

# University of Oregon Cinema Studies Department



## Canon 90D User Guide for Shooting DSLR Video

Written by Andre´Sirois

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Please note: this camera is not recommended for productions that require long shots, such as documentary where you have long interviews. This camera is ideal for narrative productions where shots are much shorter. Filming for long durations on the 90D will cause the camera to overheat and you may lose footage or have to let the camera cool.

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## What's in the Kit?

1 Sigma or Canon  
Zoom Lens



1 Canon 90D Camera Body



1 Lens Blower



2 LP-E6 Batteries



Variable ND  
Filter



1 Camera Case

# Assembly

1. Remove the body cap from the camera and the rear lens cap. Align the EF lens mount index (the red or white dot depending on the lens) on both the camera body and lens and turn clockwise until the lens locks on.

\*\*\*Do not touch the back glass of lens OR mirror/sensor of camera!!!



2. Slide card slot cover towards rear of camera and it will spring open. Gently push in SD card until you feel the spring lock mechanism click in. (To remove card push it in to unlock the mechanism). Close slot cover.



3. Push lever and open battery compartment. Gently slide battery in and close door.



We recommend SanDisk brand of SD cards. The 90D requires that you use a Class 10 and SDHC or SDXC card for shooting HQ video in the ALL-I compression. Look at a SanDisk Extreme Pro at 95MB/s.

# Layout

Shutter button



Lens release

Mirror

Shoe mount for mic,  
monitor, light, etc.

On/Off Switch

Photo / Movie mode  
record/stop <📷/🎥>

Focus assist/zoom

**MENU**

Multi-controller 1

<INFO.>

Quick menu <Q>

Quick control dial  
(scrolls within  
menus or sets  
f-stop) <🔍>

Flip screen LCD

LCD info display

Multi-controller 2  
(scrolls menus and  
w/in menus; scroll  
ISO) <🔍>

File playback Set or "ok" button

Erase Button

# Layout

Mode Dial (set to M=Manual mode)



Main dial (changes shutter speed, scrolls ISO, and scrolls menus) <img alt="Main dial icon" data-bbox="795 138 855 155"/>

ISO Speed

Mode release/lock button

Settings LCD screen

1/8" mic input  
1/8" headphone input

HDMI mini output (for use of external video monitoring)



Battery compartment



1/4" threaded hole for tripod quick release plate attachment

# Quick Use Guide

1. Set the lens to MF (manual focus) on the lens body. Turn on IS or OS (image stabilization)

2. Turn ON, and set video Mode Dial to M (Manual)



3. Swing out LCD screen. Put camera into Movie Mode. This will turn on Live View mode and the LCD screen.

\*\*\*Note that the LCD screen is a touch LCD screen.



4. Format your SD card.

**MENU** [  ]

FORMAT CARD >OK

\*\*\*Hint: use the main dial to scroll across menus; use the quick control dial to scroll through options within a given menu.




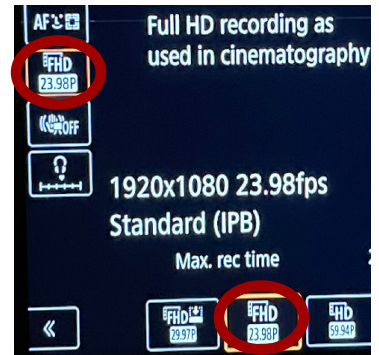
Main Dial




Quick Dial

## Quick Use Cont'd

5. Media settings. Set your resolution and frame rate. You will want to shoot full HD 1080p (1920x1080) and choose either 24fps (for cinematic look) or 30fps (for video look). **You can shoot 60fps at 720p or 4K, but ask your instructor.** Use the  menu and set your media by selecting your resolution and frame rate.



6. Adjust the focus on the focus ring of the lens so that your subject is in focus. Press the Start/Stop button to begin and stop recording. 



\*\*\*To get critical focus on your subject, use the focus assist controls to push in on your subject. You can move the white box that positions your focus point by using either of the multi-controllers.

