag can be anything that blocks light from hitting an object or bleeding into another light, but professional ones are made to withstand higher levels of heat from lights. If you use anything other than professional-grade materials to block light, make sure you do not put it close to the light or it will start a fire.



Figure **9.5.5**: Flag blocking light from hitting the backdrop. (CC BY 2.0; Tim Johnson via Wikimedia Commons)

Black Foil/Cinefoil

Black foil (or Cinefoil) is a thick aluminum foil that is covered in black (See figure 9.5.6). It can be used as a flag, but it can be shaped into whatever form you need for your production. For example, you can cut long, thin rectangles into the foil to mimic the sun or moon coming in through blinds. Black foil is also built to withstand high temperatures from lights, which makes it safe to put on the front of the light.



Figure **9.5.6**: Black foil on a roll (left) and used on a light (right). (CC BY-NC 4.0; Shelley Ho via San Francisco State University)



Figure 9.5.7: Diffusion gel held up to a light. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Diffusion gels, sometimes called frosted gels, feel like sheets of thin plastic with a frosted white covering (See figure 9.5.7). This cuts down the intensity of light and softens the light. These are made to withstand heat from lights.

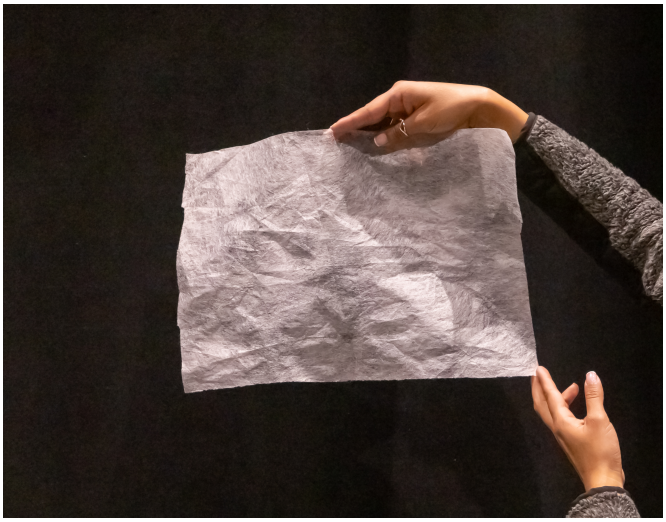


Figure 9.5.8: Tough Spun. (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Similar to diffusion gels, tough spun looks and may even feel like a used dryer sheet, but is made of professional-grade material to withstand high temperatures (See figure 9.5.8). Tough spun will also reduce light intensity and soften the light. To be clear, do not use dryer sheets to replace tough spun because you will start a fire. Although they might look and feel similar to dryer sheets, tough spun is made of different materials.

Color Gels

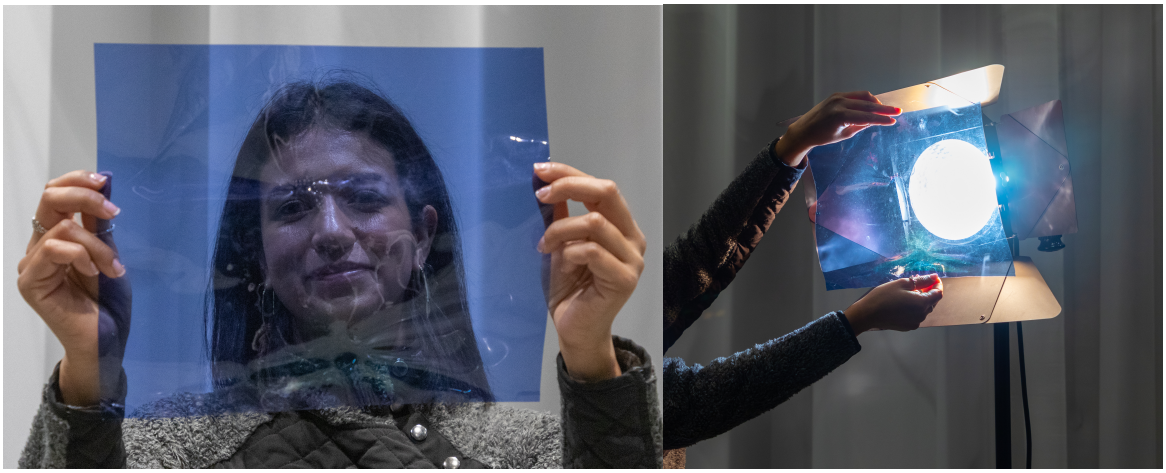


Figure 9.5.9: Color Gels held up (left) and on a light (right). (CC BY-NC 4.0; Shelley Ho via San Francisco State University)

Color gels feel like thin, flexible colored plastic (See figure 9.5.9). Gels are built to withstand high temperatures but can start to warp after multiple uses with incandescent light. Typically, they are put into a frame and placed in front of a light or attached to a light with clips to change the color of the light. If you do not have an LED light that has color options, this is the second-best option to change the color of your lights.

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9.6: Lighting Design

Three-Point Lighting

The most basic setup for lighting human subjects is Three-Point Lighting. This setup consists of three lights; key, fill, and back lights (See figure 9.6.1). There is no rule for what kind of lights or lamps are used in this setup. In fact, when shooting outside, you might use the sun as one of the lights and a reflector as another.

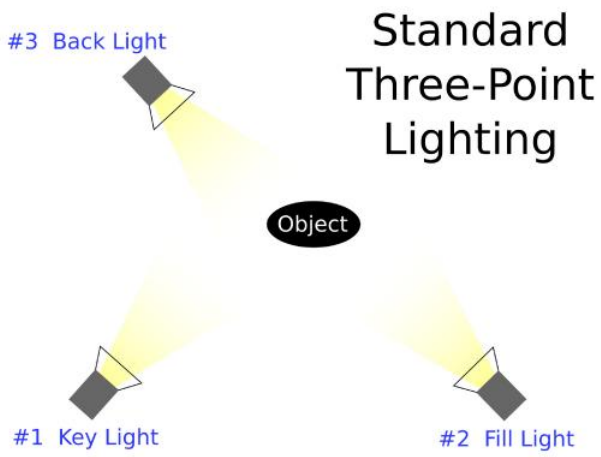


Figure **9.6.1**: Diagram of three-point lighting. (Public domain; Theonlysilentbob via Wikimedia Commons)

Key Light

The Key Light is the primary source of illumination for your subject. It is typically placed at a 45-degree angle from your camera. This allows the light to show the subject's shape and may cause shadows on the opposite side of their body.

Fill Light

The Fill Light is meant to control the shadows caused by the key light. This does not mean shadows need to be eliminated entirely, but you can control the contrast between the two sides of their body. The fill is placed at a 45-degree angle from the camera on the opposite of the key light. You can check the contrast of the key and fill using an incident light meter.

Contrast Ratios

The Contrast Ratio (sometimes called a Lighting Ratio) is the difference in brightness between your key light and your fill light. Your key light will be the brightest light and you can control how bright the fill light is to create whatever ratio is needed for your production. You can measure the difference between the two lights using an incident light meter. When you set the ISO and shutter speed, the light meter will tell you what f-stop is needed on your camera for that light.

For example, if we were lighting a subject with the key light bright enough to require f/5.6 on our incident light meter, we could then adjust the fill light to be equally as bright or dimmer than the key light to create contrast and shape (See figure 9.6.2). When the light meter reads that we need f/4.0 for our fill and f/5.6 for our key (1 f-stop difference), we know the fill light is half as bright as the key light. When the fill light is at f/2.8 and the key is at f/5.6 (2 f-stops difference), we know the fill is 1/4 as bright as the key light. Depending on the look you want, you can adjust your contrast ratio to fit that style.

Contrast Ratio	f-stop Difference	Fill Light f-stop	Key Light f-stop
1:1	0	5.6	5.6
2:1	1	4.0	5.6
4:1	2	2.8	5.6
8:1	3	2.0	5.6
16:1	4	1.4	5.6

Figure **9.6.2**: Contrast ratio chart with F-Stops (CC BY-NC 4.0; Christopher Clemens author San Francisco State University)

The video below will demonstrate what different contrast ratios look like and how to create them.



Back Light

The Back Light, sometimes called a hair light, is used to visually separate the subject from their background. It illuminates the top of the head and shoulders, which creates separation from the background. The back light is placed behind the subject (See figure 9.6.3), but if the light stand is in your shot, you can place it on the opposite side of the key or fill lights.



Figure **9.6.3**: Three-point lighting in a studio. (Unsplash License; Alexander Dummer on Unsplash)

Other Light Designs

Although three-point lighting is the standard for lighting, this does not account for lighting anything other than the subject. To light the background, you will use a background light or lights. The only guideline for lighting your background is to make sure the light cannot be seen on camera. If you are conducting an interview, it is pleasing to the eye to have even lighting in the background,

meaning there is no hot spot or an area with harsh shadows. Everything in the background is lit at a similar intensity. You can check the evenness of the light with an incident light meter.

Beyond the background, you can choose to use any number of lighting setups that will create a different effect on how your subject appears on camera. Figures 9.6.4, 9.6.5, 9.6.6, and 9.6.7 demonstrate different lighting setups for portraits.

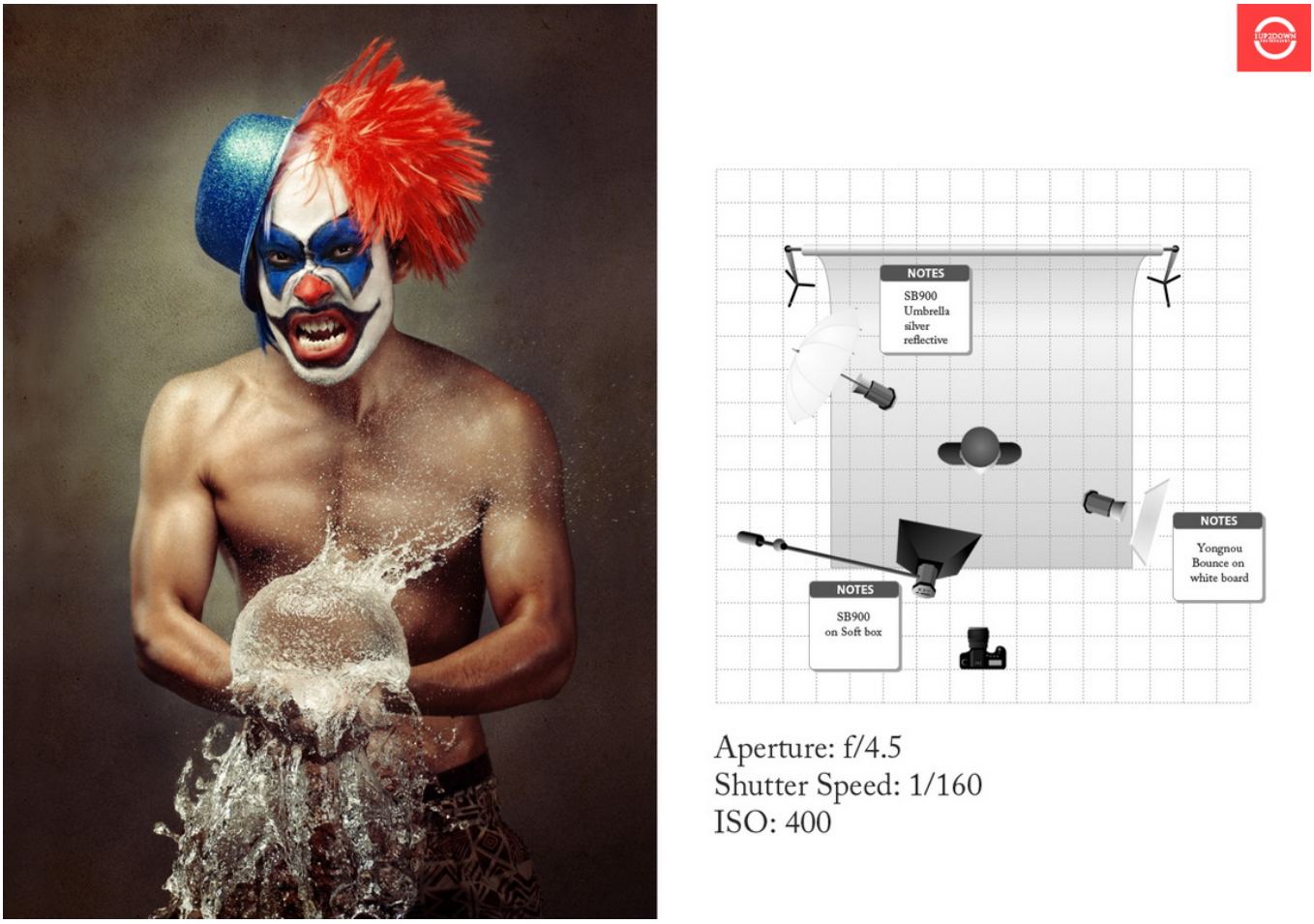


Figure 9.6.4: Clown portrait with three-light setup. (CC BY-NC-ND 2.0; Sidious Sid via flickr)

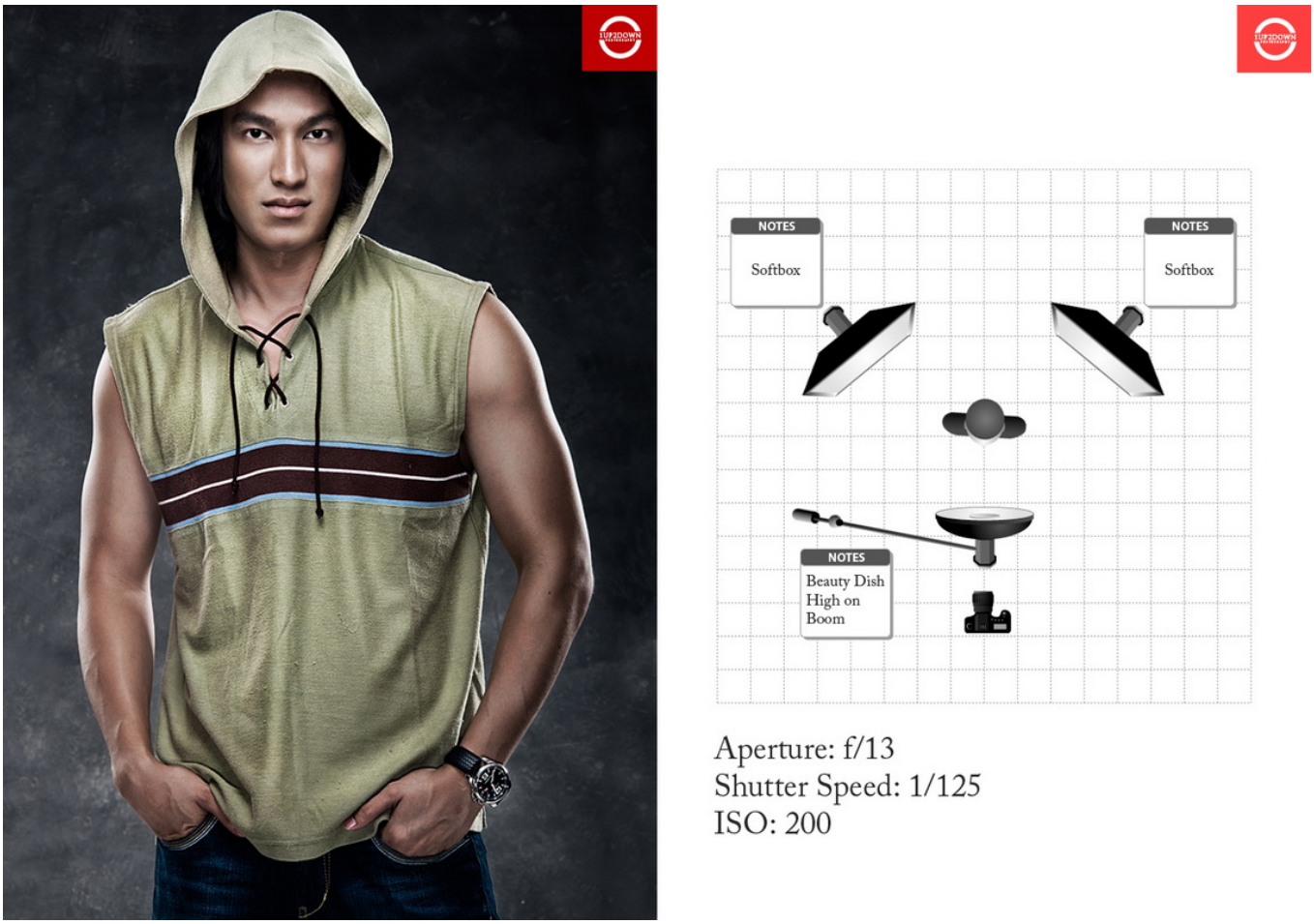


Figure **9.6.5**: Man in hoodie with three-light setup. (CC BY-NC-ND 2.0; Sidious Sid via flickr)



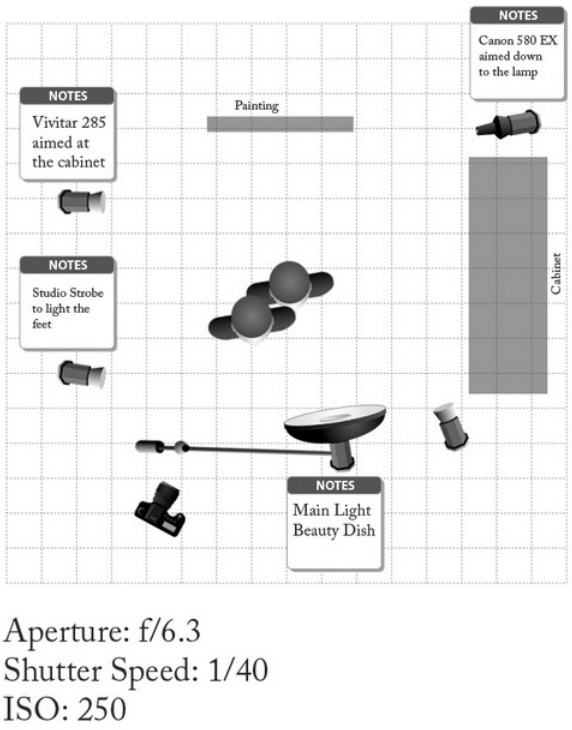
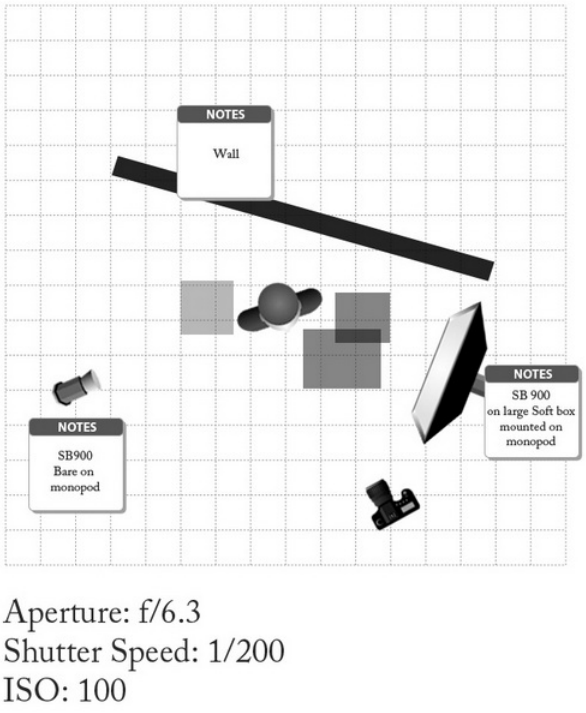


Figure **9.6.6**: Couple on bed with five-light setup. (CC BY-NC-ND 2.0; Sidious Sid via flickr)





Aperture: f/6.3
Shutter Speed: 1/200
ISO: 100

Figure **9.6.7**: Woman sitting with two-light setup. (CC BY-NC-ND 2.0; Sidious Sid via flickr)

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CHAPTER OVERVIEW

10: Sound

Learning Objectives

- Outline what sound and audio are and how they are created.
- Review the most common microphones used in video production and their uses.
- Discuss how to control sound and best practices for recording in the field.

