CHAPTER 1

Exploring the Nikon D300s

The Nikon D300s is one of Nikon's professional camera models and has many more buttons, dials, and knobs than most of the consumer and midlevel cameras. The reason for this is to make it faster and easier to access many of the controls that professional photographers need to change the most. To access most of these functions in consumer cameras, you need to enter a virtual maze of menu functions, which can cost precious time when you are in the midst of shooting. With the D300s, you can simply press one button and rotate a dial.

The many buttons and dials on the D300s can be daunting to look at. This chapter familiarizes you with each button and dial, as well as the displays on the LCD control panel and viewfinder.

Getting to know all of the buttons and dials on your camera will help you to change your settings quickly so you won't lose any shots.

Key Components of the D300s

In this section, you look at the camera from all sides and break down the layout so that you know what everything on the surface of the camera does.

This section doesn't cover the menus, only the exterior controls. Although there are many features you can access with just the push of a button, oftentimes you can change the same setting inside of a menu option. The great thing about the buttons, however, are that they give you speedy access to important settings — settings you will use often. Missing shots because you are searching through the menu options can get irritating fast, which is one of the key reasons that most people upgrade from a consumer model camera to a professional-grade camera like the D300s.

Top of the camera

The top of the D300s is where you find the most important buttons. This is where you'll find the buttons for the settings that tend to get changed most frequently. Also included in this section is a brief description of some of the things you will find on the top of the lens. Although your lens may vary, most of the features are quite similar from lens to lens.

- **Shutter Release button.** In my opinion, this is the most important button on the camera. Halfway pressing this button activates the camera's autofocus and light meter. When you fully depress this button the shutter is released and a photograph is taken. When the camera is set to C_L or C_H, pressing and holding this button takes a sequence of photos. When the camera has been idle and has "gone to sleep," lightly pressing the Shutter Release button wakes up the camera. When the image review is on, lightly pressing the Shutter Release button turns off the LCD and prepares the camera for another shot.
- **On/Off switch/LCD illuminator.** This switch is used to turn on the camera. It's concentric with the Shutter Release button. Turn the switch all the way to the left to turn off the camera. When in the center position, the camera is turned on. Turn the switch all the way to the right to turn on the top-panel LCD illuminator. This enables you to view your settings when in a dimly lit environment. The LCD illuminator automatically turns off after a few seconds or when the shutter is released. In CSM f1 you can also specify that this switch be used to display the Shooting Information Display on the rear LCD monitor.
- **Exposure Mode button.** This button is used in conjunction with the Main Command dial and allows you to change among the different exposure modes. You can choose Programmed Auto, Shutter Priority, Aperture Priority, or Manual modes (P, S, A, or M). This button also doubles as a format button when pressed

in conjunction with the Delete button. Pressing and holding down these two buttons simultaneously allows you to format the primary memory card without entering the Setup menu. Learn more about exposure modes in Chapter 2. The primary memory card can be set in CSM f1.

When the two-button format is performed only the primary card is formatted.

- **Exposure Compensation button.** Pressing this button in conjunction with spinning the Main Command dial allows you to modify the exposure that is set by the light meter on the D300s or the exposure you set in Manual exposure mode. Turning the Main Command dial to the right decreases exposure; turning the dial to the left increases the exposure. This button also doubles as the camera reset button when used in conjunction with the Quality button. Pressing these buttons at the same time restores the camera to the factory default settings. Learn more about exposure compensation in Chapter 5.
- **LCD Control panel.** This displays some of the main camera settings. This is covered in detail later in this chapter.
- **Focal plane mark.** The focal plane mark shows you where the plane of the CMOS image sensor is inside the camera. The sensor isn't exactly where the mark is; the sensor is directly behind the lens opening. When doing certain types of photography, particularly macro photography using a bellows lens, you need to measure the length of the bellows from the front element of the lens to the focal plane. This is where the focal plane mark comes in handy.
- **Hot shoe.** This is where an accessory flash is attached to the camera body. The hot shoe has an electronic contact that tells the flash to fire when the shutter is released. There are also a number of other electronic contacts that allow the camera to communicate with the flash to enable the automated features of a dedicated flash unit such as the SB-600. Learn more about flash in Chapter 6.
- **Release mode dial.** Rotating this dial changes the release mode of the camera. You can choose from Single frame, Continuous Low speed, Continuous High speed, Quiet mode, Self-timer, and Mirror up. In order to rotate the dial you must press the Release mode dial lock release button.
- **Release mode dial lock release button.** This button is used to lock the Release mode dial to prevent it from accidentally being changed.
- **Quality button.** Press this button and rotate the Main Command dial to change the file format that your camera is saving in as well as the quality of the JPEG if you are shooting that format. You can choose from RAW, TIFF, JPEG, or RAW +

JPEG. Your JPEGs are saved at the following qualities: Fine, Normal, or Basic. Rotating the Sub-command dial while pressing this button allows you to change the size of the image when the camera is set to save in TIFF, JPEG, or RAW + JPEG. Rotating the Sub-command dial when the camera is set to save RAW files has no effect.

For more information on image quality and size settings, see Chapter 2.

- **ISO button.** Press this button and rotate the Main Command dial to change the ISO sensitivity. The higher the ISO setting, the less light is needed to make an exposure. The ISO value is displayed on the LCD control panel while the ISO button is pressed. The ISO value is also displayed in the viewfinder. To learn more about ISO see Chapter 2.
- **White balance button.** Press this button and rotate the Main Command dial to choose from one of the predefined white balance (WB) settings such as Daylight, Incandescent, or Fluorescent. You can also choose to set your own WB (PRE) or choose a specific color temperature (K). White balance is used to compensate for the effect that different colored light sources have on your photos. Adjusting the WB gives your images a natural look. When set to a predefined WB, holding the button and rotating the Sub-command dial allows you to adjust the WB by making it cooler (right) or warmer (left). For more on white balance settings, see Chapter 2.
- **Focus ring.** Rotating the focus ring enables you to manually focus the camera. With some lenses, such as the high-end Nikkor AF-S lenses, you can manually adjust the focus at any time. On other lenses, typically older and non-Nikon lenses and consumer-level AF-S lenses you must switch the lens to Manual focus to disable the focusing mechanism.
- **Zoom ring.** Rotating the zoom ring allows you to change the focal length of the lens. Prime lenses do not have a zoom ring.

For more information on lenses, see Chapter 4.

- **Focus Distance scale.** This displays the approximate distance from the camera to the subject.

Image courtesy Nikon, Inc.

1.1 Top-of-the-camera controls

Back of the camera

The back of the camera is where you find the buttons that mainly control playback and menu options, although there are a few buttons that control some of the shooting functions. Most of the buttons have more than one function — a lot of them are used in conjunction with the Main Command dial or the multi-selector. On the back of the camera you also find several key features, including the all-important viewfinder and LCD.