7. To review your footage press 



# Media Storage & MGMT

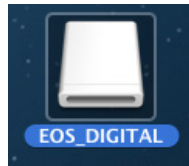
Any new SD card must be formatted. To do this:

**MENU** [👉] **FORMAT CARD > OK**

To retrieve your footage after a shoot please follow these steps:

1. Remove your SD card from camera. Set the little switch on the card to LOCK (this could prevent loss of footage during transfer if you have a corrupted disk).

2. Place SD card into SD slot on computer or use a card reader. A drive will pop up on your desktop titled EOS\_DIGITAL



3. You will find your video files by clicking on the following folder path: **EOS\_DIGITAL > DCIM > 100CANON**

4. Transfer files from the 100CANON folder. Rename the files once they have been transferred from the card. On your EXTERNAL hard drive, make a project folder, within that make a folder for footage, then make a folder to put the 100CANON folder into. For example:

External Drive > Music Video > Footage > Day 1 Shoot > Your Files Go Here

\*\*\*Clarify workflow with your instructor\*\*\*

\*\*\*The 90D shoots in the high quality codec, h.264, and uses the .MOV format/wrapper. Depending on your editing software, you may have to transcode this footage before editing.

# Crop Sensor

Focal length is based on the 35mm film standard (full frame for DSLR is 36mm x 24mm). The crop frame sensor crops out the edges of the frame. The 90D has CMOS APS-C sensor, which has a 1.6 crop factor (CF). In the image below, the red box is the crop of the sensor in comparison to what you would see with a full frame sensor.



The crop factor gives you greater depth of field (DOF) that will make pulling focus easier and your lens won't be as sensitive as it would with a shallow DOF.

The downside is that you will have less dynamic range (light and color information), a greater DOF (this may be a disadvantage depending on your aesthetic), and won't be able to shoot as well in low light settings. It also changes the FOV (field of view) you would expect from a lens given its focal length (it will show less of the scene).

# Lensing

All 90D kits come stock with a Sigma 17-50mm f/2.8 or Canon 17-55mm f/2.8 lens. You may also have access to other prime lenses. These 17-50mm lenses have variable focal length (they can “zoom,” which means you can change your framing without moving the camera). Focal length is the distance over which light rays are brought into focus from lens to sensor.

These “zoom” lenses have fixed aperture, which means that your f# will remain constant as you change your focal length. These lenses also have OS (image stabilization) for use with high focal lengths (keep OS on). When you “zoom” in or out, you are in fact changing the focal length, which changes what you can see (field of view or FOV) and perspective (visual relation of foreground to background).

With a prime lens you must move the camera or re-lense to get a different FOV. In narrative production a dolly in or out is how the camera moves closer or farther from a subject, so try and avoid “zooming” in or out with the lens during a shot.

The crop sensor will have several effects on a lens. It will impact your focal length and angular wideness (FOV) of your lens. So, multiply your lens’ focal length by 1.6 on, which gives you your true focal length (i.e a 50mm becomes 80mm). A long focal length lens collapses foreground/background while a short focal length exaggerates perspective (a great distance appears between foreground and background).

# Focal Length

Focal length choices are aesthetic choices. This will affect what's in frame, the perspective, the color information, and your DOF (while f-stop settings impact DOF, this factor is also affected by your lens choices).

**Wide:** The widest focal length is 17mm (with CF, about 27mm). This setting will give you a greater DOF, is good for establishing shots and opening up confined spaces, and makes dollying easier to keep focus. Try wide for dialog scenes and medium shots; the Coen brothers use this to create an odd sense of presence. Use this in dialog scenes to show distance between actors (emotional, spatial, etc.). Note that if action occurs along the z-axis (action moving towards or away from camera) actors must also exaggerate the action for it to show up. Also, try this focal length for low angle shots.

**Normal:** With the 1.6 CF, set the lens to 21mm-35mm (equal to 34mm-56mm) to get a "normal" FOV and perspective. A normal focal length is similar to what our eyes see in terms of perspective and FOV. Normal focal lengths are used commonly in dialog scenes.

