



Field Production Workshop Handout

1. Digital Camera

The camera works by allowing light to enter the lens and pass through an iris (aperture) and shutter. In a film camera, the film within is exposed to a small amount of light focused by the lens. This happens for a fraction of a second, over and over. In a digital video camera, the light is focused onto a Charge Coupled Device or CCD that samples the light and transcribes the image into ones and zeros that it stores on a magnetic mini DV tape.

These cameras compress the images to decrease the size of data files so they can fit on tapes and hard drives. This compression also decreases the color quality. To improve the quality, modern cameras use a prism to separate the three primary colors – red, green and blue. Each color is exposed to its own Charge Coupled Device and sampled several times each second – as determined by the shutter speed – and recorded to tape. This is where the term 3 CCD comes from.

2. Basic Features

A. Power

The first basic feature is the power dial on the left side of the camera. To turn the camera on, push the gray button on the dial and simultaneously turn it to M for manual. There are other settings including A for automatic, but you should typically use manual which allows more control.

B. DV Tapes

The next feature we'll cover is the tape compartment. To open the compartment, slide the open/eject button and simultaneously pull the compartment outward. The cassette carriage will open automatically. Place the tape, which can record up to 60 minutes, into the compartment with the window face out and the spine of the tape on top. Push the carriage in and wait for it to finish moving before you close the cover.

C. LCD and Viewfinder

The next feature is the LCD or liquid crystal display. Slide the open button and the LCD pops out. You can then pull it out and adjust as needed. You can also view your frame through the viewfinder, which helps in bright conditions. You can also toggle through different display modes by pressing the display button. It's often preferable to remove all the information on the LCD so you can focus on what's in the frame.

D. Batteries

Now we'll take a look at the battery compartment. To open it, slide the open button and the compartment lid will pop open. You can place a battery or AC power cord into the compartment. (Demonstrate) You can charge the batteries using the outlet cord and power converter.

E. Record

The final feature is the record button. There are two record buttons, one on the side and one on the handle. To begin recording, press either button. To pause recording, press either button again. While recording, a red circle will appear in the top right of the LCD. There is a counter below, which notes hours, minutes, seconds and frames elapsed. There are 29 frames in a second. There is also

a tape symbol below the counter with a number that represents the amount of time remaining on your tape.

3. Camera Tools

The two primary tools we have to control the brightness and quality of an image are Shutter Speed and Iris. These two controls must be used to properly expose your image. The light meter, located on the LCD or viewfinder, is a visual indication of exposure. We can properly expose an image by placing the indicator at the middle of the meter.

A. Shutter Speed

Shutter Speed affects the brightness and sharpness of motion. The speed determines how long the shutter stays open to expose each frame. For example, $1/500^{\text{th}}$ of a second. Slow shutter speeds, such as those $1/30^{\text{th}}$ of a second and slower, result in bright images, but blur motion. You can use slow shutter speeds to record subjects with little or no movement, unless a blurred effect is what you're after. A fast shutter speed results in darker images and sharper motion.

B. Iris

The Iris, sometimes known as the Aperture or F-Stop, affects brightness and depth of field by regulating the amount of light that reaches the CCDs and how the light is focused onto the CCDs. When you open the Iris, the image brightens, allowing you to video in low light. Also, the depth of field or focus becomes shallow and makes it more difficult to keep an entire image in focus. Conversely, when you close the Iris, the image darkens and the depth of field increases, putting the entire image into focus. The size of the Iris is typically represented on the camera's LCD or viewfinder by a number. It's a bit confusing, but the smaller the number, the bigger the opening.

Aesthetically, it's often preferable to create a shallow depth of field to focus solely on your subject and blur the background.

C. Neutral Density Filter

A Neutral Density filter decreases the amount of light that passes through the lens, similar to a pair of sunglasses. The filter is simply a dark piece of glass within the lens. The filter is used outdoors on bright days to avoid using a high shutter speed or wide-open Iris. The ND switch is located on the left side of the lens on the Canon XH-A1. There are three settings; Off, 1/6 and 1/32. When a filter is on, the LCD displays "ND."

D. Focus

Focus helps you control what your viewer looks at. A sharply focused subject in the foreground will draw the viewer's attention, diverting their eyes from unfocused subjects or objects in the background. The same applies when the subject in the background is sharply focused and other subjects or objects in the foreground are out of focus. To focus, zoom into your subject and manually focus. When you zoom out, your subject will still be in focus as long as you don't move the camera or subject.

A cousin of Focus is the Rack Focus. This is when the Focus changes from one subject to another in the same shot.

E. Gain

Gain electronically boosts the brightness of your image, but adds graininess and reduces quality. Avoid Gain whenever possible, but if you must use it, use as little as necessary. A better technique to increase light is to find a balance between the Iris and Shutter Speed where the motion within your image doesn't blur.