- **LCD monitor.** This is the most obvious feature on the back of the camera. Nikon's 3-inch, 920,000-dot liquid crystal display (LCD) screen is, so far, the highest-resolution LCD on the market today (the D3 and D300 share this feature). The LCD is where you review your images after shooting, or compose using Live View. The menus are also displayed here.
- **Viewfinder.** This is what you look through to compose your photographs (unless you're using Live View). Light coming through the lens is reflected from a mirror up to a pentaprism that reflects the image through the viewfinder to your eye, enabling you to see exactly what you're shooting (as opposed to a rangefinder camera, which gives you an approximate view). Around the viewfinder is a rubber eyepiece that serves to give you a softer place to rest your eye and to block any extra light from entering the viewfinder as you compose and shoot your images. Looking in the viewfinder you will also see a control panel (more on this later in the chapter).
- **Diopter adjustment control.** Just to the right of the viewfinder is the Diopter adjustment control. Use this control to adjust the viewfinder lens to suit your individual vision differences (not everyone's eyesight is the same). To adjust this, look through the viewfinder, and press the Shutter Release button halfway to focus on something. If what you see in the viewfinder isn't quite sharp, pull out the button and turn the Diopter adjustment until everything appears in focus. When you are satisfied with the results be sure to push the button back in.
- **Metering mode selector.** This dial is used to choose the metering mode. Turn the dial to the desired mode. You can choose Matrix, Center-weighted, or Spot metering. This dial is concentric with the AE-L/AF-L button. For more information on metering modes, see Chapter 2
- **AE-L/AF-L.** The Auto-Exposure/Auto-Focus lock button is used to lock the Auto-Exposure (AE) and Auto-Focus (AF). This button can be customized to perform many functions in CSM f7. For more information on Custom Settings, see Chapter 3.
- **AF-ON.** The Auto-Focus On button activates the AF mechanism without you having to press the Shutter Release button. When in Single focus mode the AF-ON button also locks in the focus until the button is released.
- **Main Command dial.** This dial is used to change a variety of settings depending on which button you are using in conjunction with it. By default, it is used to change the shutter speed when in Shutter priority and Manual mode. It can also be used with the ISO, QUAL, and WB buttons.

- **Multi-selector.** The multi-selector is another button that serves a few different purposes. In Playback mode, the multi-selector is used to scroll through the photographs you've taken, and it can also be used to view image information such as histograms and shooting settings. When in Shooting mode, the multi-selector can be used to change the active focus point when in Single point or Dynamic area AF mode.
- **Multi-selector center button.** The button is used to select the highlighted option when navigating menus. When in Live View, pressing this button commences video recording. When viewing videos in playback mode, pressing this button begins playback. This button can also be assigned a number of different functions in both Playback and Shooting modes. These options can be set in CSM f/2.
- **Focus selector lock.** This switch can be used to lock the multi-selector so the focus point won't accidentally be changed. Slide the switch to the L position to lock the focus point.
- **Live View button.** Pressing this button activates the Live View feature. Once in Live View you can shoot photos or press OK to use the video feature.
- **AF area mode selector.** This three-position switch is used to choose among focus modes. You can choose Single-area AF, Dynamic-area AF, or Auto-area AF.
- **Info button.** Press this button once to view the Shooting Info Display, which displays the current camera settings; press this button twice to enter the Quick Settings Display, which allows you to quickly change a few options such as Noise Reduction, Picture Controls, and color space.
- **Speaker.** This speaker allows you to hear sounds from the video playback.
- **Memory card access lamp.** This lamp lights up to let you know that data is being transferred between the camera and the CF card. Under no circumstance should you remove the CF card while this lamp is lit.
- **Playback button.** Pressing this button displays the most recently taken photograph. You can also view other pictures by pressing the multi-selector left and right.
- **Delete button.** When reviewing your pictures, if you find some that you don't want to keep you can delete them by pressing this button marked with a trash-can icon. To prevent accidental deletion of images the camera displays a dialog box asking you to confirm that you want to erase the picture. Press the Delete button a second time to permanently erase the image.

Image courtesy Nikon, Inc.

1.2 Back-of-the-camera controls

- **Menu button.** Press this button to access the menu options on the D300s. There are a number of menus, including Playback, Shooting, Custom Settings, and Retouch. Use the multi-selector to choose the menu you want to view.
- **Protect/Help button.** The Protect button has the icon of a key on it. The primary use of the Protect button is to lock the image to prevent it from being deleted. This function can be accessed only when the camera is in Playback mode. When viewing the image you want to protect, simply press this button. A small key icon will be displayed in the upper right-hand corner of images that are

protected. Pressing the Shutter Release button lightly returns you to default shooting mode. When viewing the menu options, pressing this button displays a help screen that explains the functions of that particular menu option.

- **Thumbnail/Zoom out button.** In Playback mode, pressing this button allows you to go from full-frame playback (or viewing the whole image) to viewing thumbnails. The thumbnails can be displayed either four images or nine images on a page.
- **Zoom in button.** When reviewing your images you can press the Zoom in button to get a closer look at the details of your image. This is a handy feature for checking the sharpness and focus of your shot. When zoomed in, use the multi-selector to navigate around within the image. To view your other images at the same zoom ratio you can rotate the Main Command dial. To return to full-frame playback, press the Zoom out button. You may have to press the Zoom out button multiple times depending on how much you have zoomed in.
- **OK button.** When in Menu mode, press this button to select the menu item that is highlighted.

Front of the camera

The front of the D300s (LCD monitor facing you) is where you find the buttons to quickly adjust the flash settings as well as some camera focusing options, and with certain lenses, such as the kit lens, you will find buttons that control focusing and Vibration Reduction (VR).

Left front

- **Built-in flash.** This option is a handy feature that allows you to take sharp pictures in low-light situations. Although not as versatile as one of the external Nikon Speedlights such as the SB-800 or SB-600, the built-in flash can be used very effectively and is great for snapshots, although I don't recommend using this without first getting a pop-up flash diffuser. The best feature of the built-in flash is that it can also be used as a commander unit to trigger Nikon CLS-compatible Speedlights wirelessly for off-camera use.

For more on using flash, see Chapter 6.

- **Flash pop-up button.** Press this button to open and activate the built-in flash.

Image courtesy Nikon, Inc.

1.3 Front-left camera controls

- **Flash mode/FEC button.** Pressing this button and rotating the Main Command dial on the rear of the camera allows you to choose a flash mode. You can choose from among Front-curtain sync, Red-eye reduction, Red-eye reduction with slow sync, Slow sync, and Rear-curtain sync. Pressing the Flash mode button and rotating the Sub-command dial, located just below the Shutter Release button, allows you to adjust the Flash Exposure Compensation (FEC). FEC allows you to adjust the flash output to make the flash brighter or dimmer depending on your needs.

- **PC sync terminal cover.** Underneath this rubber cover is the PC sync terminal. This terminal, also known as a flash sync, allows you to connect a PC cord to trigger an external flash or studio strobe.
- **Ten-pin remote terminal cover.** Underneath this rubber cover is the ten-pin remote terminal. This terminal allows the camera to be connected to a variety of accessories. Some of these include the Nikon MC-36 remote shutter release cord and the GP-1 GPS device. See the Nikon Web site for more information regarding specific accessories.
- **Lens release button.** This button disengages the locking mechanism of the lens, allowing the lens to be rotated and removed from the lens mount.
- **Focus mode selector.** This three-way switch is used to choose which focus mode the camera operates in: Single focus (AF-S), Continuous focus (AF-C), or Manual (M) focus. Keep in mind that your lens may also have a focus mode switch and that it must be in the A or M/A position to work with the AF-S or AF-C mode.