**Long:** With the CF, set the lens to any focal length above 35mm. A 50mm/55mm produces the perspective/FOV of an 80-85mm lens. This will produce a shallow DOF and compress the foreground and background. This will create a sense of closeness between subjects/actors, or use shallow DOF to isolate a subject. Use long focal length for CUs, ECUs, some OTS shots, fight scenes, chase scenes, shooting a subject in the back set of a car from the front, etc.




# Exposure: Shutter Speed

**Shutter Speed:** In DSLR photography, this is a very important way of manipulating exposure. However, for DSLR video you mainly have two options for shutter speed. You will set your shutter to **1/50** or **1/60** to maintain the proper film or video look (1/50 maintains the 180 degree shutter that is characteristic of the cinematic look for 24fps). **You DO NOT adjust shutter speed to obtain proper exposure.**

Shutter speed is the length of time the sensor is exposed to light by turning on. With DSLR, the shutter number is how long the sensor will be turned on for each frame.

The rule is this: your shutter speed should be twice the speed of your fps. So, if you're shooting at 24fps, you set the shutter to 1/50; if you're shooting at 30fps, you set the shutter to 1/60. If you shoot at 60fps, 1/125 is the proper number. 1/50 means the sensor is on longer than 1/60, which creates a motion blur common to film.

However, because shutter speed also affects how motion is interpreted, if you want a jerky looking shot, similar to the opening scenes of *Saving Private Ryan*, try setting your shutter to 1/80, 1/100, or 1/125.

To set your shutter speed, simply turn the Main Dial on the top of the camera. You will see the shutter number change in the lower left hand of the LCD screen. <  >

\*\*\*For chase and fight scenes, try shooting at a higher shutter than normal to intensify the action. Also try using a longer focal length on your lens.

# Exposure: F-Number

**F-Number:** The last factor in exposure is your f-number, also called a f-stop. This controls how much light is let in through the lens, and is also referred to as the “aperture” or “iris.” Some people like to set f-number first, then ISO.

Adjusting your f-stop will be the BEST way to control exposure. This allows “clean” light (not digitally enhanced light like the ISO) through the lens to the sensor. The smaller the f-number the larger the opening (iris); and the larger the f-number the smaller the iris. Moving to a smaller f-number is “opening up”; a larger f-number is “stopping down” or “closing.”

The **90D can adjust in 1/3 stops**. Moving a full stop will halve or double the light let in. Full stop f-numbers are: **f/2.8, 4, 5.6, 8, 11, 16, 22**

\*\*\*Adjusting your f-number will also change your DOF. Thus the higher the number (smaller iris) will give you a greater DOF; the lower the number (larger iris) and you’ll have a shallow DOF.

To adjust the f-number, use the Quick Control dial and you will see the number next the shutter number on the LCD change. (Note, on our prime lenses you must adjust the f-number on the lens itself).

- For documentary/news, set from f/4-f/8 for great DOF.
- For narrative, try f/2.8-f/4 for a shallow DOF. Most narrative films are shot at f/4 or f/5.6.
- Depending on lens, even at f/2.8 it’s hard to keep subject in focus.

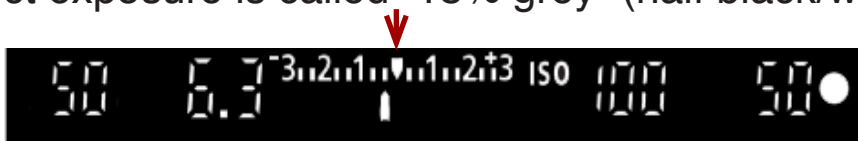


## Exposure Cont'd

To measure exposure, typically you use a light meter to get a reading. However, with the 90D you can use the built-in exposure meter to get a reading. To activate the exposure meter, half-press the shutter button; the meter mark will start to move up and down the scale.