10.1: Elements of Sound

10.2: Microphones

10.2.1: Microphones Used in Video Production

10.2.2: Polar Patterns

10.3: Audio Connectors

10.4: Controlling Sound with a Video Camera

10.5: Location Audio

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10.1: Elements of Sound

Sound Waves

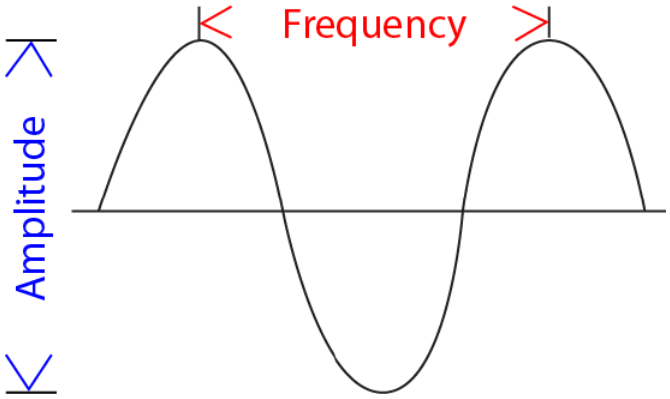


Figure **10.1.1**: Amplitude and Frequency. (CC0 1.0 Universal Public Domain Dedication: Justin Evans via Wikimedia Commons)

Amplitude

Sound travels through the air in waves. The components of those waves dictate the volume and pitch of that sound. For instance, the Amplitude of the wave (how tall the wave is as demonstrated in figure 10.1.1) dictates the volume of the sound. We measure the amplitude of sound in decibels (dB). The threshold of hearing starts at 0dB, the threshold of pain starts around 120dB, and the instant perforation of the human eardrum is around 160dB.

Frequency

Another important element of sound is Frequency which dictates the pitch of the sound. Frequency refers to how many full-wave cycles happen per second (See figure 10.1.1), which is measured in hertz (Hz). The typical male voice frequency is between 85 to 100 Hz. The typical female voice frequency is between 165 to 255 Hz. When listening to music, you may be able to adjust the bass (20-200 Hz), midrange (200-2000 Hz), or treble (2-18 kHz) on your music player.

Sound vs. Audio

Sound and audio are commonly used interchangeably, but they actually refer to two different things. Sound is vibration waves moving through materials, like air, walls, and water. When we speak, our vocal cords vibrate from air flowing between them, which creates a sound that comes out of our mouths. In other terms, it is the mechanical creation of sound waves.

Audio is an electrical representation of sound. When a microphone picks up sound, it turns sound waves into electric sound signals that get recorded. The electric sound signal is audio. It can be converted, manipulated, edited, and played back. When you play the audio back, a speaker then translates the audio signal into sound waves that we can hear (See figure 10.1.2).

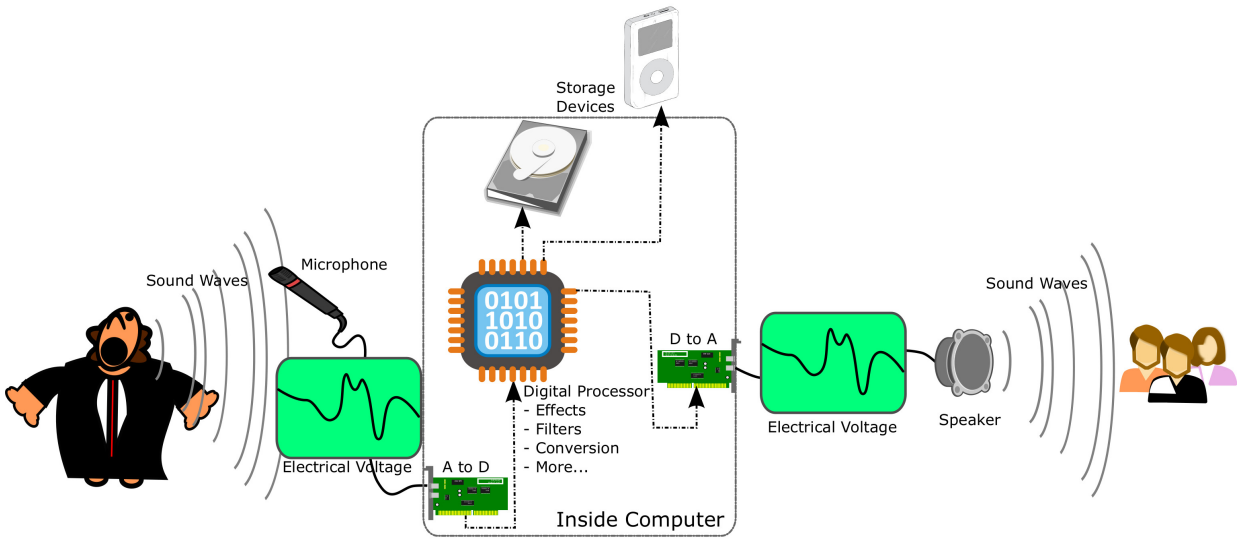


Figure **10.1.2**: Diagram of sound being converted from sound waves into audio signals with a microphone, converted into digital information in a computer, converted into audio signals, and back into sound waves through a speaker. (CC BY-SA 3.0; Teeks99 via Wikimedia Commons)

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SECTION OVERVIEW

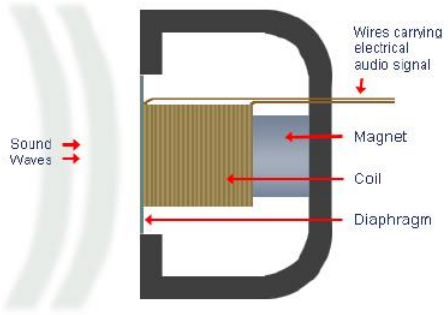
10.2: Microphones

What Are Microphones?

Microphones are transducers of sound waves, which means they convert sound into electrical signals that can be used in analog or digital formats. There are different ways sound gets converted into electric signals. We'll discuss the three most commonly used in video production, dynamic, condenser, and ribbon.

Dynamic

Dynamic microphones are built with a diaphragm that reacts to sound. The diaphragm has a strong magnet with a wire coil around it. The magnet creates a magnetic field and when the wire moves when sound waves enter, it creates an electric signal (See figure 10.2.1).



Cross-Section of Dynamic Microphone

Figure **10.2.1**: The diaphragm magnet is wrapped in a metal coil. When sound moves the metal coil, audio signals are produced. (CC BY-SA 3.0.; Jim Dearden via Stack Exchange)

These microphones are very sturdy and travel well (See figures 10.2.2 and 10.2.3). They are better at picking up louder sounds than softer ones, which is why news reporters use them when they report from an outside location. The microphone will be able to pick up the reporter's voice more so than the noise around them. The same can be said for why dynamic microphones are used at music concerts. It will pick up the sound of the singer better than any of the other sounds around them.



Figure **10.2.2**: Dynamic microphone (CC BY 2.0; AV Hire London via flickr)



Figure **10.2.3**: Dynamic microphone CC BY 2.0; (verchmarco via flickr)

Condenser

Condenser microphones are built with two metal plates that are charged with electricity. One plate is a fixed plate, called the backplate, and the other plate, the diaphragm, moves when sound hits it. When the distance between the two plates changes, it creates an audio signal (See figure 10.2.4).

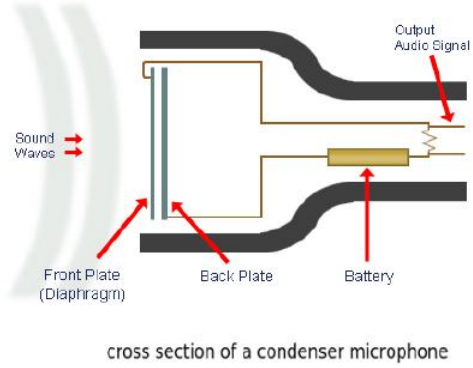


Figure **10.2.4**: Two plates are charged with electricity (from a battery or phantom power). When sound moves the diaphragm, the space between the plates creates an audio signal. (CC BY-SA 3.0.; Jim Dearden via Stack Exchange)

A battery needs to be placed inside the microphone or it needs power from what it is connected to, most commonly a camera or audio recorder. Many video cameras and audio recorders (but not DSLR or mirrorless cameras) have a setting called Phantom Power. This setting tells the camera or recorder to send an electric signal to power the two plates inside the microphone. This will drain the battery of the camera or recorder a little faster than normal.

Condenser microphones are able to pick up soft sounds much better than dynamic microphones. They are used in many productions, like studio interviews, sitcoms, and dramas (See figures 10.2.5 and 10.2.6).



Figure 10.2.5: Condenser microphone (CC BY-SA 2.0; anthony_goto via flickr)



Figure 10.2.6: Condenser microphone (CC BY-ND 2.0; Mac Users Guide via flickr)

Ribbon

Ribbon microphones are with a very thin piece of folded metal, usually aluminum, suspended in a magnetic field (usually two strong magnets). When sound waves move the metal ribbon back and forth in the magnetic field it creates an electric signal (See figure 10.2.7).

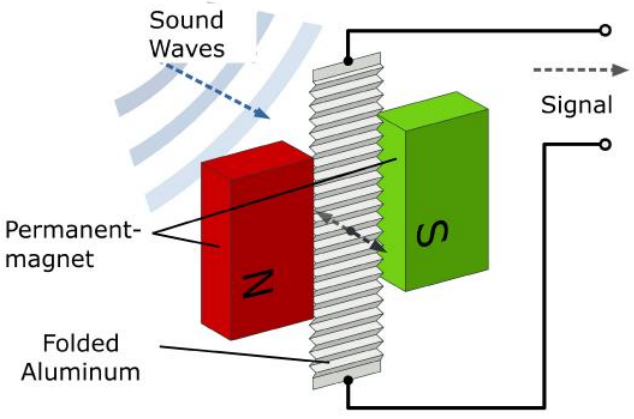


Figure 10.2.7: A folded piece of thin metal (the ribbon) is suspended between two magnets. When sound waves move the ribbon, an audio signal is created. (CC BY-SA 3.0,; Arne Nordmann (norro) via Wikimedia Commons)

Most Ribbon microphones have a figure 8 or bi-direction pickup pattern because of how the ribbon is suspended. Older ribbon mics were very sensitive and easily broken, but the ribbon microphones of today are more sturdy. Care needs to be taken to prevent gust of wind or bursts of air (like when people pop their "p"s) from hitting the ribbon and stretching it out. It is best to use this mic with a pop filter like shown Figure 10.2.5 (the disk in front of the mic) or angle the mic to prevent a direct burst of air.

Ribbon microphones are used a lot in music recording. Since ribbon microphones pick up sound much like our ears do, musical instruments sound very natural (See figures 10.2.8 and 10.2.9).



Figure 10.2.8: Ribbon microphone. (CC BY-NC-SA 4.0.; Beyerdynamic GmbH & Co KG via Science Museum Group)



Figure 10.2.9: Ribbon microphone (CC BY-NC 2.0; Wired Photostream)

Conclusion

You may have noticed in the figures above that some of the microphones look similar, like the handheld dynamic in figure 10.2.2 and the handheld ribbon mic in figure 10.2.8. Similar-looking microphones can have different internal transducers. Make sure that the microphone you have has the type of transducer you need for your production.

10.2.1: Microphones Used in Video Production

10.2.2: Polar Patterns

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10.2.1: Microphones Used in Video Production

Handheld



Figure **10.2.1.1**: Handheld Microphone.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Handheld microphones are held by someone who speaks or sings into it (See figure 10.2.1.1). You will see these microphones on the news when journalists are reporting from the field or in live music productions where the lead singer of a band is singing into the microphone.

Shotgun



Figure **10.2.1.2**: Shotgun microphone.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

A shotgun microphone is commonly used in fiction shows on television and in films (See figure 10.2.1.2). These mics are commonly placed on boom poles (and referred to as a boom mic), which allow them to be extended from off-camera and brought closer to talent by a boom operator. This gives the talent freedom to move around and not have to wear a microphone.

Boom Mics

When a shotgun mic is put on a boom pole, it is commonly referred to as a boom mic (See figure 10.2.1.3). They are great for picking up sound when the subjects of the shot cannot wear a microphone, like in fiction shows. Seeing a microphone on a fictional character could take the viewer out of the story unless the script calls for it.



Figure **10.2.1.3**: Boom microphone (CC BY 2.0; VideoVillain via flickr)

Booming the Mic

Boom poles have to be handled with two hands to keep them steady and to make sure the microphone is facing the talent. Boom operators usually position the mic above and slightly in front of the talent either by resting the pole on their shoulders and behind their neck (See figures 10.2.1.3 and 10.2.1.5) or by raising their arms up (See figure 10.2.1.4). Boom operators have to be careful not to have the mic appear on camera or have a shadow cast on the set from the boom. They usually work with the camera person to determine how close they can get to the talent without being in the shot.



Figure **10.2.1.4**: Booming the mic with both arms up.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)



Figure **10.2.1.5**: Booming the mic resting the pole on shoulders.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Figure **10.2.1.6**: Booming from below with the mic facing up.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

A boom operator can also position the mic under the talent (See figure 10.2.1.6), once again being cautious not to be in the shot. Although this technique removes the shadow casting issues of the above-the-head technique, having the microphone face upwards also increases the likelihood of capturing any sound happening above the talent. If you are recording outdoors and the mic faces upwards toward a tree, it will pick up the rustling of leaves and any birds chirping since shotgun microphones are highly directional in how they pick up sound. Since the sound is really important, most boom operators use the over-the-head technique more often.

Lavalier



Figure **10.2.1.7**: Lavalier microphone.

(CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Lavalier microphones are small microphones that are usually attached to talent. They are most commonly used in news programs and any interviews that take place indoors. These mics are placed on a clip and attached to the clothing of the talent.

In most cases, the lavalier mic can be seen on the person wearing them, but the wires are hidden as best as possible. Since these mics are tiny and fragile, we need to reduce the tension in the area where the wire connects to the mic. This is the most fragile area of a lavalier. You'll notice when you watch the news, the microphone will be on the clip on the anchor's clothing and there will be a small half-loop going underneath it that disappears behind the clothing inside the clip.

Broadcast Loop

To reduce the tension on the connection of the wire and lavalier, to look professional (see how unprofessional the mic looks in figure 10.2.1.8), and to hide as much of the wire as possible, we use what is called the Broadcast Loop. To create the loop, place the microphone on the clip and create a half loop underneath, putting the wire inside the clip. Let the wire complete the loop, but place the top of the loop behind the clothing letting the clip hold the end of the loop as demonstrated below in Figure 10.2.1.9 below.

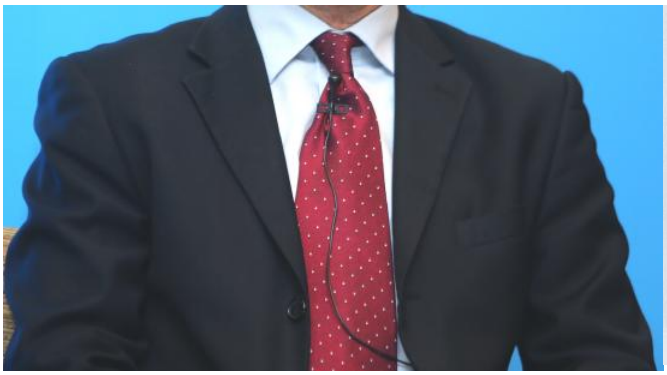


Figure **10.2.1.8**: Bad lavalier setup.

(CC BY 2.0; ITU Pictures via flickr)



Figure **10.2.1.9**: Good lavalier setup.

(CC BY 2.0; dgpodosek via flickr)

The video below will demonstrate how to create a broadcast loop using a lapel clip to hide most of the wire from a lavalier microphone.



To watch this video with Closed Captions: https://amara.org/en/videos/AvOwC2FqCQeC/info/60-seconds-on-set-lavalier-mounting-basics/

PZM



Figure **10.2.1.10**: PZM or Boundary microphone.

(CC BY-SA 4.0, Terodaktil via Wikimedia Commons)

PZM stands for Pressure Zone Microphone and is sometimes referred to as a Boundary microphone (See figure 10.2.1.10). This microphone is used to hear multiple people at once. It can be placed on the front of a stage to hear actors or the footwork of tap dancers. Several can be placed in front of a large chorus to capture all the rich sounds. It can also be placed inside of the cover of a grand piano when doing a live piano performance. PZM microphones are also commonly used as conference call microphones because they will pick up everyone sitting around a conference table well.

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10.2.2: Polar Patterns

What Are Polar Patterns?

The polar pattern (sometimes called the pick-up pattern) of a microphone is the sensitivity to sound based on the direction from which the sound is coming. It is the direction from which microphones are best able to hear sound.

Omnidirectional

Omnidirectional mics are able to pick up sound from sound equally from 360 degrees around the microphone (See figure 10.2.2.1). The microphone does not need to face the sound source and is common in lavalier microphones that are used in news programs and during interviews.

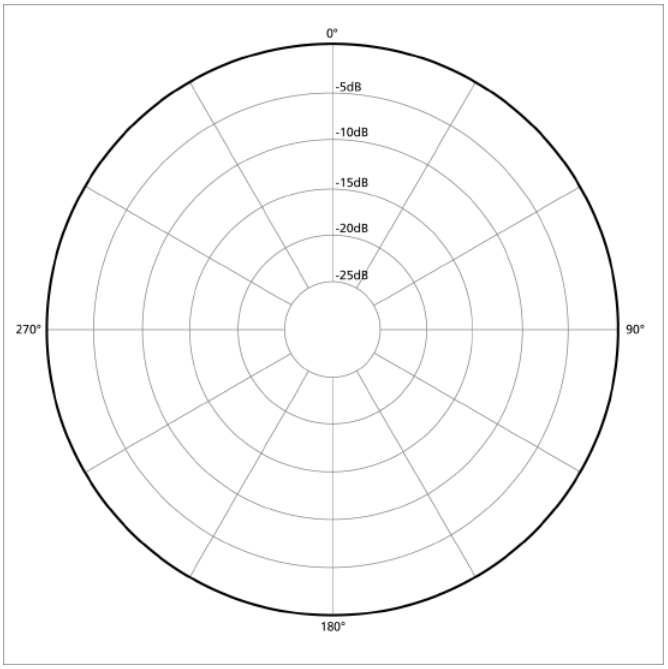


Figure **10.2.2.1**: Omnidirectional polar pattern. (CC BY-SA 3.0; Galak76 via Wikimedia Commons)

Cardioid

The shape of the cardioid polar pattern is similar to the shape of a heart (See figure 10.2.2.2). Cardioid microphones are unidirectional because they pick up sound best from the front of the mic, but it is a wide range in front.

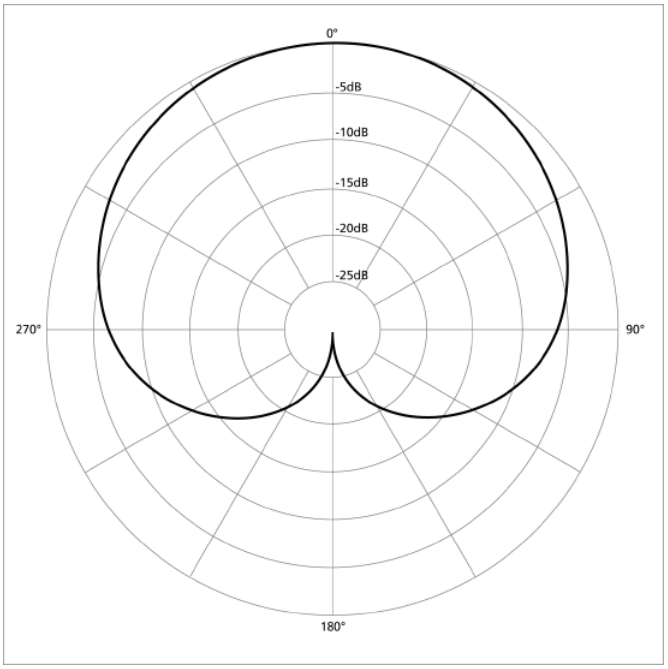


Figure 10.2.2.2: Cardioid polar pattern. (CC BY-SA 3.0; Galak76 via Wikimedia Commons)

Supercardioid

Supercardioid mics are similar to cardioid mics, but are more directional to the front of the mic and can pick up sound that is close to the bottom of the microphone (See figure 10.2.2.3).