Right front

- **AF-assist illuminator.** This is an LED that shines on the subject to help the camera to focus when the lighting is dim. The AF-assist illuminator only lights when in Single focus mode and when the camera is in Auto-area AF mode, or when in Dynamic or Single area AF and the focus point is set to the center position. This illuminator also shines when the Speedlight is set to Red-eye reduction mode. The light shines on the subject causing the pupils to contract, reducing the red-eye effect. When the self-timer is activated this light blinks to count down the timer. It's recommended that you remove your lens hood when using this feature because the hood can block the light reducing the effectiveness.
- **Sub-command dial.** This dial, by default, is used to change the aperture setting when in Aperture Priority and Manual exposure mode. It is also used to change JPEG file size when used with the QUAL button and fine-tune white balance when used with the WB button. When used in conjunction with the Flash mode button you can adjust the Flash Exposure Compensation (FEC).
- **Depth of field preview button.** When set to camera default, pressing this button stops down the aperture of the lens so you can preview how much of the subject is in focus (depth of field). The image in the viewfinder gets darker as the aperture decreases. The Depth of field preview button can also be customized in CSM f6 or in the Quick Settings Display.

CROSS REF For more information on apertures, see Chapter 5.

- **Fn button.** The Function button can be customized to perform different functions depending on user preference. It can be used to set exposure, flash, WB bracketing, flash value (FV) lock, or a number of other settings. The Fn button can be set in CSM f5.

CROSS REF For more information on the Custom Settings menu (CSM), see Chapter 3.

Image courtesy Nikon, Inc.

1.4 Front-right camera controls

Sides and bottom of camera

The sides and bottom of the camera have places for connecting and inserting things such as cables, batteries, and memory cards.

Right side

On the right side of the D300s (lens facing you) are the various input/output terminals. These are the connections you use if you want to view your images straight from the camera as a slide show on your television. Or you may have an HD monitor in your studio and use the Live View function along with Camera Control Pro2 to view your images in high definition before you even release the shutter. You can also attach an AC adapter for those long studio shoots that require plenty of juice without worrying about the batteries giving out on you.

- **Standard video out.** This connection, officially called Standard video output, is used to connect the camera to a standard TV or VCR for viewing your images on-screen. The D300s is connected with the EG-D100 video cable that is supplied with the camera.
- **HDMI out.** The High-definition video output terminal is used to connect the camera to a high-definition TV (HDTV). The camera is connected with an optional Type A HDMI cable that can be purchased at an electronics store.
- **Microphone input.** This allows you to connect an optional stereo microphone for use when recording video. It accepts microphones with a standard stereo 35mm diameter mini-pin jack. You can purchase a microphone at almost any electronics store.
- **DC in.** This AC adapter input connection allows you to plug the D300s into a standard electrical outlet using the Nikon EH-5 or EH-5a AC adapter. This allows you to operate the camera without draining your batteries. The AC adapter is available separately from Nikon.
- **USB port.** This is where the USB cable plugs in to attach the camera to your computer to transfer images straight from the camera. The USB cable is also used to connect the camera to the computer when using Nikon's optional Camera Control Pro 2 software.

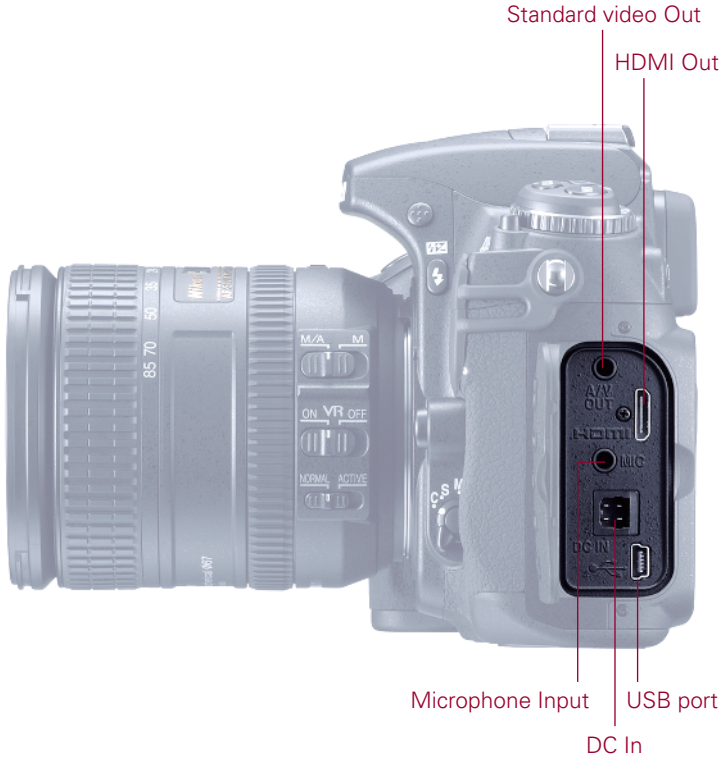


Image courtesy Nikon, Inc.

1.5 Right-side input/output terminals

Left side

On the left side of the camera (lens facing you) is the memory card slot cover. Slide this cover back and the door springs open. Insert the CF or SD card with label side facing toward the back of the camera. For the CF card, press the card in firmly until the gray button pops out. To eject the CF card, firmly press the gray button until the card is loose. For the SD card, slide the card in until fully inserted. To remove the SD card, press in and release pressure; the card should pop out slightly. You can then remove it the rest of the way.

Bottom

The bottom of the camera has a few features that are quite important.

- **Battery chamber cover.** This covers the chamber that holds the EN-EL3e battery that is supplied with your D300s.
- **Tripod socket.** This is where you attach a tripod or monopod to help steady your camera.

- **Contact cover.** This rubber cover is used to protect the contact points for the optional MB-D10 battery grip that attaches to the bottom of the camera. The MB-D10 allows you to use a variety of battery types.

Image courtesy Nikon, Inc.