Each number represents a stop change in the light (half/double the light), and each pip between the numbers represents 1/3 stop. The central mark is the “correct” exposure, as determined by the light meter on camera. The correct exposure is called “18% grey” (half black/white).



The meter measures reflected light, which is the light that reflects off of objects rather than the light that illuminates objects (incident). **HOWEVER**, the meter evaluates the average light on the camera and cannot spot meter certain parts of the frame, which means issues with scenes with high contrast (i.e. using it to gauge exposure for low key lighting style typical in film noire).

When you change f# or ISO you will need to compensate by stopping down or opening up f# or ISO, adding light or reducing light (known as “exposure compensation”) to get 18% grey. Use the meter **AND** your eye! If unsure, underexpose at 1/3 stop. You can always bump up exposure in post, but you cannot fix overexposed images in the same manner.



# Using Histograms

Again, the issue with the meter is that it averages all the light in the frame; and using your eye and the LCD screen alone will give you a subjective measure. And, there are external factors, such as glare, that will cause the images you record to be improperly exposed. One tool to objectively measure exposure is the meter, another tool is the histogram, which measures luminance.

To access the histogram, press the INFO button on the back of the camera until the histogram shows in the upper right hand of LCD screen.

**<INFO.>**

What you see horizontally on the histogram on the far left are the black pixels (darkest) and on the far right are the white pixels (lightness), and also shadows and highlights. The vertical scale measures amount of pixels. A properly exposed image will appear more even both horizontally and vertically. Big spikes in the far left or right means you're losing details or it's too contrasty. Try to get even distribution of pixels near middle, although you may have higher values at either end. You can work with a histogram in post as well.



Bright image



Dark image



Normal brightness

To get the best read take a still image of your scene. Hit the playback button. Hit INFO twice to bring up luminance histogram.

# Controlling Exposure Outside

You may find out that your image is overexposed when shooting outside, even if you dial your ISO down to 160 (or, 100). For still photography this is not a problem as you can adjust your shutter speed, but for video you must shoot at 1/50, 1/60, or 1/125. You can try to close down your iris as well, but then that will also change your DOF (f# is a stylistic choice and not just for exposure!).

In order to properly expose your image, you have two options.

1). **ND Filter:** This filter attenuates or lessens the light that hits the sensor. Each 90D kit has a variable ND filter that will ONLY work w/ zoom lenses. These are variable ND filters, and allow you to cut the light by 2 to 8 full stops by turning the ring.

\*\*\*Gently thread the ND filter onto end of the lens\*\*\*



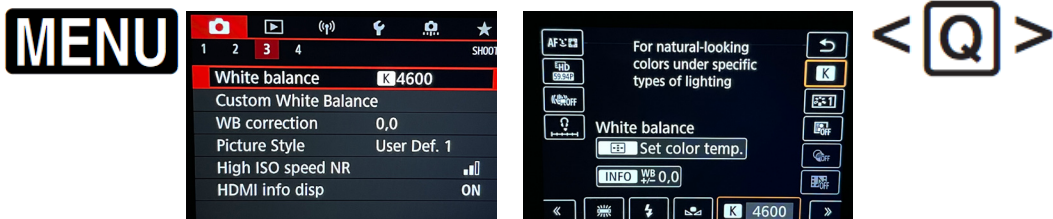
2). **Diffusion Screen:** The 7 in 1 large reflectors also act as diffusion screens, similar to a diffusion umbrella. To use one you will likely need two c-stands and then sand-bags for the c-stands.

# White Balance

Remember, exposure is color blind. But all light has color. Our eyes by nature balance color, but cameras base all color information off of the color white so that what we see in the scene (color-wise) is what we get on the camera. Color information is usually balanced in RGB (red, green and blue). You set white balance AFTER you have lit your scene and set exposure.

The color of light is referred to as temperature, measured in kelvin or K. Generally speaking, daylight is 5200K (emitting a blue light), shade is 7000K (bluer), cloud cover emits 6000K (still blue), fluorescent light is 4000K (green), and tungsten lights like our light kits or candle light give off 3200K.