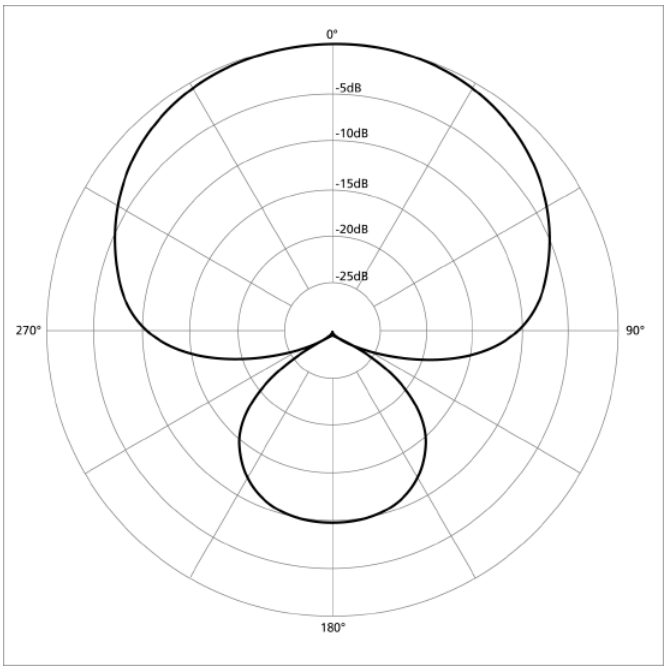


Figure 10.2.2.3: Supercardioid polar pattern. (CC BY-SA 3.0; Galak76 via Wikimedia Commons)

Hypercardioid

Hypercardioid mics are similar to supercardioid mics but have more ability to pick up sounds at the bottom of the microphone (See figure 10.2.2.4).

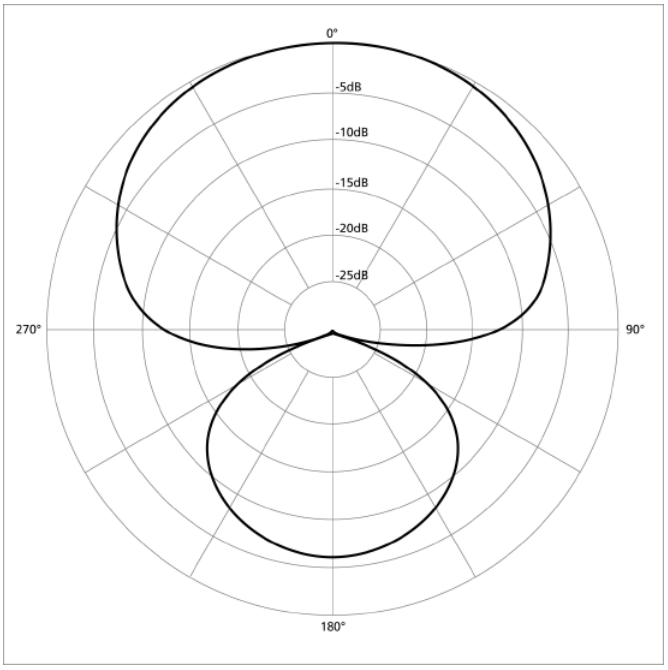


Figure 10.2.2.4: Hypercardioid polar pattern. (CC BY-SA 3.0; Galak76 via Wikimedia Commons)

Bidirectional

Bidirectional mics (sometimes called figure 8 mics) are able to pick up sound from two directions (See figure 10.2.2.5). It can pick up sounds from front and back, but not from the sides.

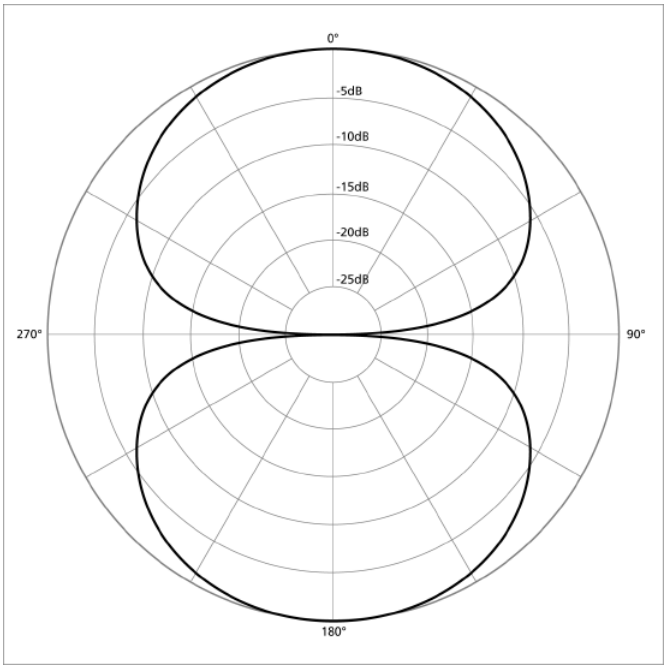


Figure 10.2.2.5: Bidirectional (or Figure 8) polar pattern. (CC BY-SA 3.0; Galak76 via Wikimedia Commons)

Shotgun

Shotgun microphones are highly directional microphones that pick up sound best from in front of the microphone. You will notice the that microphone is a long tube that is used to cancel out sounds coming from the sides (See figure 10.2.2.6).

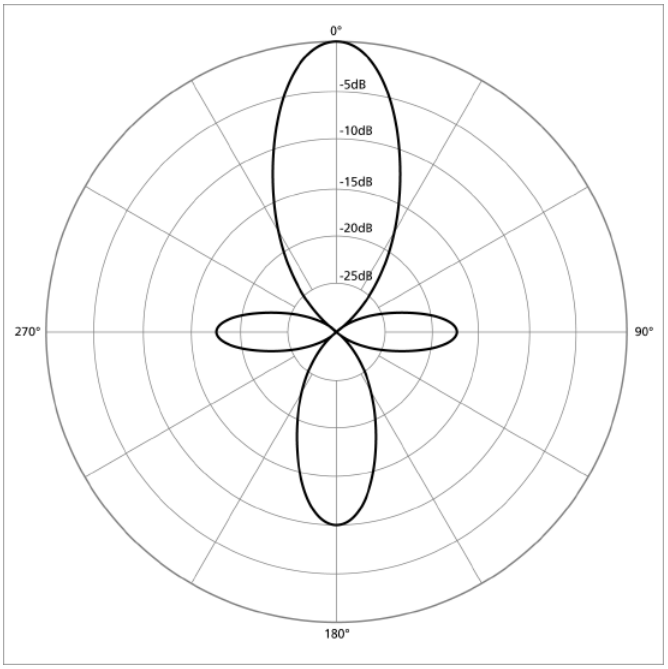


Figure 10.2.2.6: Shotgun microphone polar pattern. (CC BY-SA 3.0; Galak76 via Wikimedia Commons)

Knowing which pickup pattern to choose is important in order to capture quality audio in the field. The video below explains microphone pickup patterns and demonstrates how pickup patterns work with several microphones.



To watch the video with Closed Captions: https://amara.org/en/videos/Fa9GJfoChTsj/info/microphone-pickup-patterns/

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10.3: Audio Connectors

Hooking Up Mics

To use microphones, you have to be able to hook up the correct wires and connectors. We will go over some of the most common connectors for audio in video here.

XLR



Figure **10.3.1**: XLR cable and connectors.

(CC BY 2.0; wuestenigel via flickr)

An XLR is a circular connector with three metal prongs inside (See figure 10.3.1). These are the most common connectors for microphones. Many professional cameras will have XLR hookups into the camera. If your camera does not come with any XLR hookups like for many DSLR and Mirrorless cameras, you can record sound on an audio recorder that does have XLR hookups or use an XLR to mini adapter (See figure 10.3.2).



Figure **10.3.2**: XLR to 1/4" Plug with 1/8" plug adapter.

(CC BY-NC 2.0; Derek K. Miller via flickr)

Phone Plug/Quarter Inch Plug



Figure **10.3.3**: Phone plug connector.

(CC BY-SA 3.0,; Kreuzschnabel via Wikimedia Commons)

A quarter-inch or phone plug is the common connector for high-end headphones (See figure 10.3.3). They can also be used when plugging instruments or microphones into amplifiers.

Mini Plug/Eighth-inch/3.5mm



Figure **10.3.4**: Mini plug wire and connector.

(CC BY 2.0; wuestenigel via flickr)

The eighth-inch (or mini plug or 3.5mm) plug is the most common connector for consumer-grade headphones (See figure 10.3.4). Many video cameras will allow you to connect headphones using a mini plug to monitor the sound being recorded.

HDMI

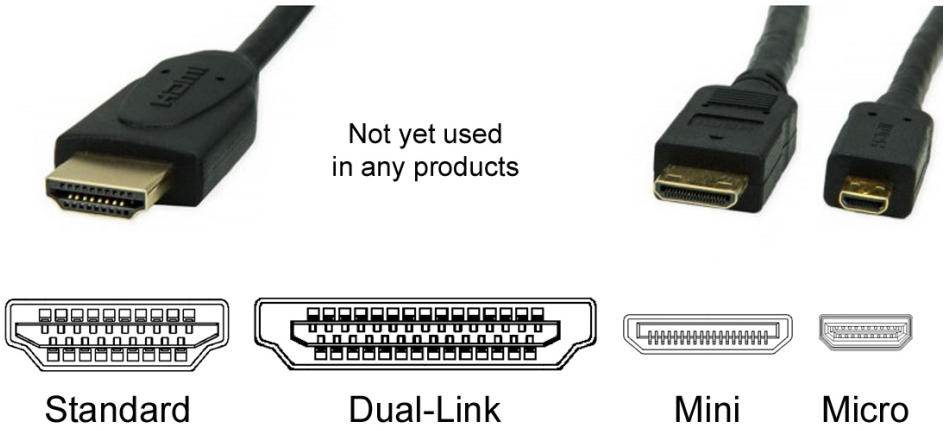


Figure **10.3.5**: HDMI connectors in Standard, Mini, and Micro sizes.

(CC BY-SA 3.0; Jan deno via Wikimedia Commons)

HDMI (High-Definition Multimedia Interface) connectors look like upside-down isosceles trapezoids and come in standard, mini, and micro sizes (See figure 10.3.5). HDMI connectors are used to carry signals to displays. You can use an HDMI on many cameras to view the recordings on a television or monitor. It is one cable that carries both the audio and video signal from the camera or computer to a display.

RCA



Figure **10.3.6**: RCA wire and connectors in red, yellow, and white.

(CC BY-SA 4.0; Dmitry Makeev via Wikimedia Commons)

Although these connectors are less prevalent with the wide use of HDMI, you still may run into them with older technology. They have one single prong with a metal casing around it. They usually come paired with one yellow plug for video and two red and white plugs for left and right audio (See figure 10.3.6).

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10.4: Controlling Sound with a Video Camera

Input Controls

The input controls on the camera let you indicate what source is plugged into the camera (See figure 10.4.1). There are usually three choices, Mic, Mic +48v, and Line. The Mic choice is for microphones, which is where you will leave it most of the time unless you are using a condenser mic without a battery installed.



Figure **10.4.1**: Audio input controls on a video camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

If you don't have a battery for a condenser mic, then you will choose Mic +48v, also known as phantom power. 48 volts is required to power condenser microphones. The Mic +48v choice tells the camera to send power to the microphone. Without a battery or phantom power, condenser microphones will not work. Also, keep in mind that the Mic +48v setting will drain the camera battery faster. Make sure that if you are using a microphone, set the Input control to Mic or Mic +48v. If the setting is on Line when you are recording from a microphone, the signal will be too weak, and little to no audio will be recorded.

The line setting is only used when you are plugging in audio coming from a soundboard. When you record a live performance, you can ask the sound person for a line connection for your camera recording. If they grant that request, you will plug an XLR from the audio board into the camera and set the Input set to Line. Audio boards have very strong audio signals that are much more powerful than any microphone. If you leave the Input setting on Mic, the audio you record will be so loud, it will be both distorted and unusable.

Channel controls



Figure **10.4.2**: Channel controls on a video camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Audio is recorded on most cameras into two separate channels. The audio input controls on the camera let you choose which input (commonly microphones) you want to record on which channel. In figure 10.4.2, channels can be set to INT (Internal microphone on the camera), Input 1, or Input 2. If you have a reporter interviewing someone, you can record the reporter's audio on one

channel and the person they are interviewing on the second channel. If you are using a boom mic, you can record that audio on one channel and have a second microphone as a backup.

VU meter

The VU meter tells you the amplitude (loudness) the sound coming into the camera. Since audio in video cameras is recorded into two channels, there will be two bars of audio, one for each channel (See figure 10.4.3). The bars have numbers between them representing the audio level in decibels. The meter may have colors on it, where red indicates your audio is distorted.



Figure **10.4.3**: VU meter on a video camera screen. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

With cameras, you will be working in digital audio, which peaks at -12db. That means if the sound goes too far above -12db, then your sound may be distorted and it will be ruined. The -12db setting is for voices only. When it comes to recording a band or multiple loud sounds, -12db may be too high. This is why it is important to use the VU meter and headphones to monitor whether your sound is too loud or is being distorted.

Volume Controls



Figure **10.4.4**: Recording volume controls on a video camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

The Volume Controls are what control the volume of the sound being recorded (See figure 10.4.4). If you increase the volume control you will notice the bars on the VU meter getting longer, which indicates the sound that will be recorded is getting louder. When you decrease the volume, the bars will get shorter on the VU meter. Check the manual for your camera for the exact placement of your recording controls.



Figure 10.4.5: Headphone controls on a video camera. (CC BY-NC 4.0; Sebastian Jimenez via San Francisco State University)

Many video cameras will have Headphone Controls (sometimes called monitor settings). The headphone controls allow you to listen to one channel at a time, both channels together, or to raise and lower the volume in the headphones (See figure 10.4.5). If you raise or lower the volume in the headphones, that does not change the volume at which your audio is being recorded. With headphones listen for the quality of the audio and not the volume because the headphone volume can be adjusted, which can be misleading. Trust your VU meter for volume and your headphones for the quality of the audio.

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10.5: Location Audio

Prepare for Location Audio

When recording audio in the field, it is best to visit the location before the day of the shoot. This will allow you to prepare the audio equipment needed for the day of the shoot. While visiting the site, here are some things to consider:

Location Acoustics

Assessing the location acoustics will allow you to prepare for the production and how audio will be recorded, and possibly need to be rerecorded. If there is a lot of echo in the room or noise that cannot be stopped or controlled (like traffic, airplanes, fans that can't be turned off, etc), then you may need to do ADR (automatic dialogue replacement). ADR means you remove the audio from the recording and rerecord the audio in a quitter place. In professional productions, this is done in an audio recording studio. The actor will watch themselves in the video and record their voices, much like karaoke, but with dialogue instead of singing.

Wind Noise



Figure **10.5.1**: Boom mic in zeppelin with windjammer.

(CC BY-SA 3.0; Galak76 via Wikimedia Commons)

If where you are recording is in a windy place, you may want to consider bringing a windscreen, zeppelin, or windjammer. If there is no breeze or a light breeze, use a regular windscreen. If it is breezy to very windy, you may want to bring a shotgun in a zeppelin (because it looks like its namesake) and a windjammer (See figures 10.5.1). You have probably seen a big furry blob at the end of a pole on a set or on television, which is a zeppelin inside a windjammer. The fur on the windjammer cuts out any possible wind noise. You may also hear a windjammer referred to by the unfortunate name "dead cat".

Room Tone

In every location you record in, make sure you record room tone. Room tone is the sound of the area you are shooting in with no one speaking and no other sounds made by the cast or crew. Room tone is used in editing when piecing different audio files together, like audio from different camera angles. It can help fill in large audio gaps, smooth out audio, and help with noise reduction in the post-production process. It is best practice to record room tone in every location.

Cell phones

When recording, everyone around the set should have their phones on airplane mode or turned off. Cell phones are microwave transmitters, which can interfere with audio recordings. If someone receives a call while recording, the audio person will hear beeps in their headphones that sound like Morse Code. If that happens, the audio cannot be fixed. To avoid this distortion, make sure cell phones are on airplane mode or turned off.

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CHAPTER OVERVIEW

11: Planning/Organizing for the Edit

Learning Objectives

1. Learn about the art and craft of video and film editing.
2. Gain understanding of what makes a good editor
3. Understand planning and organizing for the edit.

11.1: The Art and Craft of Editing

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11.1: The Art and Craft of Editing

The Art and Craft of Editing

Much of today's communication is done via video, rather than by printed text, and this is the editor's sandbox!

Editing has little to do with what buttons you push. Your choice of editing software - the various software around - are just tools used to get the effect you want. They are not the heart and soul of editing, which is the ability to tell a story that is engaging, informative and entertaining. Humans have been mesmerized by stories that resonate with their view of the world ever since they learned how to communicate. And a good video editor knows how to captivate them through story!



Figure **11.1.1**: Ancient Social Media or method of communication (Copyright: Ancient Social Media - Campfire Stories and the Evolution of Human Culture, Rebecca Savastio, guardianlv.com)

So What Actually Is Editing?

Editing is a process, where you organize, review, select, assemble video and audio footage from a production, that results in a film that:

- entertains, informs, and inspires an audience
- tells a meaningful story, true to the intent of the production's goal
- communicates clearly and concisely

Good editing:

- has suitable pacing and rhythm
- has clear and meaningful audio, usually including music
- keeps a story moving
- relentlessly cuts footage unrelated to the major theme

What Makes a Good Editor?

The editor is the last person in the creative chain of a digital film production. They can "make or break" it. Forget how great the talent, directing, lighting and shots were. A bad editor can trash the best of these. And conversely, a savvy editor with "mojo" moves can often make a pitiful production look acceptable, if not good.

In a sense, editing is a little like "playing God," because editors take the recorded production materials, breathe new life into them, and recreate them into a new scenario, giving them a vital, new character.

Good editors usually start as *Assistant Editors* - and keep learning, until they work their way to becoming the main editor. But once there, they continue to keep a fresh eye and be sensitive to the pulse of life around them their entire career, so they can best affect their potential audience.

So good editors:

- know just how to make a film look good, using the language and grammar of the film elements that speak to the viewer and evoke emotional responses and reactions
- thoroughly know the craft of editing - the rhythm, the timing, the pacing
- must also know the basics of video/film production
- recognize what makes a good performance
- must not be distracted by a great shot, no matter the cost of production, if it does not add to the story
- are sensitive and aware of the world around them, in order to know what moves their audience
- must be capable of becoming "invisible," because good editing does not want to call attention to the editing. Does anyone ever remember who won the Oscar for editing??

Planning and Organizing for the Edit

Like any complicated undertaking, a successful edit must be well planned and organized.

To begin with, you must first be comfortable operating a computer operating system, and preferably on more than one platform, such as both Macintosh and Windows. You should also know your way around the editing app you'll be using, such as Final Cut Pro, Premiere Pro, DaVinci Resolve, etc.

Before you even begin thinking of how your clips will be tossed into some timeline, there are many things to consider to avoid the many pitfalls in which many new editors find themselves:

Computer Specs

If you'll still be editing in High Definition, your CPU should be able to handle everything with 16 GB of RAM, but if you're moving into 4K production, you'd be better served with 32 GB. You should have a multi-core processor, and minimal internal storage of about 1 TB. An internal SSD drive would also be great if you can afford it.

For today's editing apps, you'll also need powerful graphics and video processing. Check out some of the graphics cards made by companies like NVIDIA, AMD Radeon, and Intel.

If you're strapped for funds, the Mac Mini is a tiny power machine that will get you started, but if you need high performance, a good choice with a terrific display is the new iMac. Apple, Inc. has just come out with a new series of M1 chips, that will probably revolutionize the computer industry. All the CPU systems are integrated on a single, tiny chip, that makes the processing many times faster than any computer built to date. These new powerhouses are just the beginning of a new world of computing, coming at a time when vast amounts of digital pixels must be dealt with. You could connect a 13" MacBook Pro housing the M1 to a larger display, and have a powerful system to edit with, and a reasonably sized display to view your work.



Figure **11.1.2**: Sapphire-brand, Radeon HD 5570 video graphics card, for computer graphics. (Copyright; Public Domain

Backup

You cannot put too much emphasis on the need for backup (copies of your source files/work). Yes, it seems an awful lot to spend in today's high prices of storage. UNTIL you lose some of the files, because of some disaster or neglect! Your only choice on loss of files is to re-shoot, if possible (more expense), or sometimes events are one-shot deals, and cannot be re-filmed. So professional editors always have not only one, but preferably two copies of all their resources. And, to be even safer, these copies should be kept on separate drives, and each drive stored in different places.

Archiving

After a project has been finished and delivered to your client, you'll want to archive it, meaning you'll want to save it for the long term, in some format, for your future use or portfolio. Unfortunately, there is no proven method that is reliable for the extreme long run, and methods we do have (mainly tape) are costly.