1.6 Memory card slot cover

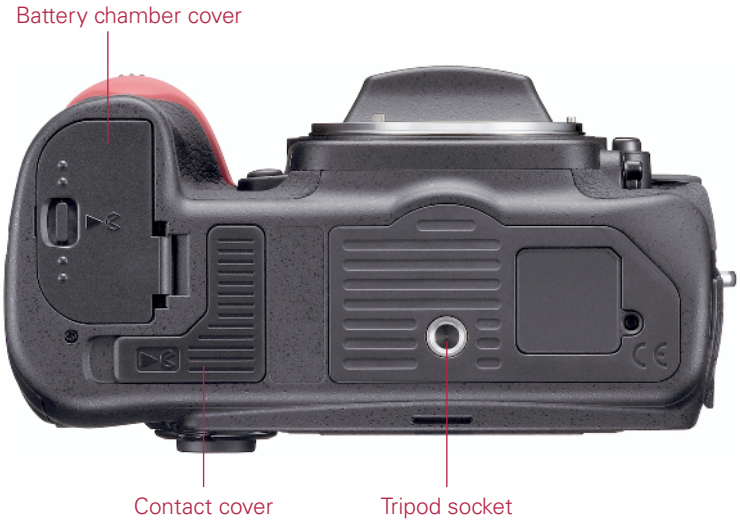
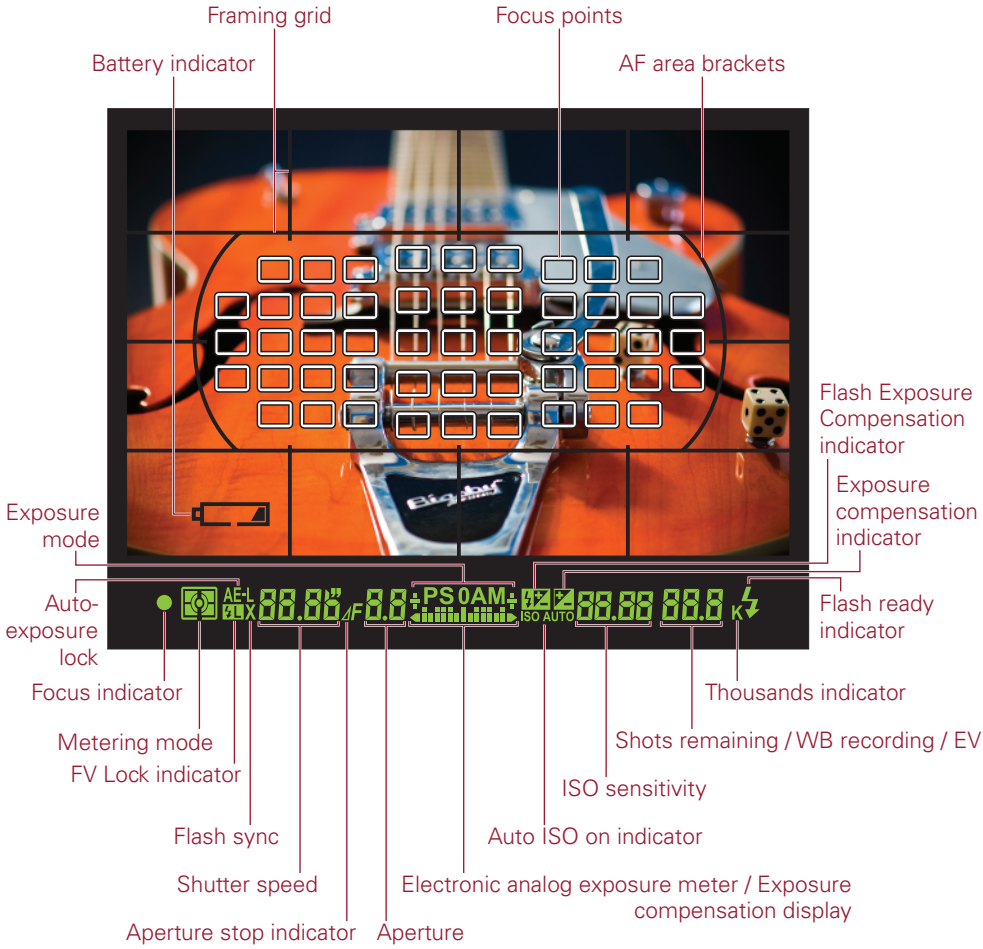


Image courtesy Nikon, Inc.

1.7 Bottom of the D300s

Viewfinder Display

When looking through the viewfinder you see a lot of useful information about the photo you are setting up. Most of the information is also displayed in the control panel LCD screen on the top of the camera, but it is less handy on top when you are composing a shot. Here is a complete list of all the information you get from the viewfinder display.



1.8 Viewfinder display. Note that this figure displays all possible focus points. Only the active focus points will be visible in actual shooting conditions.

- **Framing grid.** When this option is turned on in the Custom Settings menu (CSM d2), you will see a grid displayed in the viewing area. This is to help with composition. Use the grid to help line up elements of your composition to ensure that things are straight (or not).
- **Focus points.** The first thing you are likely to notice when looking through the viewfinder is a small rectangle near the center of the frame. This is your active focus point. Note that the focus point is only shown full time when in the Single or Dynamic AF setting. When the camera is set to Auto-area AF and Single focus, the focus point isn't shown until the Shutter button is half-pressed and focus is achieved. When in Auto-area AF and set to Continuous focus mode the focus point is not displayed at all.
- **AF-area brackets.** These brackets give you a rough estimate of where the group of 51 AF points is located. Anything in the frame outside of this bracket cannot be locked into focus.
- **Battery indicator.** This indicator is displayed if the power level in your battery is low. You can turn this warning off in CSM d3.

Below the actual image portion of the viewfinder display is a black bar with LCD readouts on it. Not only do you find your shooting information here, but depending on your chosen settings, other useful indicators appear here as well. From left to right, these items are:

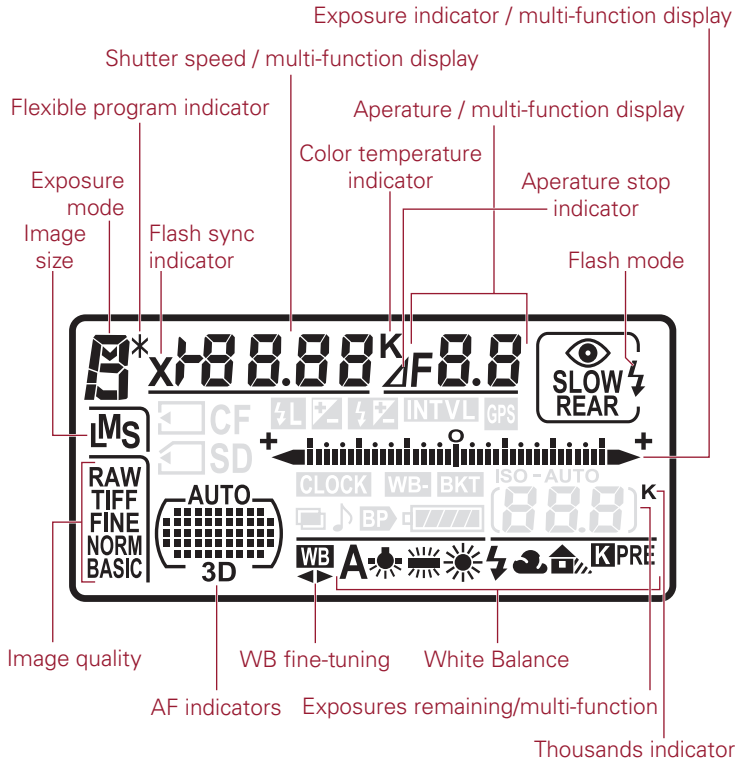
- **Focus indicator.** This is a green dot and arrows that lets you know if the camera detects that the scene is in focus. When attempting to autofocus, the dot blinks. Once the camera locks focus, the green dot will remain lit. If the camera is unable to lock focus, the dot will continue to blink.
- **Metering mode indicator.** This display shows which metering mode you are in: Spot, Center-weighted, or Matrix. For more information on metering modes see Chapter 2.
- **AE lock.** This tells you that the auto-exposure meter is locked. Depending on your settings the AE-L/AF-L button may be pressed or the shutter is half-pressed. When this is locked you can recompose the image while maintaining the correct exposure for the subject.
- **Shutter speed display.** This shows how long your shutter is set to stay open. Rotating the Main Command dial when in S or M mode can change the shutter speed.