The 90D actually has powerful presets for white balancing. To bring up the white balance options select MENU and use Movie Menu 3 or use the QUICK MENU button.



**AWB:** This will automatically set white balance

**Daylight:** 5200K

**Shade:** 7000K

**Cloudy:** 6000K

**Tungsten:** 3200K

**White Fluorescent light:** 4000K

**K:** when set to K you can use the Main Dial to set the K value

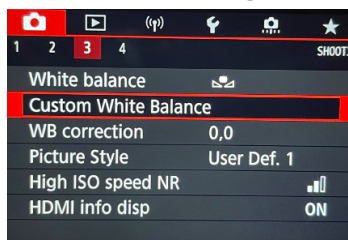
# Custom White Balance



One of the main reasons why you should custom white balance is because you may have different light sources casting different color temperatures on your scene. For instance, say you're using window light (5200k, blue) as a key light and then you use a tungsten lights (3200k, orange) to fill in the detail or provide rim light. Thus, you'll have both blue and orange light on your subject and it won't look right in the camera (unless that's what you want).

Once you have set the camera and lights, have your subject hold a white card or white piece of paper. If you have to, move the camera in until the LCD is filled with white. Always move the camera to the card. Then, take a picture (must switch to photo mode) in any white balance setting.

Go to the WB settings in MENU>Custom White Balance



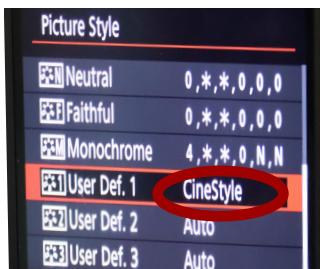
Open Custom White Balance Menu. Select the white image you just took and press SET and then OK in the following menu. Then, go into the white balance options and select the custom white balance icon and OK, which will then set the white balance based upon that image. Remember, do this every time you change the light and have different color temperatures.

# Picture Profiles

The 90D has numerous picture profiles that it shoots with. Don't use any of the preset ones! The 90D has three customizable picture profiles where you can adjust sharpness, contrast, saturation, and color tone. You want to shoot a flat or neutral image so that you can process the image in post.



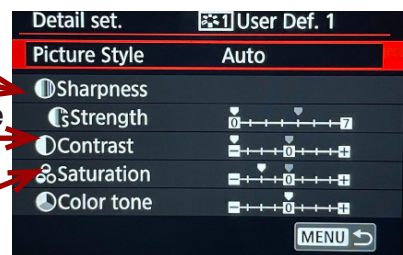
Open Camera Menu 3>Picture Style> Set>User Def. 1. Press INFO to customize. Press SET to open, then use Quick Dial to turn off sharpness and contrast, and dial down saturation one to two pips. 90Ds also have Cine-Style profile under User Def. 3 that you should use.



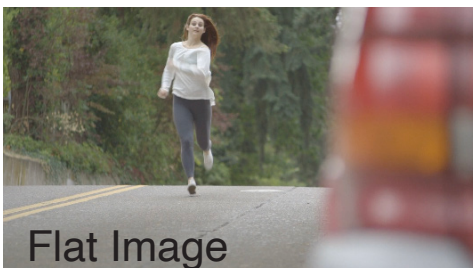
Sharpness  
(line/edge contrast)

Contrast (difference  
between light/dark)

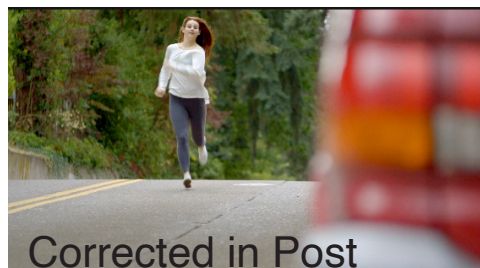
Saturation (color  
separation)



Flat images will maintain line detail and prevent loss of detail in shadows. You add sharpness using aperture and focus (sharpness in the camera is “fake” sharpness). Flat images are softer and you avoid aliasing. You add contrast and saturation in post to achieve your “look.”