F. White Balance

The human eye is able to determine white in various light temperatures such as sunlight, incandescent light and fluorescent light. A camera must be told what white is so every other color is

correct. To do this, place a white surface in the same light as your subject and zoom in so the surface fills the frame. Press the White Balance button on the camera. White Balance must be done anytime light temperatures change, such as moving outdoors or a sunny sky becoming cloudy.

G. Zooming

Zooming with your feet or moving from still shot to still shot is preferred. We don't own dollies, jibs or cranes. However you can move a camera smoothly with objects like a skateboard.

Zoom not only affects closeness, but also steadiness. You should reserve zooming to applications where the camera is on a tripod. Otherwise, frame a Wide Shot or move closer to your subject.

H. Image Stabilizer

Many cameras include an image stabilizer which smoothes camera shake, but doesn't affect your image. Use Image Stabilizer when shooting handheld video.

The best way to way to avoid shake is mechanical stabilization. In its simplest form, mechanical stabilization includes placing the camera on a surface like a desk or rock or locking your elbows against your body. A tripod is the best option when you don't need to move the camera. Nearly all of your shots should be done on a tripod.

While carrying the camera, always be sure the strap is on your shoulder.

4. Cinematography

Before you begin shooting, it's important to consider the story you want to tell. Will the audience understand your story? Will the viewer grasp the point you're attempting to make? Is the video visually appealing and the audio pleasing to the ears?

A way to make your program intelligible and appealing is to script and story board. Scripting includes writing all spoken lines and physical actions. A story board is a visual or written description of each shot you plan to record.

Using these tools makes it easier for you to understand what you're trying to do and will make the final product better. Remember, we're here to help you with your productions. If you need some instruction, let us know.

The television industry uses standard language to describe different shots. This language makes it easier for all of us to communicate, whether we're writers, directors, producers or camerapersons.

A. Long Shot

The first shot is the Long Shot: It's also called a Wide or Establishing Shot. This shot shows your entire subject and some of the background. It's often used at the start of a program or segment to establish context or orient the viewer about the subject's location.



B. Medium Shot

The second shot is the Medium Shot: The Medium Shot includes the upper half of the body, from the waist up. This is typical in interviews or to impart a sense of intimacy with your subject.



C. Close Up

The next shot is the Close Up: This shot includes the head and shoulders of the subject. This shot is also used in interviews, although more sparingly than Medium Shots. It also creates an even greater sense of intimacy.



D. Extreme Close Up

The fourth shot is the Extreme Close Up: This shot frames part of the face and leaves some of the guessing to the viewer. It is a dramatic shot.



E. Two Shot

Next is the Two Shot: This is a Medium Shot that includes two people, rather than one.



F. Over the Shoulder

Last is the Over the Shoulder Shot: This shot focuses on one subject by looking over the shoulder of another person who is facing the subject.



5. Composition

Composition is the act of placing people, animals, objects or other features a certain way within the camera frame. The frame is everything you see on the LCD, in the viewfinder or on your television screen. It's possible to achieve several goals through composition:

You can place emphasis where you want it

You can make the image visually appealing to your viewer

You can create depth or three dimensions

And finally you have continuity between different cameras or between two sequential camera shots

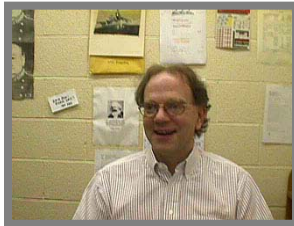
A. Head Room

The first composition technique is Head Room: This is the space between the top of the subject's head and the top of the frame. A well-composed frame places the subject's eyes one third down the frame, leaving a bit of room between the head and frame.

Too little



Too much



Just right



B. Nose Room

The next technique is Nose Room: This is the space between a person's nose and an edge of the frame. When a subject is speaking or looking at another person, they are looking toward an edge of the frame rather than directly at the camera. Place the subject off center to create nose room and signal to your viewer that the subject is speaking to someone else or looking at something.

Too little



Just right



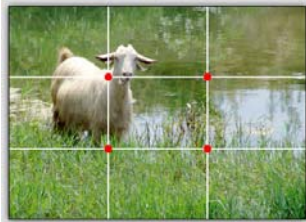
C. Lead Room

The third technique is Lead Room: Lead Room is similar to nose room, but applies when the subject is moving toward an edge of the frame. Place the subject off center to create Lead Room for the subject to move into.



D. Rule of Thirds

The next technique is the Rule of Thirds: A centered shot is often static and boring, so the Rule of Thirds is used to create balance and heighten the viewers' interest. Imagine horizontal and vertical lines that divide a frame into thirds. Place points of visual interest such as a face, hand, horizon or other object at the intersection of these lines to please the viewer's eye.