In our industry, we're very aware that technology becomes obsolete very quickly. There's a lot of old computer stuff moldering away in corners, and the data on many of those gadgets can't even be accessed anymore. For instance, up until recently, DVDs were used, but even these are now going the way of the Dodo bird!

The reliable (pricey) system available currently is video tape, used by many professionals in the industry. Video tape, if carefully handled, is known to last for approximately 20 (plus) years, and still remain in working/playing condition. The length of SSDs' playable longevity is not yet known, as they're too new a technology to have been around for too long, and have other limitations described in the next chapter.

For beginners, I'd recommend hard drives, or shorter term SSD storage, but not for posterity! When you become serious about your life's work in the industry, investment in video tape for long term storage, will give you the most bang for your buck! The best information about storing tapes that I could glean is:

- You should use your camera masters for archiving
- Use DLT (Digital Linear Tape) and rewind the tape - don't leave it in the middle somewhere, to be exposed to dust, dampness, smoke, etc.
- Stand the tape on its edge wherever it's being stored
- Store preferably in a cool and dark place

Naming Conventions

Before you eagerly start importing resource files into your editing project, you should sit down and seriously figure out a naming convention for them. That means that the name of each file should immediately give you all the information you need to know about it:

- who the client is
- date and time it was shot
- what take it was
- which camera location and type, etc.

The convention or style should give you all that info in its name or title.

For example, the convention could contain: [Client]_[Project/Event #]_[Date (YY/MM/DD)]_[type] -

which could be read something like: ABD_09_20/09/11_Red - and translated as the 9th project for ABDCorp, on Sept. 11, 2020, shot with a Red camera.

With such a system or "naming convention" you can easily keep track of all your resources, and know just what files you have, as well as what files you still need to get.

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CHAPTER OVERVIEW

12: Nonlinear Systems and Requirements

Learning Objectives

1. Learn about current storage requirements of video files and projects
2. Gain understanding of how current devices process and store large video files and projects
3. Explore the current computing platforms and applications used in industry digital media production

12.1: Nonlinear Systems and Requirements

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12.1: Nonlinear Systems and Requirements

In today's rapidly changing technology, the shooting and editing formats are getting larger and larger. Gone are the days of High Definition - most productions are now into 4K and higher resolutions. This resolves into huge files, which means huge amounts of storage - into Terabyte territory (abbreviation: TB) and higher. One TB equals 1,000 Gigabytes. When shooting in 4K RAW, you use approximately 2 Gigabytes (GB) per minute - that adds up fast, especially when there are several takes or shots of any specific scene. So you must always plan to have enough storage real estate to accommodate the size of your editing project. Figure out approximately how much space you'll need, so you don't end up short at a critical deadline.

SSD Cards

SSD cards or drives (Solid State Drives) provide very fast storage (like RAM configured to act as a hard drive, which you can read or write to). They have no moving parts, so they're more reliable than spinning drives and they do not lose data when the power if off. They are however, much more expensive, and do not hold as much data. So you must weigh your funds against your need for speedy access to your files.

They also have a limit to the number of times they can write data, so you must also think about how long you need them to be available.

Another consideration is both **Internal** and **External** storage.

- **Internal storage**: the amount of storage on your working computer, that holds all your apps and where you do all your daily computing. One to two TB are recommended.
- **External storage**: any system outside your working computer, where you house all your media resources. Get as much as you can afford - you'll always be needing more!

Since your working computer can never hold that much data, you usually must resort to external storage devices that have maximum speed connections to your home CPU, such as Thunderbolt 3 connectors used with **RAIDs** (see explanation in the section below). When deciding how much storage you'll require, you should be thinking in terms of how much space you will need per hour of shooting in your working format.

Since hard drives slow down as they fill up, usually when they hit around the 80% mark, you should also be adding a minimum of 20% to the amount of storage needed.

RAIDs

The term RAID was mentioned in the above section. Since smaller storage cards can't cope with these large files required for today's editing formats, currently most editors use high speed **RAIDs** (a Redundant Array of Independent Disks) to cope.

A RAID is a **combination** of several smaller disks merged into one system, that acts as one giant disk, to deal with the huge demands of storage and speed required. Their use can be programmed towards higher degrees of storage, or a combination of storage and file backup. Generally, RAID performance gets faster with the number of drives combined in the RAID.

For the highest speed access, use SSDs - for the lowest cost and greater storage space, use spinning media.

- **RAID 0** is fastest and cheapest. It has no backup or "redundancy," and has a minimum of 2 drives in the enclosure. It gets faster and provides more storage as the number of drives contained, grows. Caveat: if one of the drives in the chain fails, ALL the data is lost!
- **RAID 1** is used just for backup, and has a minimum of 2 drives in the enclosure. Often called "mirrored" drives. These are used mostly for backing up networks. They are as fast as the slowest drive in the chain.
- **RAID 5** divides the disks in the array, supplying both storage and speed combinations. There are a minimum of 3 drives in the enclosure, providing protection against loss of data in the event of some of the drives failing.
- **RAID 10** combines the speed of a RAID 0 with the redundancy of a RAID 1. A minimum of 4 drives are in the enclosure.

[There are several different combinations in between the ones listed, and above the RAID 10, but those listed above are the more readily accessible formats.]

When the computer sends information to the drive to record, it's called "**writing**," and when the drive sends information to the computer, it's called "**reading**."

As video files become larger, their speed of reading and writing becomes increasingly important. Consider that a single stream of ProRes 422 (an efficient editing

codec), works at a little less than 20 MB/second. That adds up to hefty file sizes very soon, and our older USB2 drives can't begin to cope with these figures.

So how do you decide how much storage/speed you need?

If you're editing in ProRes, which many applications like Final Cut Pro use, you have to consider:

- the number of video streams you'll be playing at the same time,
- multiply that by 20 MB/second,
- while figuring in the speed your drives read and write.

If you're talking 2-4K files, you'll probably end up needing a 4-drive RAID. You should be thinking in terms of how much storage you'd need per hour. As usual, having more drives is better.

Some companies making RAIDs are SanDisk, LaCie, Nvideo, Promise Technologies and OWC. These can be ordered through companies like BHPhotoVideo, which often give discounts to students.

Other factors you have to consider when combining drives into an array, are how each of the drives are **configured** and how **full** each of the drives are. Remember also, that no matter how fast any RAID you use, the speed of the setup is **only as fast as the slowest drive** in the configuration.

Besides storage and speed, you also need to research:

- how **noisy** it can be,
- if desk space is limited, how far can it reside from your computer,
- what is its total storage,
- what is the reputation of the manufacturer.

You should also look into:

- the limitations of its warranty,
- how long does it take to get a replacement if it fails,
- do you need to buy any extra hardware/software to run it,
- do you have the required connections on your computer,
- and finally, cost.

Keep in mind that the cost of a RAID is just for the **enclosure and system**. You still have to buy the number of hard drives to put into that container!



Figure **12.1.1**: Illustration of a RAID (Copyright via Pixabay Ciker-Free-Images/29546)

iCloud

iCloud and other internet services like **Dropbox,** store your files **outside** of your working computer. These work fine for backing up and sharing data, and are a good choice for inexpensive storage. However, the data or transfer rates are **too slow to work with your editing** applications.

Camera Archives

Each professional editing application will have a method of storing a project's files - these are called "camera archives." They represent a way of storing and protecting your project's original camera files, for use throughout the project, as well as future use. Professional editors will always set up archives on major projects, and will use them for easy access, safe backup, and future work.

It's a good idea for you to learn how to use the archives in whichever editing platform you're beginning on, and get in the habit of creating them for your important portfolios.

Platforms

As mentioned in the first chapter on editing, whether you choose to work on Windows or Macintosh operating systems, this will not affect your prowess as an editor. Nor will the actual editing application (eg: Final Cut Pro, Premiere, DaVinci Resolve), make you a better editor. What makes you a good editor, as outlined in Chapter 11, is being skilled and fluent in any of these programs, combined with a keen eye on what moves our human condition.

All of the professional applications use the same operations, it's just a matter of being familiar with the interface, and knowing which buttons to push. Once you more or less master one application, it's not too difficult to transfer these skills to any other one.

Actually, the more applications you have under your belt, the better chance you have of getting a good job in the industry, as different production houses tend to use different systems.

Notwithstanding the above, beyond the general editing programs, there are many useful applications that are used in the industry for specific post production needs.

For instance, though both Premiere and Final Cut Pro have great and very adequate color operations, DaVinci Resolve is considered a standard for color grading and correction. Resolve also has a robust general editing system.

For sound in video, Pro Tools has been the standard. But there are many others available, such as Logic Pro and Audition.

For video effects and animation, After Effects is most often used, but other apps, such as Motion, offer similar operations and more. These all work in 2D animation format.

For export, compression and transcoding operations, Apple's Compressor and Adobe's Media Encoder are common stand-bys.

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CHAPTER OVERVIEW

13: Formats/Compression

Learning Objectives

1. Learn about codecs for video and audio.
2. Understand the main concepts of compression
3. Gain understanding about the different types of compression

13.1: Formats/Compression

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13.1: Formats/Compression

Codecs

A "codec" is made up from 2 different words:

COmpress and **DEC**ompress = **CODEC**

Codecs translate the analog video and audio signals into numerical formulas that are read and used by computer editing applications, to numerically process these light and sound signals, (as well as still images), into digital information.

For example, a couple of codecs that are optimized for camera recording, are **H.264** and ProRes.

Some image codecs you're familiar with are **JPEG, and PNG**.

It's important to understand how these codecs influence the edit resource files in terms of quality and size, and how they affect the speed and storage of the hardware used. In the best of all possible worlds, we want to have:

- the highest quality files
- the smallest size files to keep our storage needs in check
- the fastest processing speeds for editing.

Unfortunately, the way our systems are built, we can **only ever have 2 of these 3 situations at a time**. As we're set up, if you want quality and speed, the files generated are large. If you need speed and smaller files, then the results are of poorer quality. So, understand, that you have to settle for 2 best choices, while **compromising** the third. You are always playing the balancing game...

You should be familiar with these many codecs, in order to make the best choices in your role as an editor, since you'll be seeing different codecs used for filming, different codecs for editing, and still different ones for exporting and distribution.

When you begin to edit, you'll want to change the camera codecs to ones more suitable for editing. You'll want to choose an editing codec that will give you a good, clear picture, yet be small enough in size, to edit quickly and efficiently. This **process of** codec conversion is called "**Transcoding**," and most current editing applications create these transcoded files quite easily. This process is referred to as "**optimizing"** for the edit.

Compression

When you **compress files,** you're making them **smaller**, so that they take up less space and can be processed faster. Unlike a corset that squeezes in a waist to make it smaller, you can't squeeze a digital image. The only way you can reduce its size is to take away some of the number of pixels used to display that image or frame, while using the appropriate codec.

This "removal of pixels" will affect your image, making it less sharp, or even blurry if overdone. So be careful when editing, not to magnify an image more than a very few percentage points over 100% – because this will result in fewer pixels in the image – translating into an unfocused look.

Types of Compression

With professional editing applications, it's possible to "optimize" your working files, by transcoding them for faster working speeds, and after the edit is done, transcode the edited files back into their original quality. The different codec formats used can be divided into 3 main categories:

Native codecs usually refer to camera recording codecs. These get the recording done in the most efficient way. Most editing apps will be able to use these native, camera codecs directly for editing, but they're not set up to do a speedy, high quality job. It's therefore best to transcode these native camera codecs into ones better suited for editing.

Examples of camera, native codecs are:

- H.264
- H.265
- JPEGs

These native codecs compress files using a system called **INTERFRAME or GOP** (stands for "group of pictures") compression. This method works by eliminating and re-using information from neighboring frames, when there is no change from frame to frame in the image, and thus is able to save a great deal of storage space and record very efficiently.

However, in doing so, bits of information are often thrown out for the sake of **file size**, giving these files a **"lossy"** connotation. Lossy files have irretrievable information lost or thrown away during compression, where the intent is that this lost information is either **not noticeable**, or **less important than the reduction in file size**.

Optimized codecs are those especially designed for editing. They deal with the editing operations, from basic editing to special effects, compositing, distribution etc., in a speedy and visually high quality way.

A good example of optimized codecs is the **Pro Res family of codecs from Apple**. They come in many flavors, from the lowest to the highest resolutions, and are used by all professional editing applications. They start from Pro Res Proxy (lowest) to different Pro Res HQs with the ability to edit in the newest 10- to 12-bit resolutions and deal with multi-streaming performance as well.

They do the most efficient job, because they work with a form of compression called **INTRAFRAME compression**, where the information in each individual frame is compressed individually, and not dependent on any other frames in the file. This results in the highest quality resolution files for editing and efficiency in all post production tasks. The cost of the high quality imagery is of course, its heavy file size - all those extra pixels require enormous amounts of storage.

This form of compression is also referred to as ***"lossless"*** compression, where images are compressed without losing information.

Latest production recording now includes **RAW** footage, where everything about the image is now recorded. There is actually **no** compression. This abundance of information about the camera subject, allows for the highest quality amount of image manipulation. But again, this calls for unlimited amounts of storage space, to the point where even terabytes (TB) are insufficient, resulting in formidable production challenges and cost.

Going from one extreme to another, we come to **PROXY** resolutions. These are codecs which shave down the amount of information in an image, resulting in files that require the least amount of storage space. This makes them efficient, speedy tools for editing, requiring the lowest amounts of storage. Yet, proxies are visually high enough quality to maintain a good idea of what the final, high resolution, transcoded edit will look like. These lower resolution files are designed specifically for efficient editing, with optimum system performance. Also, most professional editing apps will allow you to easily and quickly switch back and forth between proxy and higher resolutions, in order to check on your final output and distribution look.

An example of a proxy codec is Pro Res Proxy.

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CHAPTER OVERVIEW

14: Editing Workflow/Assembly

Learning Objectives

1. Learn about the process of importing files to use in editing
2. Gain understanding of the editing workflow
3. Find out ab out the first "Assembly" stage of editing - arranging your files into your timeline

14.1: Editing Workflow/Assembly

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14.1: Editing Workflow/Assembly

Importing

Importing is a process of using editing software to input resource files for your post production process. Most software will support your merely dragging files into their timeline structures. But dragging is a poor way to get your files into a professional editing project, and deprives you of the myriad ways professional software can keep you organized and spot on towards your ultimate goals.

Earlier on, we talked about how important organization was for any successful endeavor, and film editing in particular, can really benefit from a well organized approach. Assuming you have already finished your planning process, and understand the basic interface and structure of the editing system you'll be using, importing will be the next important step in preparation for the edit.

All software will have some basic interface window to use for importing files into your film. Below is a screenshot of Final Cut Pro's Import Window.

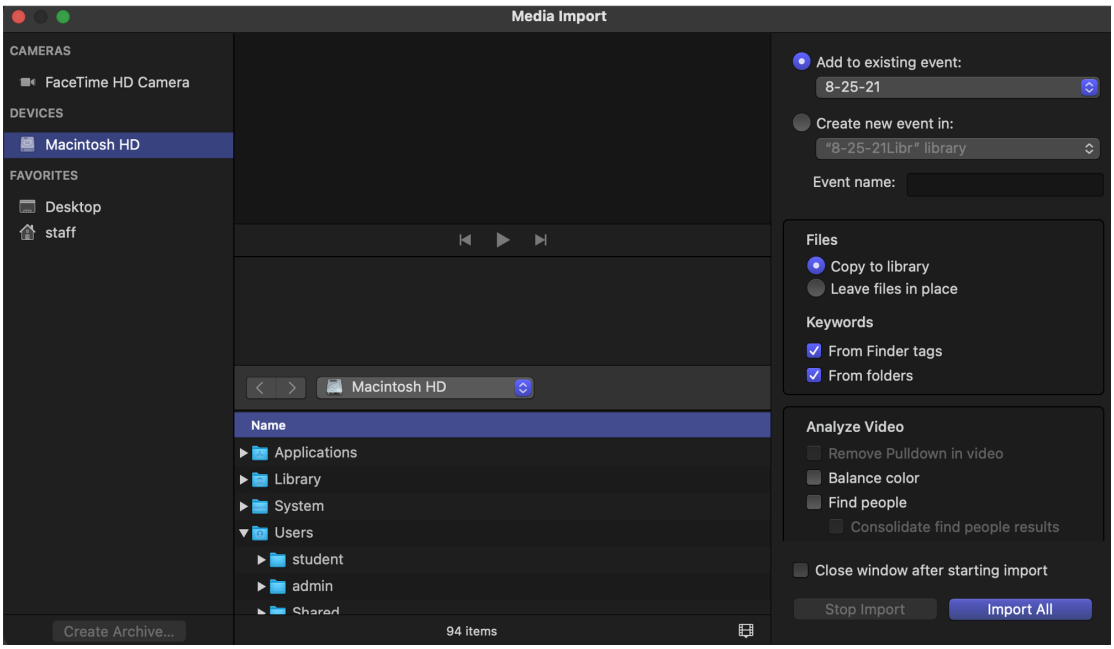


Figure 14.1: Empty Media Import Window in Final Cut Pro (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

The import interface will have entry fields for all the crucial information about your resource files, as well as how you'd like to handle them in the editing process. It will help you locate your files from many different sources such as cameras, and/or external drives. In the illustration of the Final Cut Pro import Window above, you can see that it will help you locate files from many devices, such as cameras, hard drives and archives. You can even designate Favorite sources, where much of your files are stored, so you don't have to be jumping around among lots of different device sources, when editing.

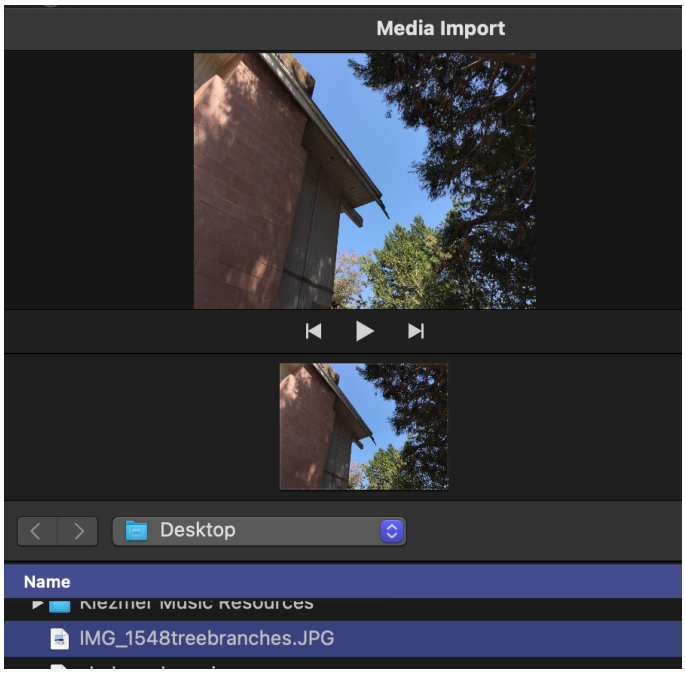


Figure 14.2: Footage in Import Window in Final Cut Pro list view, showing tree branches near roof of a house - a possible fire hazard. (Copyright; Screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

You'll often be able to plug all your Media organization, naming conventions, etc. into your clips in the actual importing process and be able to assign favorite locations and further organize your media. The software can also help with assigning different organizational elements that group clips into collections of similar items, such as shots, scenes, shooting dates, etc.

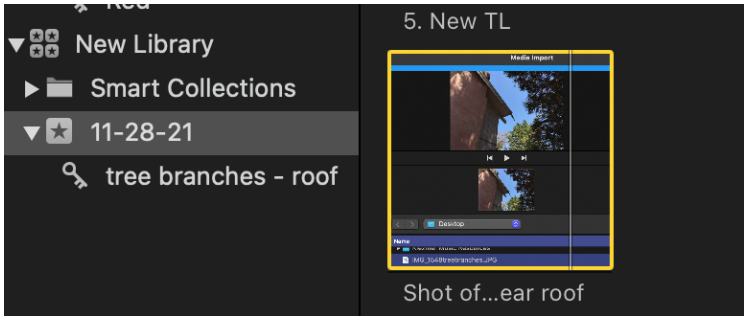


Figure 14.3: In Final Cut Pro: A small key icon in left column, and a light blue stripe across the top of thumbnail, indicate clip is part of a keyword collection labeled 'tree branches - roof'. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

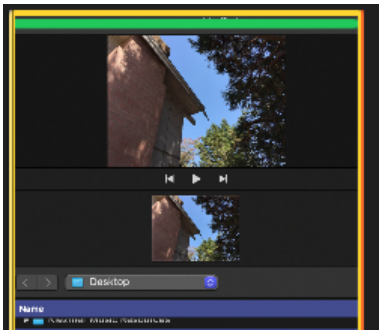


Figure 14.4: Green stripe across the top of clip in the Library Media Browser indicates it is a 'Favorite' shot. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Currently, much of the software can find specific content, analyze resource clips for illegal audio/video levels, and even automatically correct these. They will allow viewing in either filmstrip or list (text) views, supply entry fields for notations, reminders, and a multitude of presets like starting/ending timecodes, date shot, codec/camera used, etc.