Flat Image



Corrected in Post

# Focus

Now that we have our exposure correct, white balance set, and a flat image, the last element before we record is to focus our image. Make sure the lens is set to MF.

Move the white box on LCD screen using the Multi-Controller to area you want to achieve focus on. Then press the focus assist button once to magnify x5, twice to magnify x10, and a third time to go back to Live View.



Once you have magnified your image. Turn the focus ring until you have critical focus on your subject (often the eyeball). Then, press the focus assist to return to Live View. You are now ready to record!!! To begin recording press the START/STOP; to stop recording press the button again.

To play back footage hit the playback button on back of the camera. While in playback mode, use any of the dials to select files, and the focus assist buttons to see more or less file thumbnails. <▶>

\*\*\*To pull focus you will want to use a follow focus of some sort. Confirm with your instructor how to mark for focus pulls without damaging lenses, but please don't use tape or grease pencils.

# Audio

Any audio that you record using the camera's on-board mic, or any input into the 1/8" mic jack on camera, should be for sync purposes ONLY. You should NEVER record your audio intended for use in the final product on the camera, but you NEED to still record audio as a scratch track for syncing it in post. These mics pick up all of the noise from the camera mechanism and all handling of the camera/lens.

You should record audio you intend to use on the final product to a Tascam or other digital recorder. All DSLRs have unbalanced audio inputs, which are not suitable for professional audio. While interfaces are available w/ XLR inputs and channel gain, they still push the signal through the camera's unbalanced 1/8" input and audio card.

Make sure that your camera is recording audio. Set up a mic to an external audio recorder. Use a clapper board or clap your hands in front of the camera before "Action" is called by the director. This clap is important for manually syncing audio to picture. If you cannot use a clap/slate at the beginning of a take, you will do this after the take for the same sync purpose.

As a general rule, set your audio levels on your external recorder to peak between -18dB to -6dB. Please see the user guide or videos for the audio/boom kits for more information, or check with your instructor.

# Transfer/Transcode/Backup

Transfer files from your SD card to a computer/external drive using the SD card slot on the computers or a card reader. Try to avoid using the camera for this.

Before transferring we recommend you turn the LOCK on on your SD card.

We recommend that you make a folder on your external drive of your original footage and that, if you can, back this footage up on another external drive or computer. When the drive icon pops up, you will find your files here: EOS\_DIGITAL > DCIM > 100CANON

Try to avoid renaming or moving files. Many NLEs require specific folder structure for transfer/transcode, so after you move files to your external drive you will import from there (not the card). Here is a basic folder structure for transferring to your external drive: External Drive > Music Video > Footage > Day 1 Shoot > DCIM

The 90D shoots in the h.264 codec using the .MOV wrapper. When you import these files into an NLE it will transcode them to the proper codec for editing, usually creating new files.

Once you have backed up your files we recommend that you reformat your card instead of going through it on the camera or on the computer and erasing the files manually. Try and back up your original media in two locations.



# Maintenance

## **Let's start the maintenance and care section with what NOT to do.**

1. NEVER EVER touch the sensor inside the camera. In fact, if this is dirty, please notify an EM in Room 18. The camera has an auto-cleaner for the sensor, but sometimes this needs to be done manually (don't do this).
2. NEVER use anything other than a lens tissue or microfiber lens cleaning cloth. You will scratch the lens.
3. NEVER EVER use canned air EVER on this camera or lens. Each kit has an air blower.

## **What you should do.**

1. To clean dust or sand from lens, hold the camera/lens pointing down. Blow the air up. This will loosen all dust and it will fall out. You can blow dust out of lens caps as well.
2. If you have a microfiber cloth or lens tissue and lens cleaner, you can remove dust or finger grease by using very little cleaner and ALWAYS rub in a circular fashion. A microfiber cloth can remove grease from LCD as well.
3. Always make sure you have lens caps on the lenses.
4. Contact [uocinegear@uoregon.edu](mailto:uocinegear@uoregon.edu) for more help with this.