E. Depth

The fourth technique is Depth: A television picture is two dimensional. To create the illusion of three dimensions, place people, objects and props in the foreground or background at varying distances from the camera. For example, an Over the Shoulder Shot creates more depth than two people facing each other the same distance from the camera.

F. Pans and Tilts

Some other tools in the cinematographer's bag include pans and tilts. Panning is when you move the camera from left to right to follow action. However, as with zooming, panning is often considered an amateur move. Instead, cut from still shot to still shot.

A Tilt is when the camera is tilted up, down or to the side. A Tilt looking up at your subject makes them look more impressive, while a Tilt looking down at your subject makes them look more diminutive.

6. Audio

It's important to remember your audio is just as vital as your video. Audio that is distorted, too loud or soft can ruin the appeal of your entire production. Always monitor your audio using headphones, which can be plugged into the back of the camera. Trust your ears; if the audio sounds distorted, it probably is. There is also a visual representation of the audio level on the bottom right side of the LCD. The peak should stay between the green dot and the white dot to the left. The green dot represents -12 db. If your volume exceeds the green dot, it will become distorted. To control the volume level, use the dials on the left side of the camera. Turning to the right decreases the volume and to the left increases the volume. The dials are sensitive; it doesn't take much turning to achieve the desired volume.

A. On Camera Mic

So, the first type of microphone is the built-in camera mic. It's best only to use this mic in a pinch, because the quality is poor. To turn on the built-in mic, press the menu button and scroll to audio using the select/set dial. Select audio setup by pressing the dial, then select XLR Input Off. To control the volume, use both dials on the left side of the camera. Channel 1 controls the left side and Channel 2 controls the right side.

B. Handheld

The next type of mic is the handheld. It's good to use for interviews on the street or to pass around during lecture question and answer sessions. (Demonstrate setup.) To turn on the handheld mic after it's been connected, press the menu button and scroll to audio setup using the select/set dial. Select audio setup by pressing the dial, then select XLR Input On. You'll notice it says XLR on the LCD. To control the volume, you'll only need to use the Channel 1 dial.

C. Lavalier or Lapel

The third type is the lavalier or lapel mic. This is good for sit down interviews. (Demonstrate setup.) After setup, be sure the XLR input is on. To control the volume, you'll only need to use the Channel 1 dial.

The wireless setup can be used with two lapel mics or a lapel mic and handheld, but never all three.

D. Boom

The final type of microphone is the boom or shotgun. This is good for narrative stories when you don't want the microphone in your shot. (Demonstrate setup.) Again, be sure the XLR input is on. To control the volume, you'll only need to use the Channel 1 dial. This microphone runs on battery power and phantom power from the camera. To turn phantom power on, slide the 48 v switch on Channel 1 at the front of the camera to on. Be sure to turn this off when you're finished.

When you film where there is an audio setup already installed, you can plug an XLR or phone jack into the existing system to get better audio.

7. Lighting

Now we'll take a look at lighting. Lighting is important to achieve an appealing image, whether you use natural light, indoor lighting, a lighting kit or a combination thereof.

You must be aware of each light source around you while filming. They all emit a different color temperature and video cameras are sensitive to these differences. Think about fluorescent lights; they give objects a greenish tint. Your incandescent light bulbs at home produce an orange tint. Sunshine is blue.

While it is possible to white balance in places where the light source is uniform, it is not possible to accurately white balance in places where light sources with different color temperatures exist. To make light sources uniform, you can turn lights off or cover windows and lights with colored gels.

In low light or controlled situations, you can use a lighting kit to illuminate your scene. The basic setup is called three-point lighting. This technique uses a key light, fill light and back light, which we'll demonstrate in the following video.

A. Key Light

The key light is your primary source of light and is used to illuminate your subject. The other lights make your image more appealing. The key light is a bright light directed at the broad side of your subject's face, typically at eye level or above and off center, which adds depth and shadows, much like the sun.

B. Fill Light

The fill light is a diffused light dimmer than the key. The fill is placed on the opposite side of your subject and fills the shadows left by the key light.

C. Back Light

The back light is a small light above and behind your subject that shines on the back of their head and shoulders. The back light produces highlights on the hair and shoulders, which adds depth by separating the subject from the background.

We have three lights at PATV 5: two Lowell Omnis and a Lowell Rifa.

The Omnis may be used as a key, fill or backlight. You can change the intensity of the light with the lever on the back or focus the light with the barn doors. The Omnis come with umbrellas, which when pointed at your subject create a fill light or a key light when pointed away. The Omnis also have holders, which can be used with diffusers and gels.

The Rifa is a soft light which fills shadows created by the key.