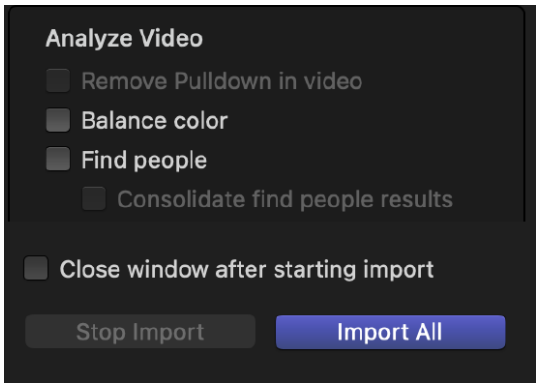


Figure 14.5: Note that the Import Window in Final Cut Pro can also find and fix color and audio problems (should there be any in the clip). It can even find people and group them by number if desired. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Importing from Different Sources:

All software will have a section/fields on various clip resources, such as Cameras, screen cameras, hard drives, archives, etc. You'll choose the source, and then the software will have various ways to access its files, as well as where they are to reside in your media management scheme.

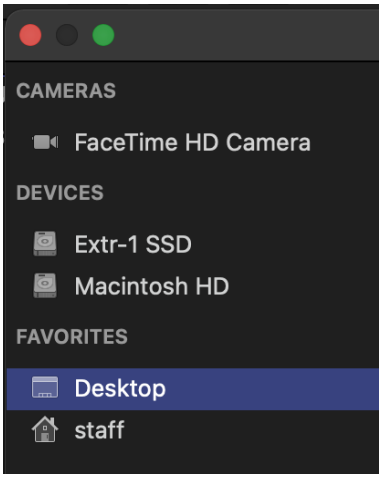


Figure 14.6: Left column of the Final Cut Pro Import window, showing the various sources to which the current project is hooked up (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Importing from Cameras:

Most software will allow you to plug your camera directly into your computer software, but usually, you'll be plugging your camera's recording drive into a card reader, which then attaches to your computer input.

It is very important to understand that the camera records image information in more than one place for each file on its recording devices. These files are in mystifying numerical systems, making it impossible to know if you have all the information for each specific shot. So the only way **NOT** to lose information, is to immediately copy the **entire** card into a **folder** on your hard drive. Then, let the software do the organizing and the gathering of the different shots for you. If you mistakenly try and just copy a couple of shots from the camera card, rather than the whole card, you might end up missing some important parts necessary to displaying the video/audio, and think you've messed up on the recording side!

Your computer's display camera will also be directly connected to your import device, so be prepared to 'see yourself on TV' if you accidently click on its source. In the image above, it shows up as a "FaceTime HD Camera."

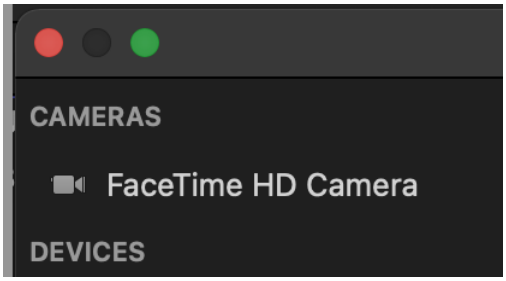


Figure 14.7: Illustration shows computer camera as a source for Final Cut Pro footage. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Importing from External Drives

External drives show up as source devices in your import interface, and you can choose which drive, and find/play potential project clips from them. Most applications will also allow you to import clips directly into, and saved inside your project. Or, one can choose to "**leave the files in place**" and the software will create links to these external sources. This is a great way to save space in your editing computer's storage, since often 10 to 20 times the amount of media is imported, than actually used in the final cut. That's a lot of gigabytes!

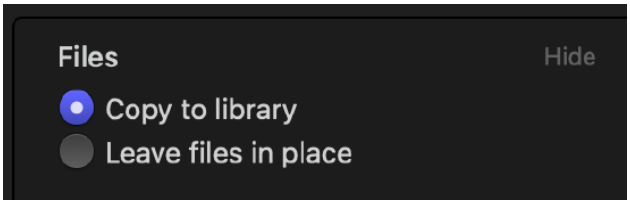


Figure 14.8: Illustration shows the right column of the Final Cut Pro Import Pane. Here you can choose to copy your source footage directly into your project (in this case, the "Library"), or leave your file footage stored in their original place, freeing up memory on your working computer. Don't forget to connect this external source ('place' before editing. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines

Your importing software will contain various types of transport controls, different views (eg: filmstrip [thumbnails] vs list [text] views), allowing you to choose either the most convenient at the moment, or the one that suits your style best.

Transcoding/Analyzing during Import

Since so many different formats exist these days, most applications allow for transcoding your source clips. We previously talked about native, vs optimized, vs proxy files, and usually during import, one can choose to **transcode their sources during import**. Though this is convenient when it comes to editing in the timeline, transcoding can take time, and a lot of space is used for many files which might never get to be in the final cut. Editing apps like Final Cut Pro also let you choose to transcode within the editing software **while editing**, thus working around one of the storage problems (storing only the files actually used).

The same is true for analyzing and fixing problems during import. This can be convenient, but again, the same potential exists for wasting time and space for clips that never get into the final output/sharing of the project.

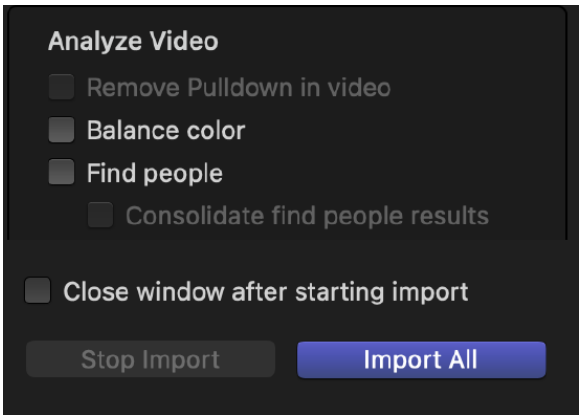


Figure 14.9: Note that the Import Window in Final Cut Pro can also find and fix color and audio problems, should there be any in the clip. It can even find people and group them by number if desired. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Creating an Archive:

All software will have a way of creating an "**Archive**,"which is a way of backing up your imported material for a long duration, even after the editing is complete. This archival source will contain all the information from the camera card and preserve it for future use. Professional editors, in their workflow, will upon receiving source files, immediately create an archive. Then they'll make a couple of copies, to be stored in different places, to prevent loss of crucial source materials, especially during the editing process. If files are lost for any reason, without this kind of backup, the only recourse is to go back and re-shoot the file. Sometimes even this is impossible. So, "backup, backup, backup" is the only way to go for a successful career in editing.

Media Navigation and Selection Operations:

Although there are transport controls all throughout the application interface, it's usually easier to just use the **Spacebar**, to toggle playing off and on. This however, only plays your material back in Real Time. But when reviewing your available clips, you'll want to be able to quickly skim through them, as you would when skimming hard copy books, newspapers, etc. You will find some kind of skimming device in all professional editing software, which allows you to fast forward/backward through your source materials. Also you'll find that there's always **more than one way to perform an operation**. First, there's the **menu** at the top of the interface, though this is the most time consuming way to perform any operation. Then there are **buttons** throughout the interface that can be clicked on, and lastly, there are **keyboard shortcuts** for most steps, which I recommend you learn ASAP. Using the shortcuts gives you the greatest speed and versatility in editing. And fluency in all the different ways to do a specific operation, gets the job done quicker, resulting in a quicker paycheck. Remember, if you are considering becoming a film editor, you are paid by the job, but what you put into the job is your **TIME**, so efficiency puts you ahead of the game.

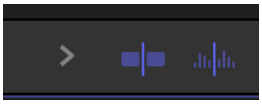


Figure 14.10: Two buttons highlighted in blue in Final Cut Pro, show the skimmer function on the left, and the skimmer function with audio on the right. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Media Selection for your Project:

Once you've actually imported your source footage into your editing project, your next most important job is to **REVIEW** it, to find out precisely what you've got to work with, and become "intimately" acquainted with it. And I'm serious about the "intimate" part – knowing exactly what clips you have, and also what you don't have (and still need to get if possible) is crucial to a successful edit. You can never tell when that ho-hum clip just might save your you know what, if you improvidently run into some crisis, when you can't find a shot you desperately need.

In the old days, these reviews used to be called "**logging**." The review process is still referred to as such, but gone are the yesteryear pen and paper lists of timecodes, content, notes, etc. You can thank your digital gods that this has been greatly simplified by your editing application. All of them contain ways to rate clips as to their usefulness (or not), and group them into similar type

collections for fast access. They also have convenient fields with presets, such as timecode, start/end, date shot, codecs used, date of shot, scene/take, etc. etc. etc. All this, plus the ability to group these categories according to your personal work style, makes logging a lot more tolerable.

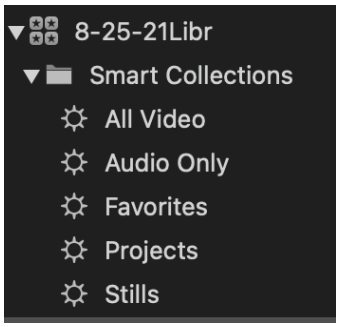


Figure 14.11: Image shows an opened Smart Collections folder in Final Cut Pro, which organizes all imported clips into the categories shown.(Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

While reviewing your sources, part of this process also involves choosing what portion of the imported clip you wish to use in your edit. As you skim through your clips, you can mark **In and Out points** in the sections, designating the portions you wish to use. These will be less detailed, gross choices - not tweaked or frame-accurate edits, but just a little more than you want to use. This allow for more discreet, frame-accurate edits or changes later. Again, there is more than one way to do this, and the more ways you are fluent in, the more versatile and speedy your editing will be. Digital editing is of course**, indestructible**, so you're able to use your clips and their portions as many times as you wish.

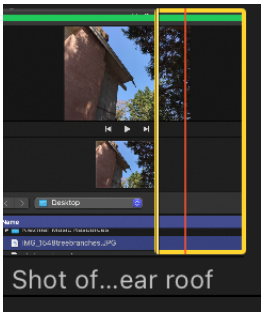


Figure 14.12: In and Out points selected in a clip, as outlined by a yellow bounding box in the Final Cut Pro Media Browser. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

All software will have a way of searching for clips, adding notes/reminders to clips, ways of marking specific points in clips (**markers**) and ways of batching groups of clips for certain operations. The better you know your editing software, the more time you'll have to spend on being creative, and less time on scratching your head trying to figure out how to do some procedure. And, just like learning to play the violin, the music will come after you know your way around the "violin bow and fingerboard."

Editing Workflow

Now that we've gotten our source clips imported into our project, let's first talk a little about a Professional Workflow. Here are the basic steps:

1. Copy the camera footage onto your hard drive and import your working clips
2. Review or log your footage – get very familiar with it and organize it into categories for quick and easy access
3. Make a "Rough Cut" with vide and audio – to get a good idea of how the whole movie can come together
4. Make sure the audio sounds good and is corrected if necessary (though this can also come a little later)
5. Tweak your edit to frame accuracy, and then add effects – like titling, color correcting, etc.
6. Distribution or output – create a Master File for future use. You keep this in your editing Fort Knox, and then output to various codecs from its copy

It doesn't matter if you're editing as a hobby or for a client. If you've planned and organized, and follow the steps above, you will be on a direct path to your first Oscar!

Starting a Project and Editing clips into the Timeline:

In all platforms, once you're ready to begin putting together the actual movie, you first have to set up or create a timeline in which your movie will reside. These can have different names (eg: Premiere calls it a **Sequence**, Final Cut Pro calls it a **Project**), but basically it's a timed space in which you insert your clips in the order that best tells your story. You will have to make decisions as to this movie's duration, what its starting timecode will be, and other video and audio properties. In some cases you must insert this custom information first - in others, like in Final Cut, the movie takes on the same specs as the first clip inserted into the timeline. You will also make choices for the way you'd like to view your timeline, such as clip height, how to view audio waveforms, etc.

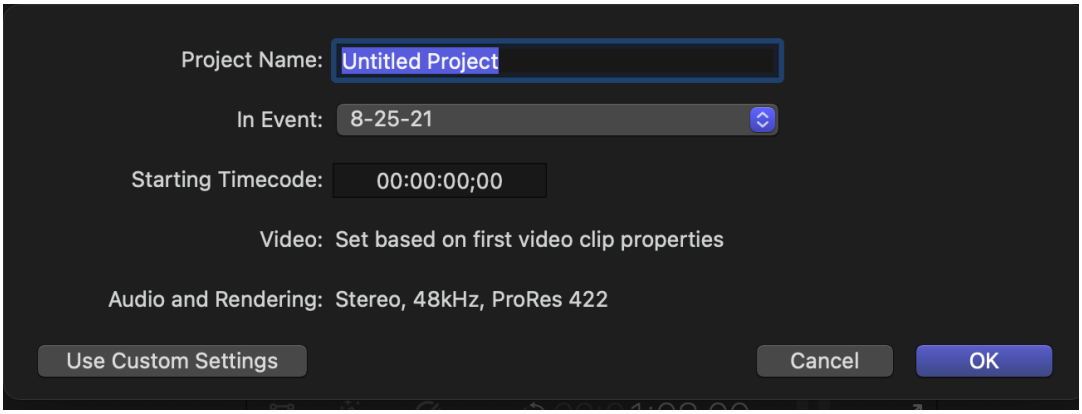


Figure 14.13: Dialog box in Final Cut Pro, setting up a new project/sequence. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

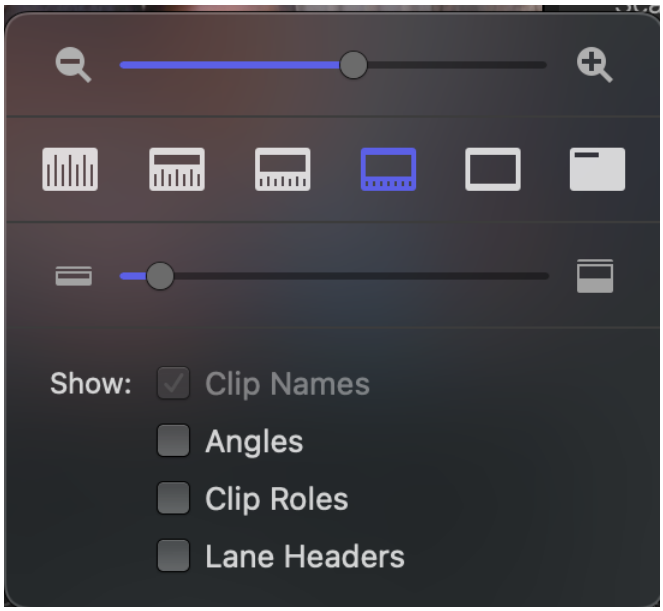


Figure 14.14: Timeline clip appearance choices in Final Cut Pro, designating the amounts of video/audio displayed in the timeline clips. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Adding Media to Your Timeline

As with all the operations in these editing chapters, you'll find there are also several ways to add media files to your story timeline. For instance, by clicking on specific buttons, using the main menu at the top of the interface, or by far the fastest, using keyboard shortcuts. Again, being handy with all these methods affords you the greatest fluency of operation.

Your basic workflow here will be to:

1. View and/or listen to the imported clips in your media bin or browser,
2. Decide which portion you wish to use,
3. Mark the In and Out of that portion,

4. Then add it to a particular place in your story timeline.

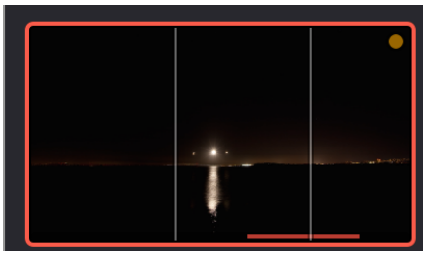


Figure 14.1.15: Two gray, vertical lines mark the selected in and out points of the clip in the DaVinci Resolve Edit Page (Copyright; screenshot of DaVinci Resolve by Vina Cera used under fair use guidelines)

Depending on how your editing application works, there are several methods of adding the clips. Here is some standard nomenclature for this operation:

- **Appending**: adding clips to the end of your storyline (either singly or in batches), regardless of where your playhead is located
- **Inserting**: inserting clips between others already in the timeline, or even splitting a clip in the timeline (either singly or in batches), at the playhead site
- **Replacing**: replacing clips already in the storyline
- **Overwriting**: writing over clips already in the storyline
- **Connecting or Adding Tracks**: to have layers of clips appearing/sounding at the **same time**

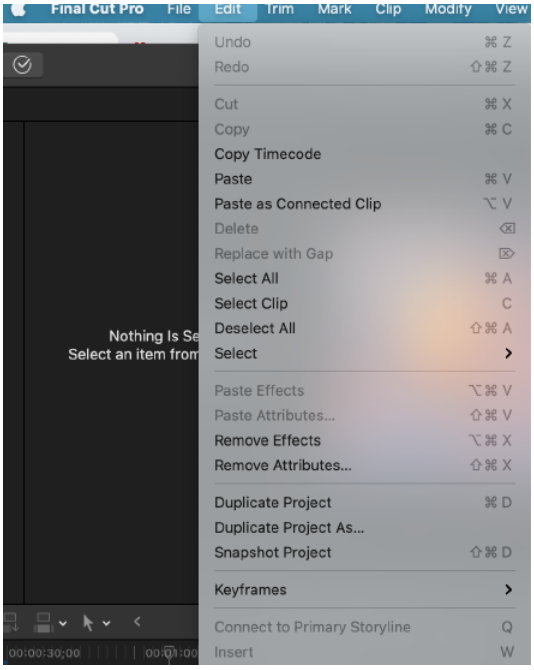


Figure 14.16: Illustration shows the Insert function at the bottom of the list, using either the Edit Menu, or the Keyboard Shortcut "W." (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

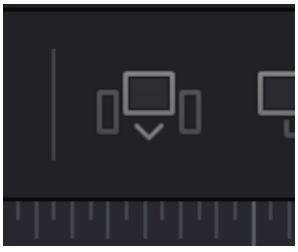


Figure 14.1.17: Insert button in DaVinci Resolve (Copyright; screenshot of DaVinci Resolve by Vina Cera used under fair use guidelines)

Assembly

The first, really **fun** part of editing is the rough assembly, where, after you've finished the more tedious process of viewing and organizing your source clips, you can abandon yourself into throwing those clips into your story timeline, helter skelter, in all kinds of ways, moving them around using the software's navigational rules, and just playing, to see how they look, sound and feel together, for the most impactful way to tell your story.

Many editing platforms will allow you to have several projects open at the same time, making it easier to compare and make decisions about what works best. This is also the time where you can freely experiment with all kinds of combinations. It's a good idea to save some of the more promising initial versions, in case you decide the path you've chosen to start with, doesn't really work. Having these available, will allow you to tune back in to that initial creative energy, and try a different approach.

In this frenzied tossing around of clips, notice, that you'll be "butting" clips up against each other in the timeline.

When there is no special effects type of transition between the clips, (think eg: cross dissolves), you get a kind of "non transition" transition. This makes for an abrupt change, where one clip ends, and another begins, without any smoothing of the impact from the outgoing clip to the incoming one. This kind of abrupt transition is called a "**cut**," and the name comes from the old film, celluloid days, when editors had to literally "cut" pieces of filmstrips, to change scenes. The greatest number of transitions in most films are cuts, and you'll find lots to read about when and where to cut, in order to be most effective.

The whole idea of the craft of editing is to be able to fit real hours- and minutes-time, into a shortened movie world, where years can fly by in seconds. You'll want to be able to keep your audience from being distracted, and totally believing this is really happening while watching. The good editor can keep her audience spellbound beyond our temporal world, by knowing when to change a scene, and at which precise frame to do this. The golden craft of editing is knowing how to do this effectively, without the audience realizing, and keeping them focused on the story.