- **Aperture/f-stop display.** This shows what your current lens opening setting is. Aperture is adjusted by rotating the Sub-command dial when in M or A mode.
- **Exposure Mode.** This indicates which exposure mode the camera is set to: P, S, A, or M.
- **FEC indicator.** When this is displayed your Flash Exposure Compensation is on. FEC is adjusted by pressing the Flash mode button and rotating the Sub-command dial. For more information on FEC, see Chapter 6.
- **ISO sensitivity.** This tells you to what the ISO sensitivity is currently set.
- **Shots remaining/WB recording/EV.** This set of numbers lets you know how many more exposures can fit on the CF or SD card. The actual number of exposures may vary according to file information and compression. When the Shutter Release button is half-pressed, the display changes to show how many exposures can fit in the camera's *buffer* before the buffer is full and the frame rate slows down. The buffer is in-camera RAM that stores your image data while the data is being written to the memory card. This also shows the WB preset recording information as well as your exposure compensation values.
- **Flash ready indicator.** When this is displayed the flash, whether it is the built-in flash or an external Speedlight attached to the hot shoe, is fully charged and ready to fire at full power.
- **FV lock indicator.** When the FV lock indicator is on it means you have locked in the flash exposure value. The flash value can only be locked when the Function (or Preview or AE-L/AF-L) button has been set to do this.
- **Flash sync indicator.** This indicator is displayed as a small X. This comes on when you set your camera to the flash sync speed limit that is set in CSM e1. This is only available when in Shutter Priority or Manual mode. To set the camera to the preset sync speed, dial the shutter speed down one setting past the longest shutter time, which is 30 seconds in S and bulb in M.
- **Aperture stop indicator.** When using non-CPU lenses you must use the aperture ring to adjust the aperture. If the non-CPU lens data has been entered, the lens aperture is displayed. If no lens data is entered, the aperture display shows the number of stops. Non-CPU lens data can be entered in the Shooting menu.
- **Electronic analog exposure meter / Exposure compensation display.** Although Nikon gives this feature a long and confusing name, in simpler terms this is your light meter. When the bars are in the center you are at the proper settings to get a good exposure; when the bars are to the left you are overexposed; and when the bars are to the right you are underexposing your image. You can reverse this in CSM f8. This feature is especially handy when using Manual exposure.

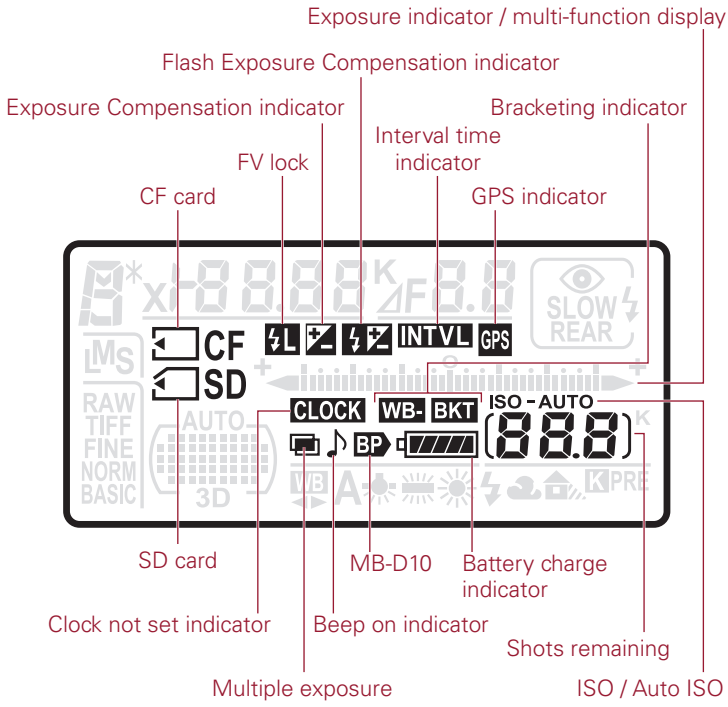
- **Auto ISO indicator.** This is displayed when the Automatic ISO setting is activated to let you know that the camera is controlling the ISO settings. Auto ISO can be turned on in the ISO sensitivity settings located in the Shooting menu.
- **Thousands indicator.** This lets you know that there are more than 1000 exposures remaining on your memory card.

Control Panel

The monochrome control panel on top of the camera displays some of the same shooting information that appears in the viewfinder, but there are also some settings that are only displayed here. This LCD allows you to view and change the settings without looking through the viewfinder.



1.9 LCD control panel display 1



1.10 LCD control panel display 2

- **Color temperature indicator.** When the WB is set to K, the panel displays this K denoting Kelvin.
- **Shutter speed/multi-function display.** By default, this set of numbers shows you the shutter speed setting. This set of numbers also shows myriad other settings depending on which buttons are being pressed.
  - **Exposure Compensation indicator.** When pressing the Exposure Compensation button and rotating the Sub-command dial, the EV compensation number is displayed.
  - **Flash Exposure Compensation indicator.** Pressing the Flash mode button and rotating the Sub-command dial displays the FEC value.
  - **ISO/Auto ISO.** The ISO sensitivity appears when the ISO button is pressed. Rotating the Main Command dial changes the sensitivity.

- **WB fine-tuning.** Pressing the WB button and rotating the Sub-command dial fine-tunes the white balance setting. A is warmer, and B is cooler.
- **Color temperature.** When the WB is set to K, the panel displays the color temperature in the Kelvin scale when you press the WB button.
- **WB preset number.** When the WB is set to one of the preset numbers, pressing the WB button displays the preset number that is currently being used.
- **Bracketing sequence.** When the D300s auto-bracketing feature is activated, pressing the Function button displays the number of shots left in the bracketing sequence. This includes WB, exposure, and flash bracketing.
- **Interval timer indicator.** When the camera is set to use the interval timer for time-lapse photography this displays the number of shots remaining in the current interval.
- **Non-CPU lens number.** When the camera's Function button is set to choose a non-CPU lens number when the Function button is pressed, the focal length of the non-CPU lens is displayed. You must enter the lens data in the Setup menu.

- **Flash sync indicator.** This indicator is displayed as a small X. This comes on when you set your camera to the sync speed that is set in the Custom Settings menu (CSM e1). This is only available when in Shutter Priority or Manual mode. To set the camera to the preset sync speed, dial the shutter speed down one setting past the longest shutter time, which is 30 seconds in S and bulb in M.
- **Flexible program indicator.** This is an asterisk that appears next to the Exposure mode when in P or Programmed Auto mode. This lets you know that you have changed the default auto exposure set by the camera to better suit your creative needs.
- **Exposure mode.** This displays the corresponding letter of the exposure mode to which the camera is set: P, S, A, or M.
- **Image size.** When shooting JPEG, TIFF, or RAW + JPEG files, this tells you whether you are recording Large, Medium, or Small files. This display is turned off when shooting RAW files.

