On DSLR Camera-Description

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Abstract

It is easy to use a DSLR to snap good photos, the wide variety of options that we see on the settings screen is still a mystery to me. This is an effort to understand what each of those settings means while gaining an experience into what works best in specific situations.

I have a **Canon EOS 700D**. The following is everything described on the Canon Products page. Let us dissect what everything really means.[1]

Type

This is digital, single-lens reflex, AF/AE camera with built-in flash.
Single-lens reflex uses a mirror and prism system allowing the photographer to see what will be captured. As Wikipedia puts it, this is contrary to rangefinder cameras where image could be significantly different than what meets the eye.
AF/AE means Auto-Focus, Auto-Exposure.

Image Sensor Size

Approx. 22.3 x 14.9 mm
This is the size of the sensor which captures the image. If this is larger, we have a greater number of pixels to caputre, hence amounting to a greater amount of information per shot, thus better quality images.

Compatible Lenses and Lens Mount

This is the part which I understand the least. There are a lot of different types of optical arrangements that you can find.
EF stands for Electro Focus. All communication between camera and lens is by electrical contacts, no mechanical levers. And that's all I think I need to know as of now.

Image Sensor

It has a CMOS sensor, with aspect ratio 3:2, a total of approximately 18 Megapixels.

CMOS vs CCD

This came as a surprise to me. The details of the differences can be read on the Wikipedia page for Image sensor. [3]
The important things to understand are that extra circuitry next to each photo sensor converts the light energy to a voltage contrary to a CCD where each cell holds electrical charge which is converted to a voltage one pixel at a time.

Dust delete feature

Auto, Manual or Dust Delete Data Appending can be performed.
The Dust Delete Data feature takes a special test shot at a small lens aperture, with the camera aimed at a clean, plain white surface (such as a piece of paper, or a section of a white wall). Follow the menu prompts to complete the process and obtain the dust location data. Then aim at a CLEAN white surface and follow the menu prompts to obtain the data. The camera will let you know if you make a mistake. The Dust Delete Data option is usually located in the RED shooting menus. You should use this feature often enough so the camera can stay current with the location of dust on the sensor. [2]

Image Processing during Shooting

We have noise reduction application to high exposures. We also have peripheral illumination correction and chromatic aberration correction. While I assume the reader is familiar with the latter, the former is elaborated below:

Due to the lens characteristics or shooting conditions, the four corners of the picture might look darker. This is called lens light fall-off or drop in peripheral illumination. The correction can be specified on the camera during shooting or later using software. [4]

Viewfinder

We have an eye level pentamirror which is cheaper, better for auto focus and slightly darker in comparison to the pentaprism which is heavy, expensive, brighter and better for manual focus.
Magnification is 0.85x with 50mm lens focused at infinity
Eyepoint is at 19mm, from eyepiece lens center. This refers to how far from the viewfinder you can keep your eye and still have the entire image.

Autofocus

The camera uses Phase Detection method. It is achieved by dividing the incoming light in pairs of images and comparing them. Through the lens secondary image registration (TTL SIR): beamsplitter to direct light to an AF sensor at the bottom of the camera. The two images are then analyzed for similar light intensity patterns and the separation error is calculated in order to find if the object is in front or back focus. This gives a direction and estimate of ring movement. [5]

AF points

The camera computes distance to each AF point and locks in to the nearest one. Be default, it uses every AF point available but you can choose AF points manually.
There are multiple AF modes available. Couple use of selective AF points with *One shot* for stationery objects. *AI focus* for erratic subjects or *AI Servo* AF for tracking moving subjects.

- When you want to focus on the **nearest object** and you need to quickly react to whatever is going around you, Auto Select is a good option as it avoids potentially missing a shot.
- For extreme light conditions, use center AF point.

- For landscape shot, use upper AF point
- For portraits, use diagonal AF points and focus on the eye which is closest to you.
- When throwing foreground objects into soft-focus while focussing on something at the side, use edge AF point.

The problem with only using the central AF point: it also takes a light reading, thus if you focus on a dull area, the final image will be over-exposed. Press the AE lock button after recomposing the image, thereby taking a new light reading, while still holding the shutter button to keep autofocus locked. For tracking objects, go into Auto AF point selection with AI Servo AF. [6]

Exposure Control

Metering

We have 63-zone TTL full-aperture metering with modes like Evaluative metering and Partial metering. Some forums note that this is not something a photographer should be concerned with, and is just a specification, but I think fair knowledge on what is going on in the background is helpful.
Metering is how the camera determines what the correct aperture and shutter speed should be.
In manual mode, you will see bars going away from 0, positive indicating too much light. You then adjust shutter speed to get to 0, which is optimal exposure according to camera meter
If the scene is evenly lit, meters work great. But getting the right exposure is challenging when there are objects with different light levels and intensities. [7]

- Matrix or Evaluative metering divides frame into zones. The focus area is given more importance. This is default and useful for most purposes.
- Center-weighted metering; use for portraits
- Spot metering; around focus point. When our subject is small and in extreme contrast e.g. moon in dark sky.

ISO Speed

We can go from ISO 100 to ISO 12800. This is just an index of sensitivity of sensor. Use for low light conditions; but using a tripod and wider aperture might turn out better because a higher ISO also gives greater noise.

The shutter speeds range from 1/4000s to 30s, and it has a built-in flash with 3 sec recycling time.

The other specifications deal with details of file format and interface which I am not really concerned with right now.

References

[1] Canon India *Specifications for EOS 700D(Body).*

[2] Eric Stoner *Automatic Sensor Dust Removal using Canon's Digital Photo Professional.*

[3] Wikipedia *Image Sensor*

[4] Lens Peripheral Illumination Correction
http://canoncanada.custhelp.com/app/answers/detail/a_id/15738//˜lens-peripheral-illumination-correction

[5] Wikipedia *Autofocus*

[6] Master your camera's autofocus: which AF points to use and when to use them
http://www.digitalcameraworld.com/2013/02/07/af-points-how-to-take-control-of-autofocus-to-get-the-shots-you-want/

[7] Understanding metering and metering modes
https://photographylife.com/understanding-metering-modes