14.1: Editing Workflow/Assembly is shared under a not declared license and was authored, remixed, and/or curated by Vina Cera.

CHAPTER OVERVIEW

15: Rough Cuts

Learning Objectives

1. Learn how to begin the actual edit
2. Understand the different modes of trimming.
3. Get to know special editing tools in your editing application, such as 'Help' and 'Troubleshooting'

15.1: Rough Cuts

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15.1: Rough Cuts

Rough Cuts or Beginning the Actual Edit

In the previous Chapters, we talked about **organizing** for the edit, **importing** files into the editing project, and playing around with the **assembly** of clips to find their best order within the edit. Once this is generally established, (basically "knowing where you're going and more or less, how to get there,") the serious, and nitty gritty job of editing begins. This initial "Rough Cut" still has a lot of work ahead of it, where you'll need to spend a lot of time "tweaking" all your clips as you try and re-try, to find the best frame for them to begin and end with, as each clip follows the other, in the timeline of your story.

But even before you actually think of this fine tuning, for this initial assembly, ask yourself, "How do I **choose** the best shot to use?"

It is the shot that **answers** our questions about the "**who, what, when, where, how"** in the story you're trying to tell. These answers have to be revealed to the viewer in a timely manner, when they're expecting that information. Actually, every shot used, should be advancing the story in this revealing way. If you're very new to the world of editing, this is a good time to go back to the camera section on different types of shots and **review what they tell you**, before you seriously begin to unfold your sequences/projects.

For example, a **wide or long** shot, sometimes referred to as a **Master** shot, tells the audience **where** a story is taking place. A **close up** (CU) shot tells us **who** the story is about, and an **over the shoulder shot** sets up the relationships between the characters.

Remember that your ultimate goal is to focus the viewer's attention on the story, and away from any artifice of production, making the edit invisible to your audience. The most important choice an editor can make, is to **only use** the shots that **enhance and advance** the story, and to **throw away** the shots that do not, no matter how pretty these are, or how much time and money was spent on getting them!

There are many ways to tell an effective story, but the successful editor must first master the software available, and also be fluent in how to focus attention to the story. Many films begin with a Master shot, that sets the scene for the story, then zoom in to reveal the characters and conflict. Try to choose those takes with **best actor performances**. Another invisible way of changing a shot is to make the **cut in the middle of an action**.

Most importantly, keep in mind that **every new shot used should add new information**, answering the questions referred to earlier.

Types of Edit Trimming Operations

All apps will have a set of Editing Tools which will allow you to manipulate your media repository and timeline clips. There will be tools for selection of clips or ranges within, trimming, positioning, slicing into smaller portions, and zooming in and out. These will usually be found singly in the main menu, in some kind of tool browser, or even have individual icons. They will also have many keyboard shortcuts, which I suggest you learn as soon as possible, since these are the quickest way to perform an editing operation. Knowing the many different ways of doing any one single step will enable you to edit most quickly and efficiently. You'll have to become thoroughly familiar with all of these, in whichever application you're working.

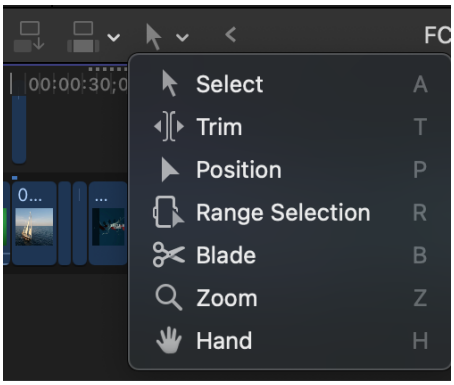


Figure **15.1.1**: Illustration of the Final Cut Pro Tool Browser, which is located just under the Library Browser, and is accessed by clicking on the small, downward-pointing arrow to the right of the larger arrow icon (screenshot of Final Cut Pro Tool Browser by Vina Cera used under fair use guidelines).

From the tool browser, you can choose various editing tools, like the selection tool, the trimming tool, positioning and range selecting tools, etc. Notice also the keyboard shortcuts for these, on the right side of the list. Most of the shortcuts are easy to remember, since they take the first letter of the beginning name of the tool. For example, the Position tool shortcut is the letter 'P', and the Zoom tool is the letter 'Z.' The only exception is the selection tool, with the shortcut of "A." However this is also easy to remember because it has the shape of an Arrow, and is often called the arrow tool.

Once in your timeline, clips will need to be fine-tuned to the exact edit points (ins and outs) that help propel your story theme. Regardless of what different applications name them, they fall into the following general categories:

Rippling

Trimming **one side** of a clip (either the in or the out point). Usually, with the proper tool, you hover over one of the edit points, then drag in either direction (right or left), to make the clip longer or shorter. There will be some kind of indicator/s to see the actual amount of your trim as you work it. There are also operations to allow you to move automatically in one or more increments at a time. Most applications will have two or more ways of affecting this trim. A great deal of your editing time will be spent on rippling and rolling (which we'll cover next). You should also keep in mind the fact that the rippling process always affects the **duration/length** of your project – an important point when you are tied into a specific duration or time deadline for any program.

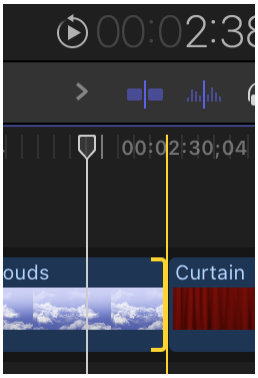


Figure **15.1.2**: Illustration shows preparation for setting up a **Rippling** operation on the Clouds clip, to the left of the edit point. Notice the bracket, which is **yellow** and pointing inwards, towards the Clouds clip, indicating that there are handles (unused portions of the resource clip) available to allow for the procedure. If there were **NO** handles available, the bracket would be colored **red**.(Copyright; (screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Rolling

Trimming **two sides of a clip at the same time** (both the in and the out points). Here, the **end of the outgoing** clip is trimmed in tandem with the **beginning of the incoming** clip. An edit point is chosen, and with the proper tool, you drag to the left or right, affecting frames of the clips on either side of the edit point, as you drag. Indicators of some kind will show you the exact number of frames affected on either side, and automatic trimming moves will also be available. Again, you should learn these operations thoroughly for keeping on your creative roll. The process of rolling does **NOT** affect the **duration/length** of your program. The

see-saw effect between the two clips (meaning, as you shorten or lengthen the outgoing clip, the incoming clip compensates in the opposite direction) thereby neutralizes any change of the overall length/timing of your project.

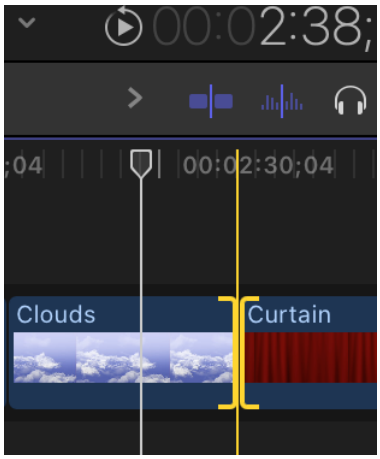


Figure **15.1.3**: Setting up for a Roll trim. Notice there are now **2 yellow brackets**, indicating that both the Clouds clip and the Curtain clip will be affected, and that both clips have handles available for the operation. In the illustration, if the Clouds clip is made longer, the Curtain clip will shorten by the same number of frames (and vice versa), since a "Roll" edit does **NOT** change the timing/duration of the project. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Slipping

Trimming **within a clip** already in the timeline. When a clip in the timeline has the needed placement and duration, but you then decide that you'd like to use a different portion of the larger, imported source clip within this same spot in the timeline. The slipping edit tool allows you to **move to the desired part of that clip**, without having to first remove the unwanted clip portion, and then replacing it with the newer one. This is not so common an editing procedure, but still very useful and timesaving when needed.

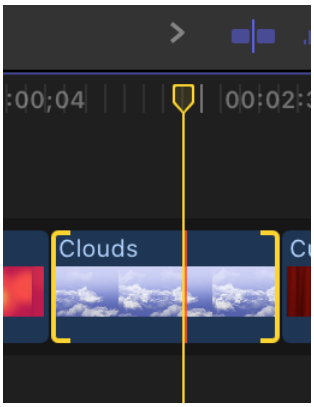


Figure **15.1.4**: Setting up for a "slipping" operation in Final Cut Pro. Notice that the 2 yellow brackets are now pointing to the **same** clip in the timeline, meaning that both the In and Out points of that clip will be affected. In this way, a different portion of the Clouds clip can be chosen in the timeline of your project, without having to first take out the original selection, and then replacing it with the newly desired portion. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

There are also many other different types of editing operations, which you'll learn with the application you've chosen to use. These include tools and shortcuts for extending edits to specific lengths, "back timing" (meaning choosing the ending frame in a timed spot in your timeline, which then automatically selects your in point), lining up edits to specific timecodes, jumping between edit points, replacing edits, writing over timeline clips, and many more. The more adept you are at accomplishing what you wish to do within the application, the less time you have to quit your creative impetus to scratch your head and wonder, "Gee, how do I do that?" Needing to stop everything and look up how/what to do in any particular operation is a quick way to fall out of your creative momentum.

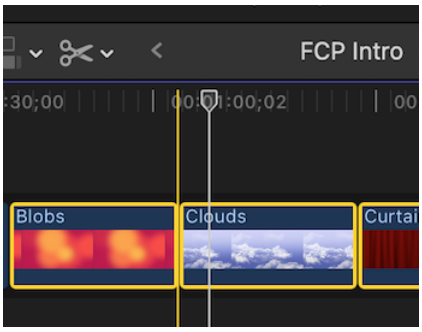


Figure **15.1.5**: Illustration shows that the **Blade** cutting tool has been selected (notice the **scissors** icon at the upper left). In Final Cut Pro, when you click in a timeline clip with the Blade tool, it will make a cut in the clip at that position, cutting the clip into 2 parts. At that point, you can select either clip half and delete it, using the Delete key. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Special Editing Tools

Editing applications will also have special tools that aid the operations explained above. These are usually visual tools that help you see what the effect of your editing move will actually look like to your viewing audience. Final Cut names will be used here, but all apps will have a similar type of tool/display.

Snapping is an operation that, when turned on, the items you are placing into the timeline - including the skimmer and playhead - seem to "**snap**" or glom on to each other at various editing points in the timeline. Snapping affects the functions of many of the editing tools. In Final Cut Pro, these include the Select tool, the Trim tool, the Position tool, the Range Selection tool, and the Blade tool.

Snapping is a big help especially when you're first assembling clips into your timeline. You never have to worry about where you're placing the clips so they don't write over each other, or cause a gap.

However, when you're focusing on fine-tuning your edit points, snapping can become a hindrance, because this snapping procedure begins a few frames at either end of the clip, not allowing you to make very fine adjustments to these points. But, you can **disable** snapping when frame-by-frame precision editing in these areas is necessary.

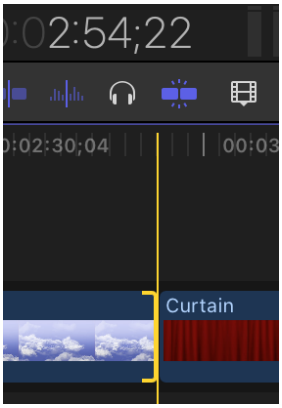


Figure **15.1.6**: Note the blue-colored icon above the timecode area in the pictured Final Cut Pro timeline. This is the **Snapping** icon, and looks like 2 clips colliding together. It is to the right of the white headphones icon. Snapping allows clips to snap or align perfectly together, without either overwriting parts of each other, or causing any empty gaps in the timeline. Since this hinders tweaking frames right next to the edit point between the 2 clips, it can be turned off if necessary. Otherwise, it is best to leave the Snapping function on, to facilitate playhead placement. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Two-Up Display

This is particularly useful in ripple and roll operations. When trying to decide the best in and out points for these, a divided display comes up in your viewing window, showing you a view of each side of the clips affected, thereby allowing you to see which of the frames provide the best cut for your storytelling.

This is some type of display that shows the amount and status of any rendering. Rendering is the process of creating new editing materials, such as transitions, various effects. This allows the editor to know if/when such an operation has been completed. Most editing applications will allow you to see a realistic view of the procedure immediately, before the render is complete, though not at full resolution. This monitor will tell you when the rendering is done, and you are looking at the final view. You can also make choices in the Preferences section of your editing application, as to when the rendering process will take place - either in the background, or by manual choice.

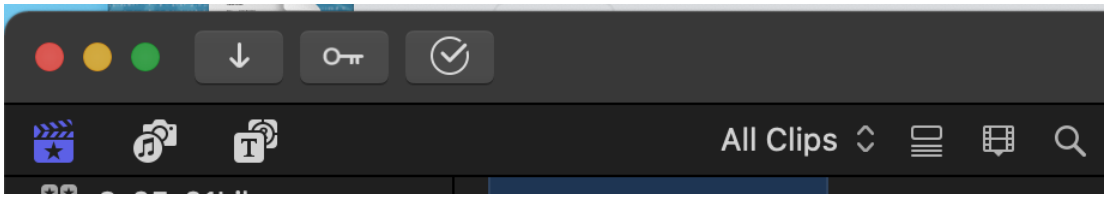


Figure **15.1.7**: The Background Task Monitor in Final Cut Pro is the small circle with the checkmark inside, found in the top, left-hand corner of the interface. When a complicated editing procedure is requested, that must first be rendered before it can be displayed at full resolution, the icon will wind clockwise - one full circle during rendering. Once a full circle is made, the rendering process is complete. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Preferences

Preferences refer to setting up your editing interface and operations to accommodate your personal working style. You'll find a preferences browser in each app, with a myriad of ways to make the app work with and for you.

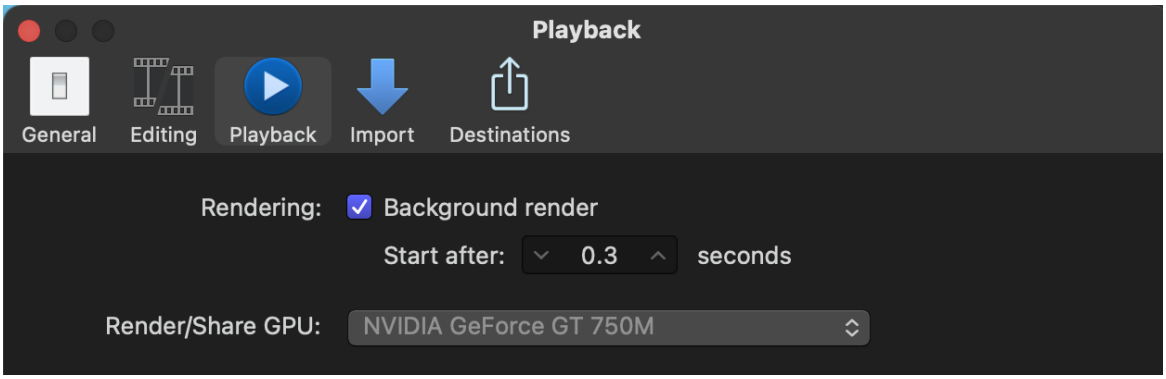


Figure **15.1.8**: The Final Cut Pro Preferences setup. Preferences in any application allow the user to set up the workspaces and operations within the app, to match the user's specific workflow style. Notice that in Final Cut Pro, you'll find setups for general editing, specific editing, playback and import styles, and distribution/destinations. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

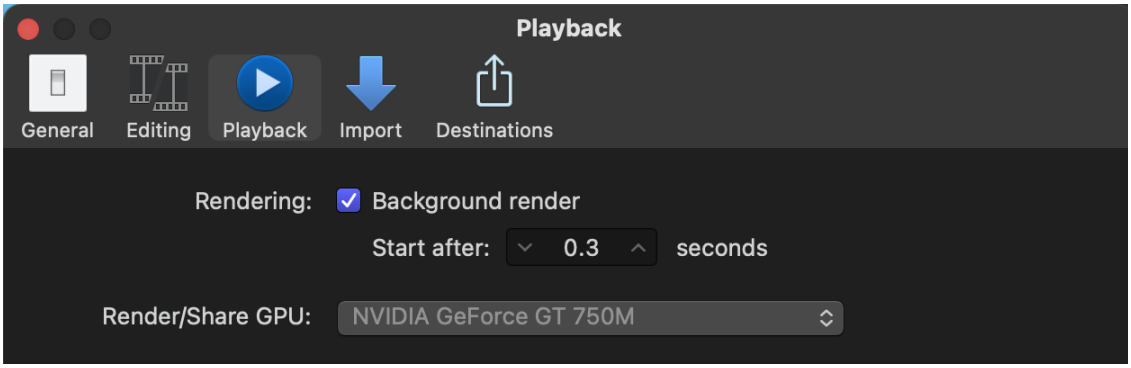


Figure **15.1.9**: The Playback tab selected in the Final Cut Pro Preferences, showing that the editor has chosen to have the application **render** in the Background, and to start the rendering process automatically after 0.3 seconds, when the application is not actively being used. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Help

Help for editing questions is always available in each application. Usually this is in two forms:

1. One from the website of the company that makes the app, containing all the information in the application manual. This is always accessed with a very prominent help button in the main menu

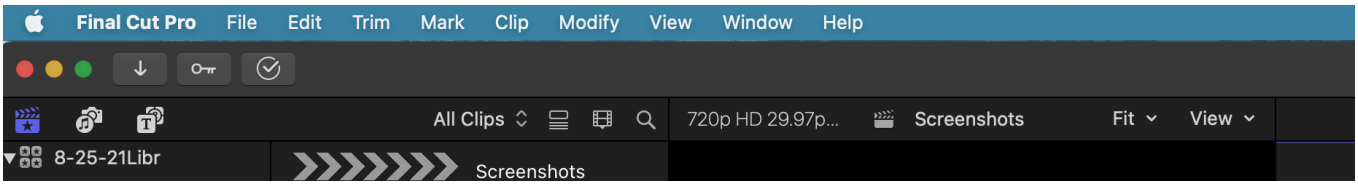


Figure **15.1.10**: The Help Menu in Final Cut Pro. When this button (at the top of the Interface) is pressed, a search field comes up where you input the operation you wish to find out about. The application will come up with a list of selections pertinent to your query, that you can examine for the answer to your request. These are very easy to use, with helpful, step-by-step wording and illustrations. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)



Figure **15.1.11**: Opening page of the FCP Help section from Apple. You start by clicking in one of the general contents list in the left-hand column. This opens to a list of specific operations in that category, which will help you with your request. This Help section gives information from the entire Final Cut Pro Manual. Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

2 And one from within the application itself, such as the **Command Editor** in Final Cut Pro:

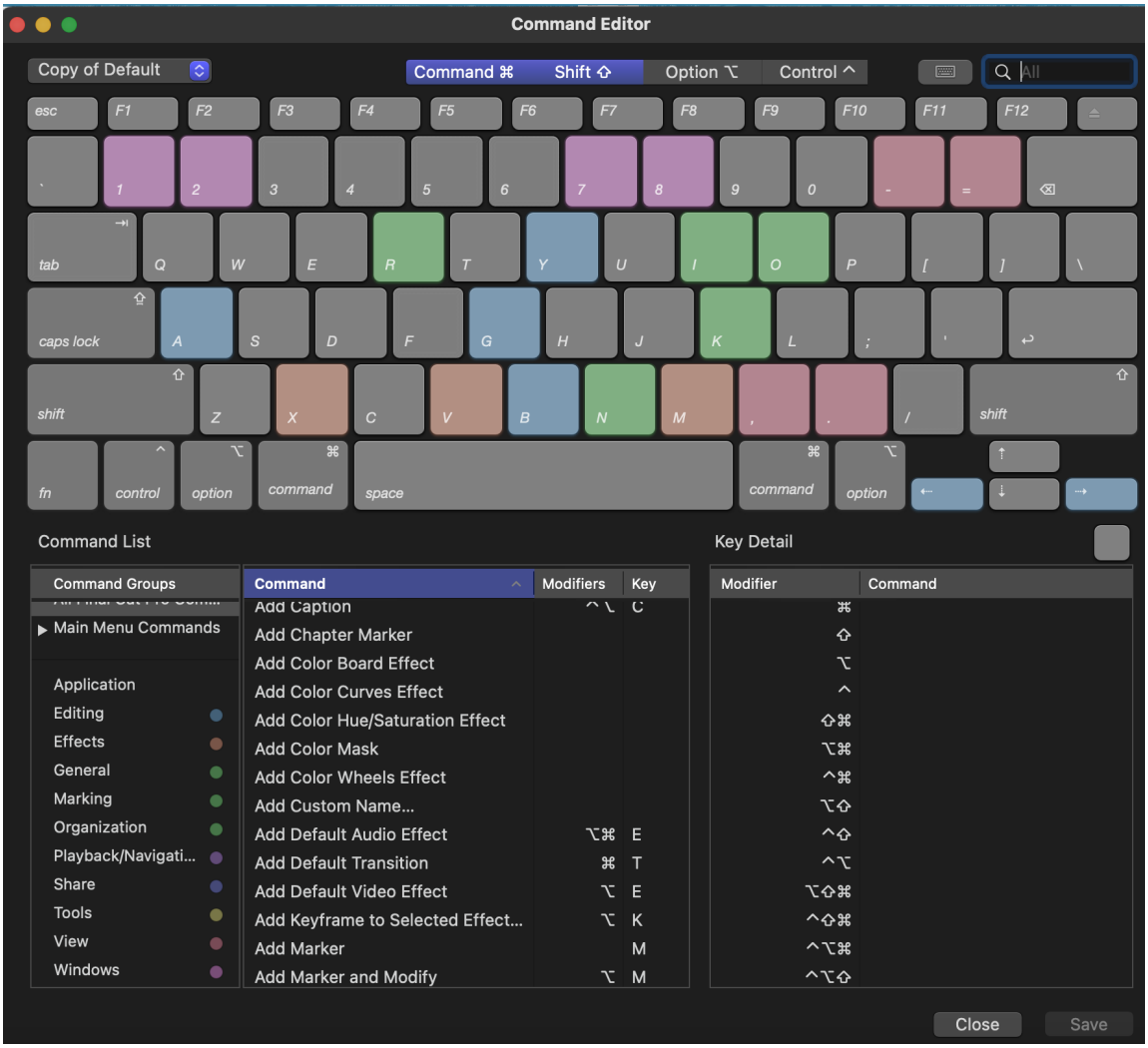


Figure **15.1.12** The Command Editor in Final Cut Pro. Notice the search field in the upper, right-hand corner, the one with a magnifying glass, where you can type in a query for the editing operation you're looking for. It also displays a full keyboard with all the various keyboard combinations, and is color-cued as well, grouping similar types of moves. Three columns on the bottom divide the information into the color-cued editing commands, actual editing commands with their keyboard shortcuts, and use of the special Macintosh modifier keys (Shift, Control, Option and Command). In Final Cut Pro's case, in the upper left-hand corner, it also allows you to switch between the "Default, application" system, to one of your own devising. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

Application Specific Tools

Precision Editor in Final Cut Pro

An editing device which allows the editor to see what handles are available in your resource clips, that have not yet been used, and also allows the editor to perform the ripple/roll functions from therein. A very handy gadget.