- **Image Quality.** This displays the type of file format you are recording. You can shoot RAW, TIFF, or JPEG. When shooting JPEG or RAW + JPEG, it displays the compression quality: FINE, NORM, or BASIC.
- **AF indicators.** This display shows you the Autofocus area modes.
- **WB fine-tuning indicator.** When the white balance fine-tuning feature is activated these two arrows are displayed. WB can be fine-tuned by pressing the WB button and rotating the Sub-command dial.
- **White Balance.** This shows you which white balance setting is currently selected.
- **Thousands indicator.** This appears when the number of remaining exposures exceeds 1000. This is not to be confused with the K that may appear in the WB area, which is used to denote the Kelvin temperature.
- **Exposure indicator/multi-function display.** This is your light meter. When the bars are in the center, you are at the proper settings to get a good exposure; when the bars are to the left, you are overexposed; when the bars are to the right, you are underexposing your image. This is displayed when the camera is set to Manual exposure. When in P, S, or A mode this is only displayed when the current settings will cause an under- or overexposure.
- **Aperture/multi-function display.** At default settings this displays the aperture at which the camera is set. This indicator also displays other settings as follows:
  - **Auto-bracketing compensation increments.** The exposure bracketing can be adjusted to over- and underexpose in 1/3-stop increments. When the Function button is set to Auto-bracketing the number of exposure value (EV) stops is displayed in this area. The choices are 0.3, 0.7, or 1.0 EV. The WB auto-bracketing can also be adjusted; the settings are 1, 2, or 3.
  - **Number of shots per interval.** When the D300s is set to Interval Timer shooting the number of frames shot in the interval is displayed here.
  - **Maximum aperture (non-CPU lenses).** When the non-CPU lens data is activated, the maximum aperture of the specified lens appears here.
- **Aperture stop indicator.** When using non-CPU lenses you must use the aperture ring to adjust the aperture. If the non-CPU lens data has been entered, the lens aperture will be displayed. If no lens data is entered the aperture

display shows the number of stops. Non-CPU lens data can be entered in the Shooting menu.

- **Flash Exposure Compensation indicator.** When this is displayed, your Flash Exposure Compensation is on. Adjust the FEC by pressing the Flash mode button and rotating the Sub-command dial.
- **Exposure compensation indicator.** When this appears in the control panel, your camera has exposure compensation activated. This affects your exposure. Adjust the exposure compensation by pressing the exposure compensation and rotating the Main Command dial.
- **Flash Value (FV) Lock.** This icon is shown to alert you that the Flash Value has been locked and may have an impact on your exposure.
- **CF card indicator.** This icon is displayed when a Compact Flash card is inserted. When the icon is blinking the card is either full or has an error.
- **SD card indicator.** This icon is displayed when a Secure Digital card is inserted. When the icon is blinking the card is either full, locked, or has an error.
- **Clock not set indicator.** When this appears in the control panel, the camera's internal clock needs to be set. The Clock settings can be found in the Setup Menu.
- **Multiple exposure indicator.** This icon informs you that the camera is set to record multiple exposures. Set Multiple exposures in the Shooting menu.
- **Beep on indicator.** This informs you that the camera will beep when the self-timer is activated or when the camera achieves focus when in Single focus mode.
- **MB-D10 battery indicator.** When the MB-D10 battery grip is attached and the camera is using the battery installed in the grip this icon is displayed.
- **Battery charge indicator.** This display shows the charge remaining on the active battery. When this indicator is blinking the battery is dead and the shutter is disabled.
- **Shots remaining.** By default, this displays the number of exposures remaining on your CF or SD card. When you half-press the Shutter Release button to focus, the display changes to show the number of shots remaining in the camera's buffer. In preset WB, the icon PRE appears when the camera is ready to set a

custom WB. When using Camera Control Pro2 to shoot tethered to a computer this appears as PC.

- **Auto ISO indicator.** This is displayed when the Automatic ISO setting is activated to let you know that the camera is controlling the ISO settings. Auto ISO can be activated in the Shooting menu.
- **Bracketing indicator.** When in Auto-exposure or flash bracketing this appears on the control panel; when using WB bracketing, a WB icon also appears above the icon. Auto-bracketing is set in CSM e5.
- **GPS connection indicator.** This icon appears in the control panel when a GPS system, such as Nikon's GP-1, is connected to the D300s' 10-pin connector.
- **Interval timer indicator.** When the camera's Interval Timer option is turned on, this appears in the control panel. Set the Interval timer in the Shooting menu.

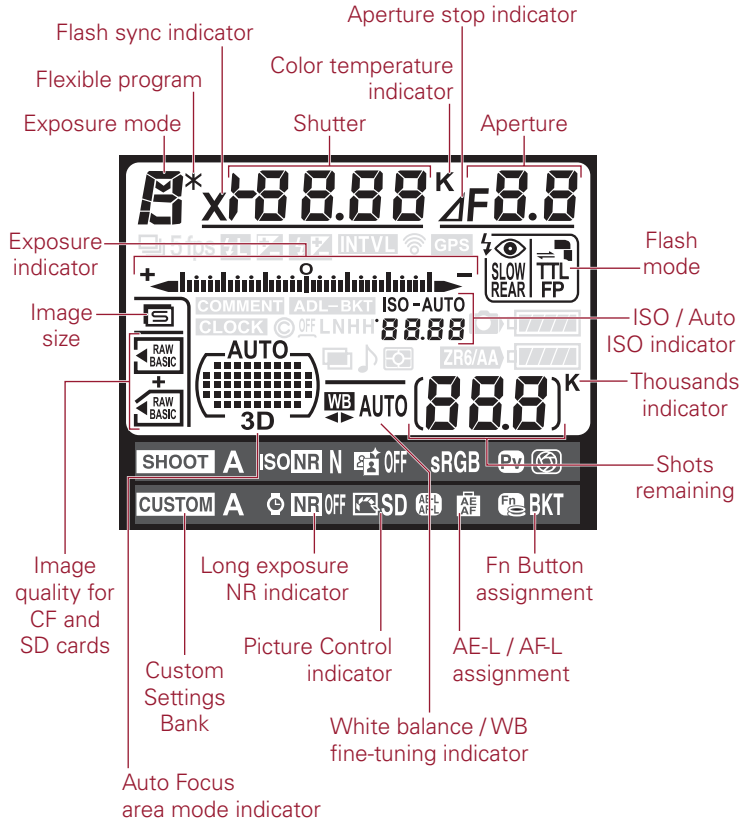
Shooting Info Display

The Shooting info display is shown on the LCD monitor when you press the Info button found underneath the AF-area selector switch (where the CF card door latch used to be for you D200/300 users). This Info screen was first introduced with the consumer-level D40 camera, which lacks an LCD control panel.