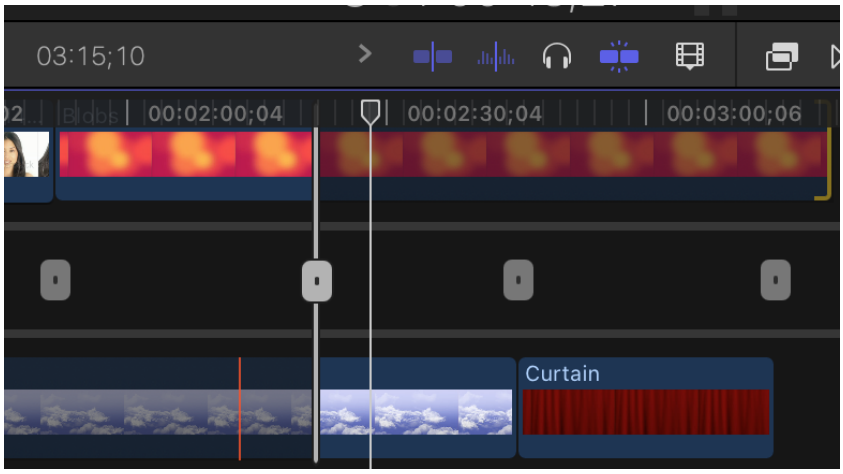


Figure **15.1.13**: The Precision Editor in Final Cut Pro. This tool allows you to see the actual handles you have in your resource or browser clips. In this illustration, the bright clips show the portions actually edited to the timeline. The duller portions show the remaining handles (or remaining portions not yet used) on either side of the timeline. This tool allows you to make a ripple or roll edit into the timeline, without having to guess just how much unused footage you have, and also, what it looks like. When you need to make a change to one of these edits in your timeline, this is a very handy gadget to work with. (Copyright; screenshot of Final Cut Pro by Vina Cera used under fair use guidelines)

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CHAPTER OVERVIEW

16: The Finishing Process

Learning Objectives

- Delve into the "finishing" stage in video editing to improve the quality of your projects
- Apply techniques to different aspects of video and audio in your edit
- Learn about color correction and easy adjustments

16.1: Steps of the Finishing Process
16.2: Fixing Transition Mistakes
16.3: Fixing Titles and Graphics
16.4: Fixing Color and Exposure
16.5: Video scopes for post-production
16.6: Video Tutorials on Color and Audio techniques

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16.1: Steps of the Finishing Process

What is Finishing?

The process of “finishing” a video project refers to taking steps and applying post-production techniques such as color-correction and sound sweetening. The goal is to make your project look and sound its best. This is generally a very last step in completing a video project and it’s important that all producing, shooting and editing is completed before starting into the finishing process. Even though one might want to continue to make changes to a project, deadlines and time constraints need to be observed (and in professional work are crucial).

Picture Lock

This stage now allows you to optionally export your sequence, with all the video tracks in place, for color correction and color grading to dedicated software, such as Blackmagic Design’s DaVinci Resolve. Once that’s completed, you’ll re-import your edited timeline and replace your old timeline with a new color corrected one (once you’ve checked all is well).

Picture Lock is also the stage at which you have the option to export your audio tracks, keeping their place in time in your sequence, to optimize or sweeten the sound.

You, or a colleague, with experience using a DAW, or Digital Audio Workstation, such as Avid ProTools or Apple LogicPro will be able to adjust gain, pan, EQ, fix noise a bit better than in your main video NLE, non-linear editor. This is whether you are working with the most popular software in the US for this, Adobe Premiere, or an alternative, such as Apple’s Final Cut Pro.

Keep in mind that “sending” your video or audio for optimization is optional and really comes down to the time and the skills you have, since it adds a significant level of complexity, file and software management to your duties. If you are just starting out, it’s best to use and become familiar with the options you easily have access to. Below are examples of each approach.

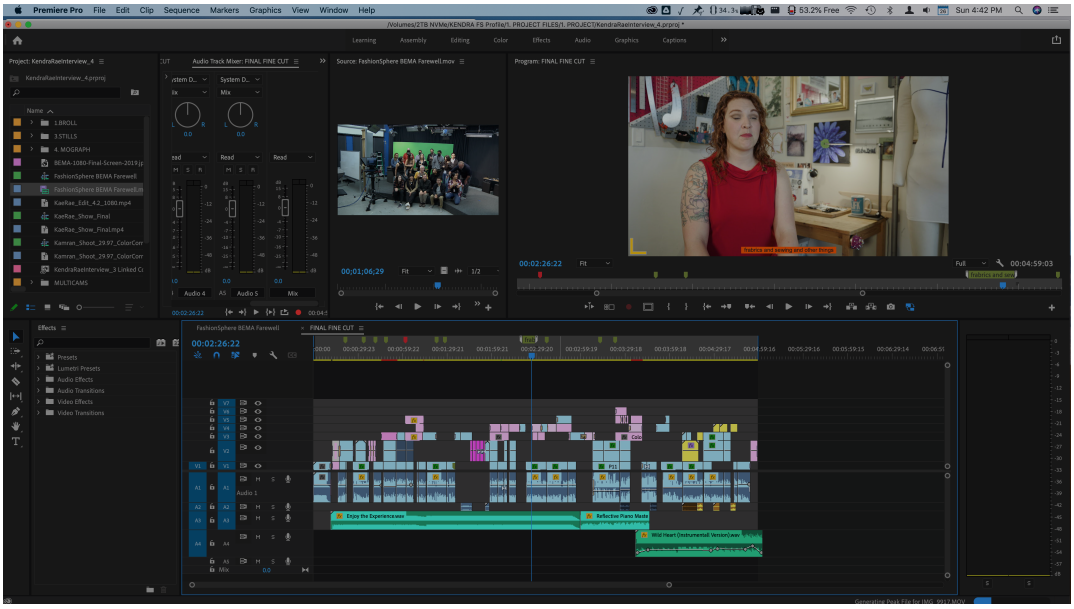


Figure 16.1.1 : Example of a completed edit timeline in Adobe Premiere Pro ready for finishing. (CC BY-SA 3.0; by Misha Antonich)

When to do a Finishing pass

What and how many techniques you apply to a finishing pass depends on a few things: your time, your skill and the context of a project. Are you racing to meet an assignment deadline with little time to spare? Are you comfortable with intermediate color and/or audio sweetening concepts or are you new to them? Are you working on a first student film or the final episode of a hit series on Netflix?

Professional films and videos, edited for movie, television, corporate or institutional distribution generally include finishing as an important last stage before publishing and distributing a project. In contrast, for an early student project, that might not seem as appropriate.Often, however, there are some steps you can take at the end of editing any project that can make a world of a difference.

Read on to see a checklist of options to consider for all and any projects you work on.

What follows are some quick finishing techniques you can consider for any project.
After that you'll find suggested techniques that go beyond this and are appropriate for projects that you are more invested in.

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16.2: Fixing Transition Mistakes

Below are some common issues with ways to fix them in the popular and industry-standard software.

Fixing Gaps or “Flash Frames”

Gaps, also called “black frames” or “flash frames” are unintentional gaps between clips in your timeline. When you play back your video at regular speed, it is often hard to spot them, since a single gap or flash frame will play back at the framerate of your timeline, so just "flash" on screen for a 1/24th or 1/30th of a second at a time.

You can do a few things to find and remove any gaps in your timeline(s). If your program is under 10 minutes and without too many small clips, you could simply move through your edit points to confirm they are all directly abutted.

For longer timelines you can enlist help from your editing program.
In Adobe Premiere Pro you can use this dedicated item in the menu:

- *Sequence* > *Go To Gap* > *Next in Sequence* [Premiere will place the playhead at the next gap. There are also options to go to the *previous* gap.]

If you find any gaps, you can also close them manually or by using this item:

- *Sequence* > *Close Gap* [Premiere will close the gap]

In Blackmagic Design’s DaVinci Resolve you can use:

- *Jump Cut detector* [on the Cut page].

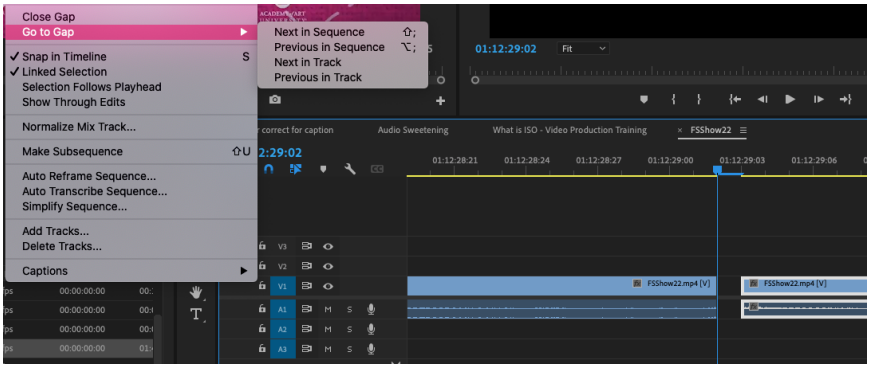


Figure **16.2.1**: Premiere Pro menu displaying options to find and close gaps in sequences. (CC BY-SA 3.0; by Misha Antonich)

Finding Duplicate Clips

In some situations it’s possible to use a clip two or more times, unintentionally. This can sometimes happen when working on longer projects, or projects with many short b-roll clips - or also with footage that includes multiple takes or similar content.

Fortunately,it's relatively easy to see if a clip has been used multiple times.

In Adobe Premiere Pro there are multiple ways to find duplicate clips:

- In the *timeline panel*, select the “*wrench*” icon and select > *Show Duplicate Frame Markers*
  [Premiere will display matching colors for any duplicate frames. This works for both audio and video]

Also in Premiere Pro you can:

- Right-click in the *Project panel* on the header row in list view and choose “*Metadata display...*”. Then, use the disclosure triangle to view items in the first top option, Premiere Pro Project Metadata. Place a checkmark on the metadata columns “*Video Usage*” and “*Audio Usage*” to make these items appear in your list.
  [Premiere will now show how many times a clip has been used - this works for both audio and video clips]

In DaVinci Resolve, on the Media page you can check:

- the *Usage* column to see if and how many times a video or audio clip was used.

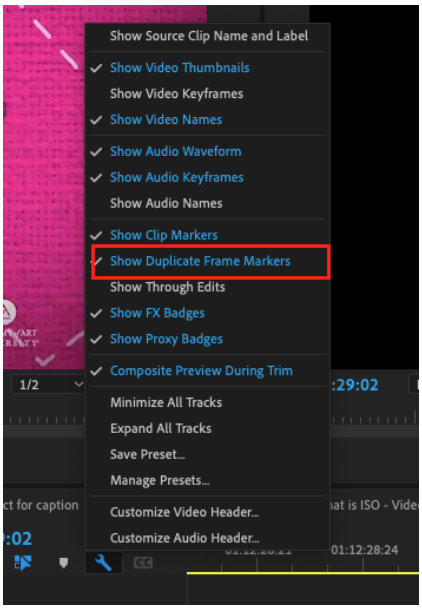


Figure **16.2.2**: Premiere Pro's "wrench" menu displaying the duplicate frame marker option. (CC BY-SA 3.0; by Misha Antonich)

Checking and Fixing Transitions

Checking and fixing transitions can take more time than the issues above, so do this for a project that you are trying to perfect as much as possible, within the given time. There are a few ways that transitions can yield unintended results, and two common ways, and their solution, is outlined below.

Adobe Premiere Pro (and most editing programs) have trouble creating a transition between clips without enough overlapping (or "extra" footage in addition to where you "cut") to allow the adjoining clips to "mix", for instance using a dissolve. In the case of a lack of footage for the transition, Premiere automatically creates still frames for the clip which is certainly a good stand-in approach but less ideal than a smooth transition. In Premiere Pro you have a few options to improve this transition:

- Check on the clip with the lack of footage (at the head or tail (the beginning or end of the clip) and consider adding footage by using a *slip edit.* A slip edit will retain the In and Out markers and its position in the timeline but allow you to "scroll" and review the available footage in the clip. This is often a fast fix, but won't work if you need the head or tail in the transition.
- Another option is to move the offending clip to another track, usually above the edit. This can help fix an issue as you can now more freely adjust the clip on the upper track.

In DaVinci Resolve, on the Edit page you can use the same *slip edit* tool and strategies. To use *slip edit* in Resolve:

- Select the *trim edit* tool and hover over the clip to "scroll" and review and adjust the content of that clip.

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16.3: Fixing Titles and Graphics

Checking and Fixing Titles & Graphics

Graphics, images and text in video programs can be a deep topic. A opening title of a project can reveal the need for graphic design experience to more easily place images and text in a readable way on-screen. Choosing “the right” font, colors and sizes can also cause consternation. While this guide won’t replace the years of training graphic designer’s undertake, there are a few steps you can quickly take to improve graphics and text in your projects.

Resolution

To make sure that any photos or images you are adding to a video, ensure they have sufficient resolution before adding them to your sequence in your editor. Resolution is the number of distinct pixels in each dimension that can be displayed. Commonly, you’ll be working with with one of these video resolutions:

1. *FHD* (Full High Definition) with a resolution of 1920 pixel width by 1080 pixel height.
2. *UHD* resolution (Ultra High Definition at 3840px x 2160px)
3. *4K* (4096 x 2160).

When adding full-screen photos or images to your video, try to make sure that their resolution matches that of your video resolution. Also, if you plan to scale any images in your editor, you’ll need images that match the size you plan to “zoom” in on them. For example, if you plan to add a full screen photo to an UHD sequence, use images with a resolution of 3840 x 2160 or greater. If you further wanted to “zoom in” or scale up this photo by 200% - your photo resolution should also be 2x the size to display the best quality. While it’s not always possible to find the perfect graphic assets in the resolution you need, in a professional setting scaling more than 115-120% is generally not permissible.

Title Safe or **Safe Margins**

According to Wikipedia: "The title-safe area or graphics-safe area is, in television broadcasting, a rectangular area which is far enough in from the four edges, such that text or graphics show neatly". Exact standards have long been set and updated over time for the exact placement of the title safe area, but it is around 10% in from the edges of the video frame. At around 5% from the edge is a larger rectangle called action safe. Even though the issues with the curved CRT screens that prompted the title safe standards are no longer a concern, it’s still almost always a good idea to keep all titles within safety areas.

Editing and compositing software commonly include overlays you can turn on or off that display boxes around the areas deemed best for any action in the video, called *action safe* and a second, smaller box that should generally show the outer limits within which to place text, the *title safe area.* Find these in the menu of the software you are usiing (search in help for “title safe”, “safe margin” or “guide”) and adjust your text and graphics by moving them inside the inner rectangle, the *title safe area*, if necessary.

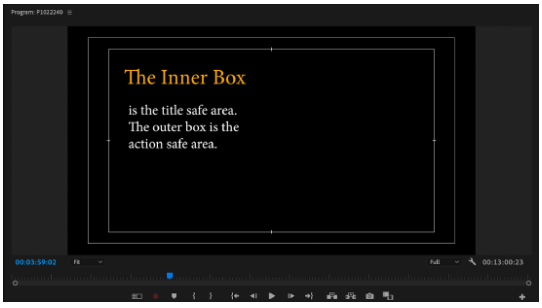


Figure **16.3.1**: Video text in editing software with contrasting title. (CC BY-SA 3.0; by Misha Antonich)

Visual Hierarchy

For titles and full-screen graphics with important information, such as definitions or explanatory text, it’s important to place textual and graphic elements on the screen in a way that makes them easy and intuitive to read and understand. *Visual hierarchy* is a term from graphic design that refers to structuring information for an audience by importance. The easiest way to draw someone’s attention to some important text is to establish a difference or contrast to the surrounding element. By creating a contrast in any of these properties below, you will be on your way to structuring the textual or graphic information for your audience, making your

information easier to understand and digest.

Use any of these properties to create a contrast and draw attention to an important detail.

1. Color
2. Size
3. Fonts
4. Orientation
5. Position
6. Shape

Here are two examples :

Creating visual hierarchy by contrasting the size of your text elements.

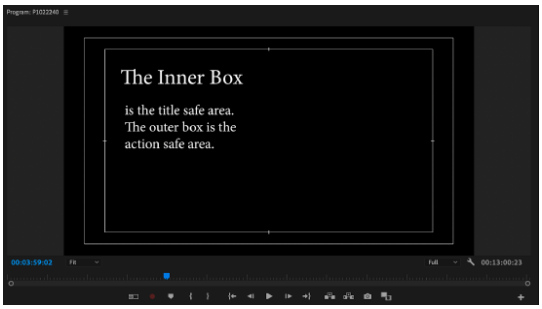


Figure **16.3.2**: Video text in editing software with larger title. (CC BY-SA 3.0; by Misha Antonich)

Creating visual hierarchy by contrasting by size and color, thereby drawing attention to the second yellow text.

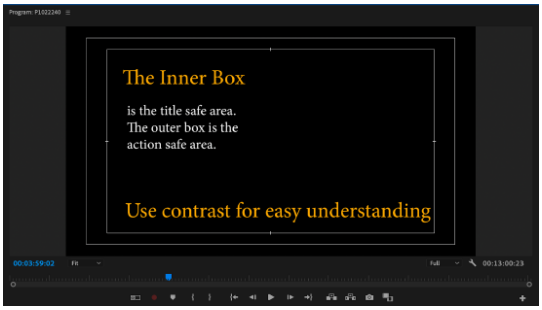


Figure **16.3.3**: Video text in editing software with larger title with contrasting color. (CC BY-SA 3.0; by Misha Antonich)

Typefaces for Video

The same computer you edit your video with has tens if not hundreds of different typefaces for use within applications that use writing. A *typeface* is a complete set of characters and symbols created with a certain look. *Fonts* are subsets of these characters with different weights, style and size, including *bold* and *italic* versions. Typefaces give personality to your text, have a bearing on legibility. Be aware that decorative typefaces might only have the bare minimum of characters available while those used professionally usually include all characters.