This display definitely comes in handy when shooting on a tripod, but other than that I don't find myself using this screen very often. I just find it easier to glance at the control panel to find what I need. The other drawback to this display is that it helps to deplete your batteries faster because the display is shown on the large 3-inch LCD monitor.

That being said, the Shooting info display shows quite a wealth of information. It shows everything that is available in the viewfinder display, the control panel, and a few other things that aren't found anywhere else.

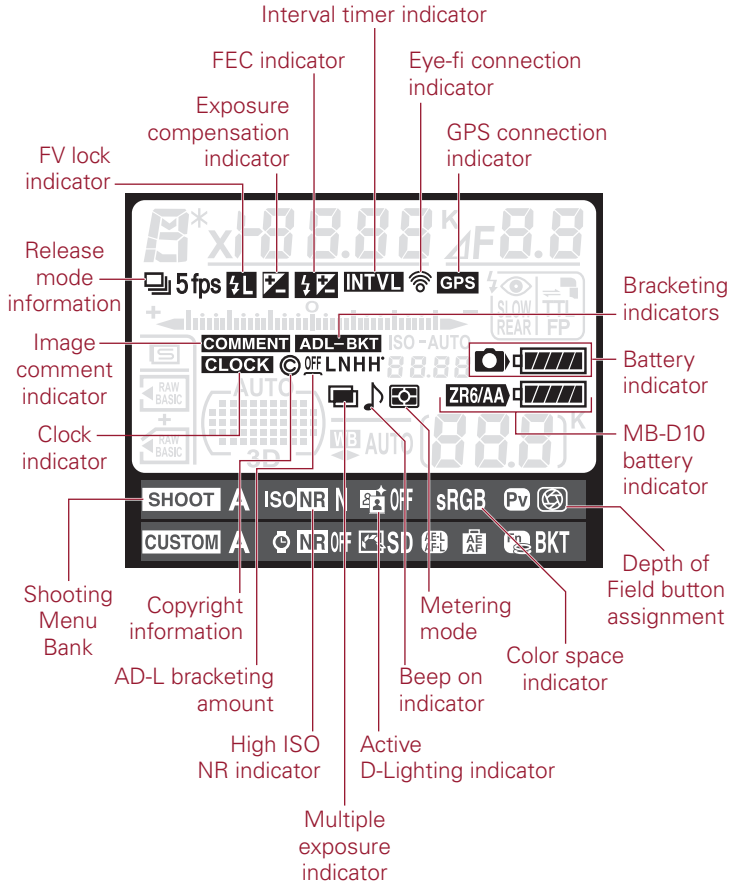
The Shooting info display automatically changes from light to dark depending on the brightness of the ambient light, or you can set it manually in CSM d8.



1.11 The Information Display 1

Here's a complete rundown of everything that appears on the Shooting info display:

- **Exposure mode.** This tells you which exposure mode you are currently using: P, S, A, or M.
- **Flexible program indicator.** This is an asterisk that appears next to the Exposure mode when in Programmed Auto (P) mode. This lets you know that you have changed the default auto exposure set by the camera to better suit your creative needs.
- **Flash sync indicator.** This indicator is displayed as a small X. This comes on when you set your camera to the sync speed that is set in the Custom Settings menu (CSM e1). This is only available when in Shutter Priority or Manual mode. To set the camera to the preset sync speed, dial the shutter speed down one setting past the longest shutter time, which is 30 seconds in S and bulb in M.



1.12 The Information Display 2

- **Shutter speed.** By default, this set of numbers shows you the shutter speed setting. This set of numbers also shows myriad other settings depending on which buttons are being pressed.
  - **Exposure compensation value.** When pressing the Exposure Compensation button and rotating the Sub-command dial, the EV compensation number is displayed.
  - **FEC value.** Pressing the Flash mode button and rotating the Sub-command dial displays the FEC value.
  - **ISO.** The ISO sensitivity appears when the ISO button is pressed. Rotating the Main Command dial changes the sensitivity.

- **WB fine-tuning.** Pressing the WB button and rotating the Sub-command dial fine-tunes the white balance setting. A is warmer, and B is cooler.
- **Color temperature.** When the WB is set to K, the panel displays the color temperature in the Kelvin scale when you press the WB button.
- **WB preset number.** When the WB is set to one of the preset numbers, pressing the WB button displays the preset number that is currently being used.
- **Bracketing sequence.** When the D300s auto-bracketing feature is activated, pressing the Function button displays the number of shots left in the bracketing sequence. This includes WB, exposure, and flash bracketing.
- **Interval timer number.** When the camera is set to use the interval timer for time-lapse photography this displays the number of shots remaining in the current interval.
- **Focal length (non-CPU lenses).** When the camera's Function button is set to choose a non-CPU lens number when the Function button is pressed, the focal length of the non-CPU lens is displayed. You must enter the lens data in the Setup menu.

- **Color temperature indicator.** When this indicator is shown the WB is set to Kelvin.
- **Aperture stop indicator.** When using non-CPU lenses you must use the aperture ring to adjust the aperture. If the non-CPU lens data has been entered, the lens aperture will be displayed. If no lens data is entered the aperture display shows the number of stops. Non-CPU lens data can be entered in the Shooting menu.
- **Aperture.** At default settings this displays the aperture at which the camera is set. This indicator also displays other settings as follows:
  - **Auto-bracketing compensation increments.** The exposure bracketing can be adjusted to over- and underexpose in 1/3-stop increments. When the Function button is set to Auto-bracketing the number of exposure value (EV) stops is displayed in this area. The choices are 0.3, 0.7, or 1.0 EV. The WB auto-bracketing can also be adjusted; the settings are 1, 2, or 3.
  - **Number of shots per interval.** When the D300s is set to Interval Timer shooting the number of frames shot in the interval is displayed here.
  - **Maximum aperture (non-CPU lenses).** When the non-CPU lens data is activated the maximum aperture of the specified lens appears here.

- **Flash mode indicator.** This area shows you the flash mode the camera is using. This option is shown only when the built-in flash is raised or an accessory Speedlight is attached. When an accessory Speedlight is attached an icon is displayed in the top-right corner of this box. Additionally, this option shows you if the Speedlight is in TTL mode (TTL), Repeating flash mode (RPT), Commander mode (CMD), and High Speed FP Sync mode (FP). For more detailed information on flash modes and Speedlights, see Chapter 6.
- **ISO sensitivity indicator.** This shows your ISO setting. ISO Auto appears when the Automatic ISO setting is activated to let you know that the camera is controlling the ISO settings. Auto ISO can be activated in the Shooting menu. When Auto appears next to this the Auto-ISO feature is activated. Auto-ISO can be activated in the Shooting menu.
- **WB setting.** This displays the icon of the current WB setting. When fine-tuning has been applied to the default setting, two small arrows appear beneath the WB icon to remind you.
- **K.** This appears when the number of remaining exposures exceeds 1000. This is not to be confused with the K that may appear in the WB area, which is used to denote the Kelvin temperature.
- **Exposures remaining.** This number indicates the approximate amount of exposures you can store on the primary memory card. This display also shows the lens number of the saved non-CPU lens when that option is set to a Function button.
- **Fn. button assignment.** This tells you what custom function is assigned to the Function button.
- **AE-L/AF-L button assignment.** This tells you what custom function is assigned to the AE-L/AF-L button.
- **Picture Control indicator.** This icon shows which Picture Control setting is activated. For more information on Picture Controls, see Chapter 2.
- **Long exposure noise reduction indicator.** This lets you know if Long Exposure NR is activated.
- **Custom Settings Bank.** This item lets you know which Custom Settings Bank you're using — A, B, C, or D. For more information on Custom Settings Banks, see Chapter 3.
- **AF indicators.** This display shows you the Autofocus area modes.
- **Image Quality.** This tells you the type and quality of file that is being written to your CF or SD card as you take photos. The options are RAW, RAW+JPEG,

JPEG, and TIFF. Change this by pressing the QUAL button and rotating the Main Command dial.

- **Image size.** This tells you the resolution size of the file when saving to JPEG or TIFF — Large (L), Medium (M), or Small (S). Change this setting by pressing the QUAL button and rotating the Sub-command dial.
- **Exposure indicator.** This is your light meter. When the bars are in the center, you are at the proper settings to get a good exposure; when the bars are to the left, you are overexposed; when the bars are to the right, you are underexposing your image. This is displayed when the camera is set to Manual exposure. When in P, S, or A mode this is only displayed when the current settings will cause an under- or overexposure.

D300s DX-format CMOS Sensor

This is arguably one of the most important parts of the camera. In this era of digital photography and specifically in dSLR cameras such as the D300s, the CMOS sensor has replaced film. The function of the sensor is the same as film, which is simply to collect light and produce an image based upon how much light hits it.

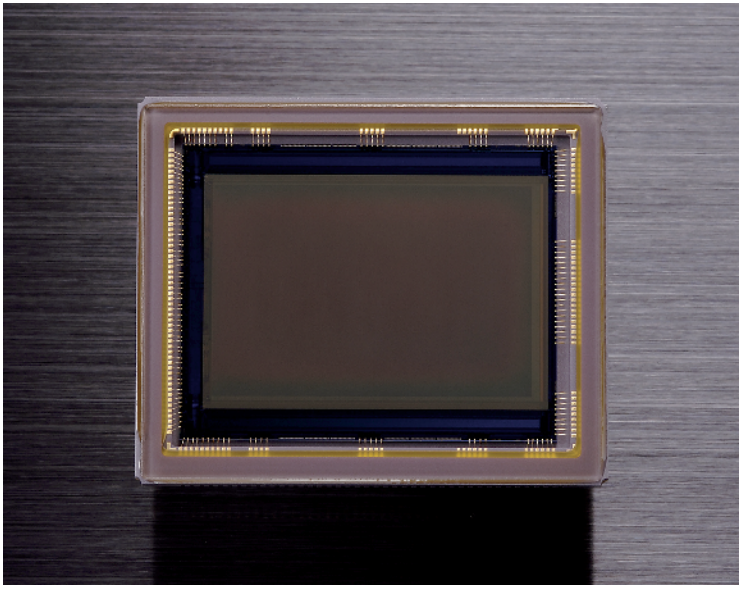


Image courtesy of Nikon, Inc.

1.13 The D300s 12.3-megapixel DX-format CMOS sensor

From Analog to Digital

Believe it or not, digital image sensors are actually analog devices that capture light just like emulsion on a piece of film. When the shutter is opened, light from the scene that you're photographing, whether it be sunlight or flash, travels through the lens and is projected (hopefully in focus) onto the sensor. Each sensor has millions of pixels, which act as a receptacle that collects individual *photons* of light. A photon is a quantum particle of light, which is a form of electromagnetic radiation. The more photons the pixel collects, the brighter the area is; conversely, if the pixel doesn't collect a lot of photons the area is dark.

Each pixel has a photodiode that converts these photons into minute electrical charges that can be read by the analog-to-digital (A/D) converter. The A/D converter renders this analog data into digital data that can be utilized by Nikon's EXPEED imaging processor.

CMOS versus CCD

In the past, most Nikon dSLRs used CCD sensors, although Nikon is moving away from this technology by putting a CMOS sensor in all cameras since the D90, even the entry-level D3000. Although CMOS and CCD sensors do the same job they do it differently, and each type of sensor has its own strengths and weaknesses.

CCD

CCD stands for charge-coupled device. This name is a reference to how the sensor moves the electrical charges created by the photons that the pixels have collected. The CCD sensor moves these electrical charges from the first row of pixels to a shift register, a digital circuit that allows the charges to be shifted down the line. From there the signal is amplified to make it readable by the A/D converter. The sensor then repeats the processes with each row of pixels until every row of pixels on the sensor has been processed. This is a pretty precise method of transfer, but in digital terms it's quite slow and it requires a large amount of power, relatively speaking, so it uses more of the camera battery resulting in less shots per charge. CCD sensors have a lower signal-to-noise ratio and therefore are less prone to high ISO noise than CMOS sensors and also provide a higher image quality.

CMOS

CMOS stands for complementary metal-oxide semiconductor. Just like a CCD sensor, a CMOS sensor has millions of pixels and photodiodes. The big difference between the CMOS and CCD sensor is that each pixel has its own amplifier and it converts the charge to voltage on the spot. It's much more efficient to transfer voltage than it is to transfer a charge; therefore, CMOS sensors use less power than CCDs. Multiple channels of sensor data can also be sent out at the same time so the CMOS sensor can send the data to the A/D converter much faster. CMOS chips are also cheaper to manufacture than CCDs.

Pixels

The more pixels the sensor has, the higher the resolution of the sensor is, but packing more pixels onto a sensor means that although the resolution is higher each pixel becomes less effective at gathering light because it's much smaller. A larger pixel is more effective at gathering photons, therefore you get a wider dynamic range and a better signal-to-noise ratio, which means less inherent noise and the ability to achieve a higher ISO sensitivity. This is possibly why the megapixel wars of the early days of digital photography seem to be coming to an end.

Micro-lenses

In addition to having larger pixels to gather more light, camera manufacturers place micro-lenses over the pixels. These micro-lenses collect the light and focus them onto the photodiode in much the same way as the camera lens focuses the image onto the sensor. By making the micro-lenses larger, Nikon has decreased the gaps between them increasing the effective light-gathering ability of each pixel.

Interpreting color

The light-sensitive pixels on the sensor only measure the brightness in relation to how many photons it has gathered, so the basic image captured is, in effect, black and white. To determine color information, the pixels are covered with red-, green-, or blue-colored filters. These filters are arranged in a Bayer pattern (Dr. Bryce Bayer was a scientist at Kodak who developed this pattern). The Bayer pattern lays the filters out in an array that consists of 50 percent green, 25 percent blue, and 25 percent red. The green filters are luminance (brightness) sensitive elements, and the red and blue filters are chrominance (color) sensitive. Twice as many green filters are used to simulate human eyesight because our eyes are more sensitive to green than to red or blue.

The camera determines the colors in the image by a process called demosaicing, in which the camera *interpolates* the red, green, and blue data for each pixel by using information from adjacent pixels. Interpolation is a mathematical process in which sets of known data are used to determine new data points (I like to call it an educated guess).