Typefaces for personality

A title of a program will have more impact if its typeface suggests the type of genre it contains. Most NLE's show you samples of the types and you should take some time to experiment. Since titles are often large, legibility is often not an issue but make sure to test by asking others for feedback. For instance, below is an example of a simple title set with different typefaces that uses the same color, position and size. Don't these typefaces do a lot to suggest the type of video you might expect to see?

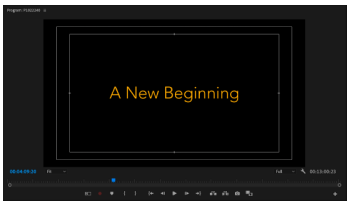


Figure **16.3.4**: Video text in editing software with a sans serif typeface. (CC BY-SA 3.0; by Misha Antonich)



Figure **16.3.5**: Video text in editing software with a slab serif typeface. (CC BY-SA 3.0; by Misha Antonich)



Figure **16.3.6**: Video text in editing software with a decorative typeface. (CC BY-SA 3.0; by Misha Antonich)

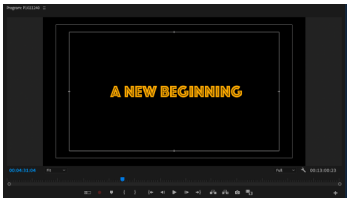


Figure **16.3.7**: Video text in editing software with a modern, decorative typeface. (CC BY-SA 3.0; by Misha Antonich)

Typefaces for video and legibility

While titles should project a personality and suggest the type of video viewers can expect, other text-based content needs to ensure legibility while still adhering to the style of the program.

Typefaces are classified in a number of ways, including whether a typeface is a *serif* or *sans serif* typeface. *Serifs* are the small strokes on the larger strokes that make up the letters of a typeface and and typefaces without these small strokes are classified as *sans serifs* (from the french, meaning, “without”).

Since the advent of television in the 1950’s and the beginning of video production in the 1970’s, it has been recommended to use sans serif typefaces for greater legibility. Otherwise, the resolution of early TV and video could blur the fine details of the text. Using sans serifs is still recommended although the increase in screen resolution makes this choice less of a stringent requirement. The main objective is to present your audience with concise textual information, when necessary, that they can easily read and understand.

Side by side comparison of these two common typefaces:
Left side: Ariel (a *Sans Serif* typeface**)** and on the right: Minion Pro (a *Serif* typeface**)**

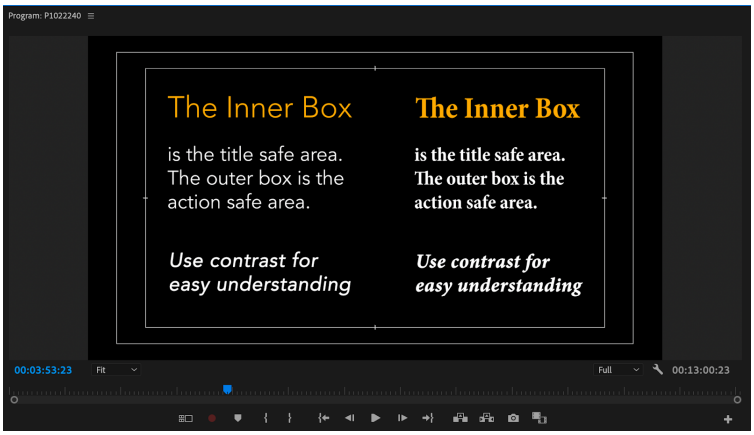


Figure **16.3.8**: Video text in editing software with sans serif (left) and serif (right) typefaces. (CC BY-SA 3.0; by Misha Antonich)

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16.4: Fixing Color and Exposure

Improving the look of your video

A sure-fire way to improve almost any production is to do a color correction pass on your video once you've "*locked picture*". This involves learning how to read video scopes to evaluate the amount of brightness captured in your clips and knowing how to correct or optimize properties that will improve the appeal of them. This process is color correction and it is fairly straightforward and easy to learn. The related step of creating a signature color and brightness profile for an edited film, called color grading, is a more involved process that goes beyond this guide. Here are some steps you can take, relatively quickly, to improve the overall look of your video by adjusting the brightness and color in your clips and across your timeline.

Evaluation of Brightness and Color in video

The first step to images with more impact and general appeal is an evaluation of both the brightness and the color in a clip. Brightness in video terms is called Luminance or shortened to *Luma* and is the "black-and-white" aspect of the image that defines the shape and lighting of the person or scene being photographed. Color, called *Chrominance* by video technicians and colorists, refers to all the color information, mixed from the primary channels of *Red, Green and Blue* (*RGB*) that are applied to an image.

The image of the flowers shows *Luma* (left), *Chroma* (middle) and both together.

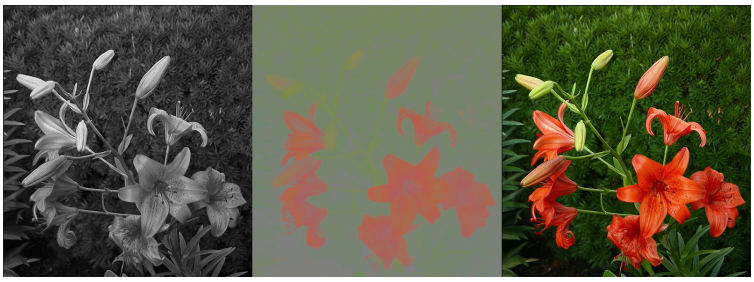


Figure **16.4.1**: Luminance only, Chrominance only, and full color image. (CC BY-SA 3.0; Imagage by Algr via Wikimedia)

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16.5: Video scopes for post-production

Video Scopes and color correction

Video scopes are essential when you start to color correct your footage. They are a consistent guide you will need to optimize the color, exposure and contrast of the clips you are working on. However, while scopes can give you reliable and consistent information about the color and brightness of the pixels recorded, they are only a reference. By understanding scopes and adding your own unique taste (often influenced by your favorite videos and movies) you can methodically fix common *color correction* issues. After you master the related the tools and concepts you can choose to go beyond this step to create a certain mood or "look" in your video by using the same tools to "*grade"* your video. For now, find common concepts for color correction on this page.

The Waveform Monitor

The waveform video shows you the luminance (brightness) values of an image on the vertical axis - the brightest parts (or trace) at the top and the darkest trace at the bottom. Horizontally, the **Waveform monitor** represents the amount of pixels a given brightness level in your image. While **Waveform monitors** can also display the distribution of the **RGB** color channels, many post-production specialists use them as a dedicated way to evaluate **Luminance** only.

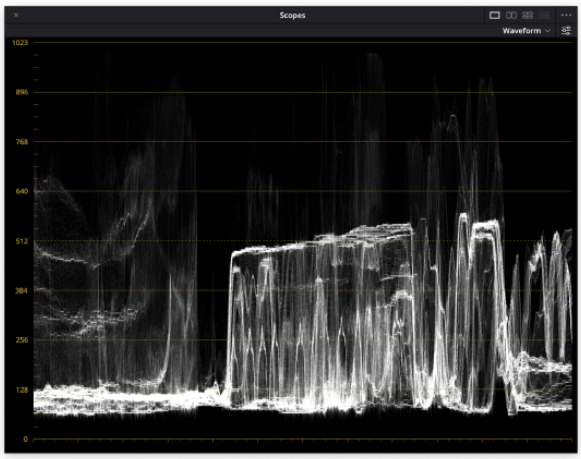


Figure **16.5.1**: Waveform monitor in editing software to evaluate brightness (or luminance). (CC BY-SA 3.0; by Misha Antonich)

Image of a digital Waveform Monitor (from DaVinci Resolve) showing the **Luminance** channel only (“Y”). Note that a “colorize” option and the display of the RGB channels have been turned off in the tool settings.

Here the Waveform Monitor (from DaVinci Resolve) shows the **Luminance** channel of the side shot of the biker. It displays the brightest values, of the sky and the white parts of the helmet on top and the darkest parts, the mountain and black parts of the shirt on the bottom.

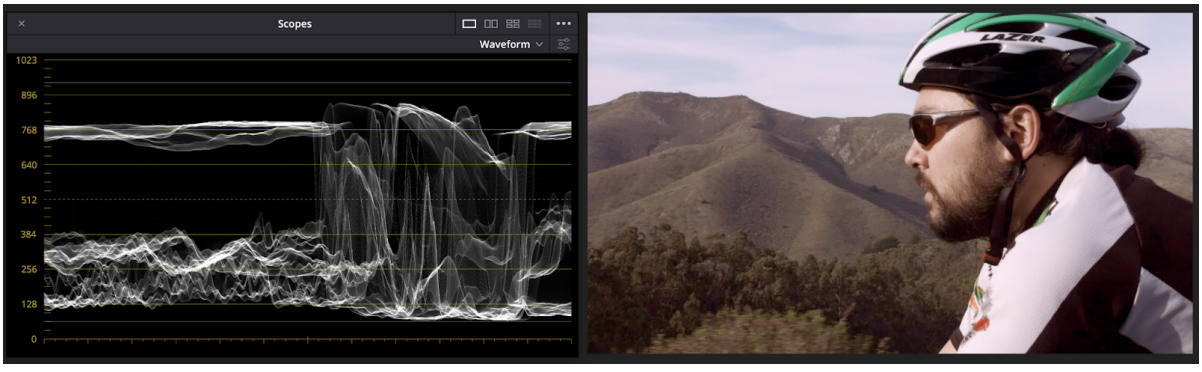


Figure **16.5.2**: Using a subject example the waveform monitor displays brightness or luminance. (CC BY-SA 3.0; by Misha Antonich)

The RGB Parade

This scope displays 3 waveforms measuring the luminance of the red, green and blue (the **RGB**) channels separately. You read the brightness values the same as with the waveform, but the individual channels allow you to evaluate the balance between colors and to correct the white balance. White balance is color calibration done in camera while in production that makes the camera record the correct colors on set, allowing for white to appear as white without a “color cast” of blue or orange.

Image of a digital **RGB Parade** (DaVinci Resolve) showing the RGB color and luminance values.

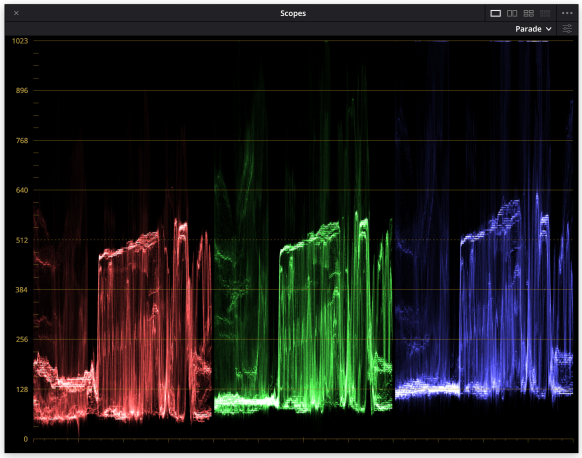


Figure **16.5.3**: A RGB Parade shows color channel brightness and distribution. (CC BY-SA 3.0; by Misha Antonich)

You can use the RGB parade tool to evaluate if and what colors dominate the image. In the image below, you can see that blues and red are dominate in the highlights of the image of the biker. Here the RGB Parade shows the distribution of color in the RGB channels of the shot.

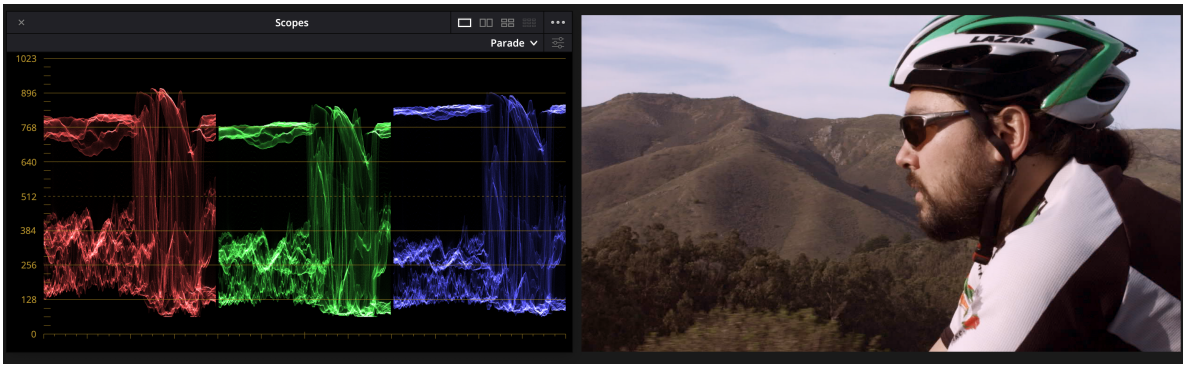


Figure **16.5.4**: A subject example to show how the RGB Parade shows color channel brightness and distribution. (CC BY-SA 3.0; by Misha Antonich)

The Vectorscope

The *Vectorscope* shows you color values by displaying the *hue* (color) and the *saturation* (richness). In the circular display area, the overlay "trace" (or graticule) from the image visible in the scope, shows the direction of the color and their saturation. The further away from the center that away the graticule increases the more that displayed color are saturated or rich.

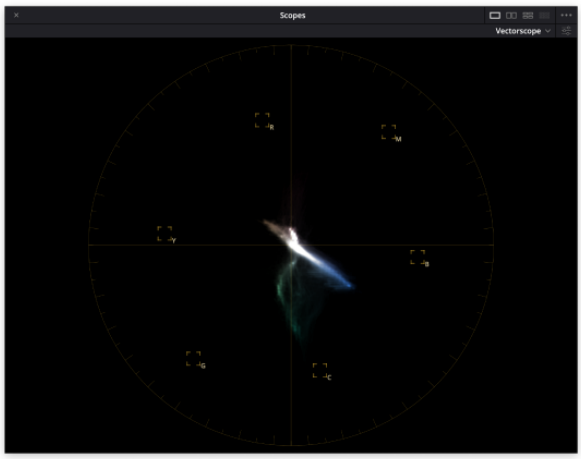


Figure **16.5.5**: Vectorscope in editing software to evaluate colors, saturation and skin tones. (CC BY-SA 3.0; by Misha Antonich)

SMPTE test patterns, from the standards group, the Science and Motion Picture Television Engineers group will display color bars by displaying graticule in the appropriate boxes for Red, Green, Blue, Yellow, Magenta and Yellow (RGB and YUV, two color encoding system used in video). In this case, all hues are adhering correctly to the currently most common *SMPTE standard*, *BT709*.

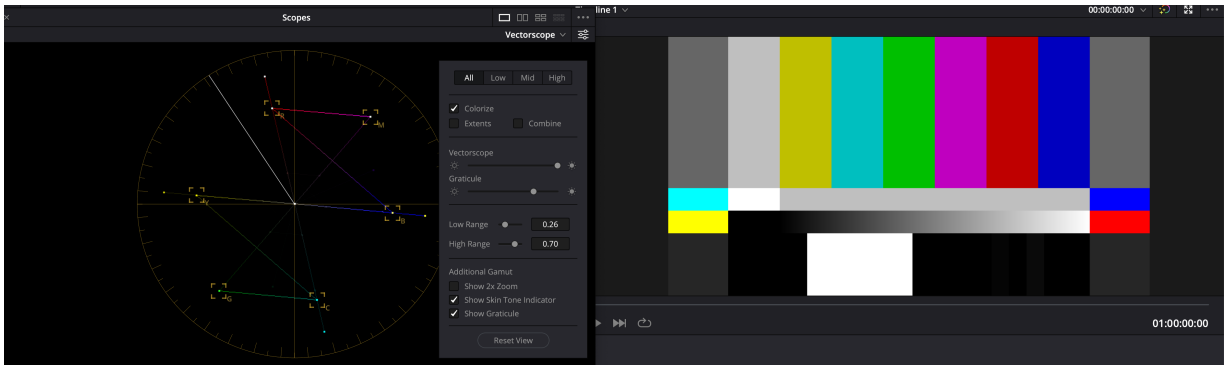


Figure **16.5.6**: Vecctorscope measuring color and saturation of SMPTE color bars. (CC BY-SA 3.0; by Misha Antonich)

For video editors, the main use of the *Vectorscope*, is in helping to figure out realistic skin tones of a shot. It's not as useful when applied to the whole image - with all included colors and regions. Instead, if you use masks, that hide and reveal areas in an image, to limit the analysis only to a subject's skin you can test if their skin falls along the *skin color line*, the prominent bold line at "11 O'Clock" on the graph.

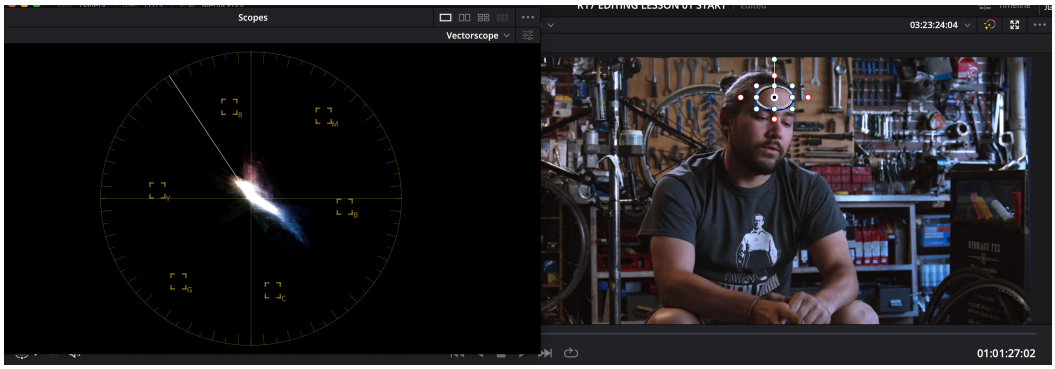


Figure **16.5.7**: Vectorscope and a video with a mask (not turned on). (CC BY-SA 3.0; by Misha Antonich)

In the image below, the mask has been turned. The trace is collected on and in the direction of the skin color line. Note how the graticule now lies along the *skin tone line.*

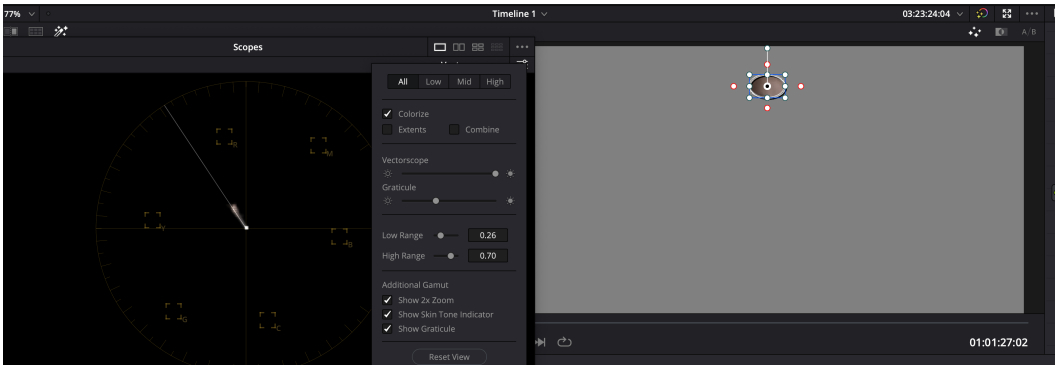


Figure 16.5.8: Vectorscope analysis using a mask that is turned on. (CC BY-SA 3.0; by Misha Antonich)

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16.6: Video Tutorials on Color and Audio techniques

Video Example of Color Correction techniques

A video tutorial on color correction for improving the exposure, color cast and skin tones using color correction techniques.



Figure **16.6.1**: A linked YouTube video with a demonstration of a color correction process. (CC BY-SA 3.0; by Misha Antonich)

Video Example of Audio Sweetening techniques

A video tutorial on audio sweetening - the improving or "sweetening" of an audio mix using techniques such audio ducking, EQ'ing and limiters.



Figure **16.6.2**: A linked YouTube video with a demonstration of an audio sweetening process. (CC BY-SA 3.0; by Misha Antonich)

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