Exploring the Nikon D90

his chapter covers the key components of the Nikon D90. These are the features that are most readily accessible because they're situated on the outside of the camera: the buttons, knobs, switches, and dials.

If you're upgrading from another Nikon dSLR, some of this may seem like review, but there are some new features that you may or may not be aware of, so a quick read-through is a good idea even if you're an experienced Nikon dSLR user.

For those of you who are new to the world of dSLRs, this chapter is a great way to become acquainted with some of the terms that are used in conjunction with your new camera.

So, let's explore the D90!

Key Components of the D90

If you've read the Quick Tour, you should be pretty familiar with the buttons and switches that you need for basic settings. In this section, you look at the camera from all sides and break down the layout so that you know what everything on the camera's surface does.

This section doesn't cover the menus (see Chapter 3), only the exterior controls. Although there are many features you can access with just the push of a button, you can usually change the same setting inside of a menu option. While the D90 doesn't have the same amount of buttons as some of its bigger siblings in the Nikon line, it does have quite a few of them. Knowing exactly what these buttons do can save you a lot of time and help you to not miss out on getting a shot.



The D90 DX CMOS sensor

Viewfinder display

Control panel

Shooting Info Display

Top of the camera

The top of the D90 is where you find some of the most important buttons and dials. This is where you can change the Shooting mode and press the Shutter Release to take your photo. Also included in this section is a brief description of some of the things you find on the top of the lens.



Although your lens may vary, most of the features are quite similar from lens to lens.

Mode dial. This is an important dial. Rotating this dial allows you to quickly change your Shooting mode. You can choose one of the Scene modes or one of the semiautomatic modes or you can choose to manually set the exposure.



For more on the Exposure modes, see Chapter 2.

- Focal plane mark. The focal plane mark shows you where the plane of the 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 by 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.
- Shutter Release button. In my opinion, this is the most important button on the camera. Halfway

pressing this button activates the camera's autofocusing and light meter. When you fully depress this button, the shutter is released and a photograph is taken. 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, which surrounds the Shutter Release button, is used to turn the camera on and off. Push the switch all the way to the left to turn off the camera. Pull the switch to the right to turn your camera on. This button also has a springloaded switch that, when pulled all the way to the right, lights up the LCD control panel on the top of the camera for viewing in dim light. You can also set this momentary switch to light up the LCD control panel and show the Shooting Info Display on the rear LCD in the Custom Setting menu (CSM f1).

Metering mode button. This button is used to choose the Metering mode. Press this button and then rotate the Main Command dial until the desired mode appears on the LCD control panel. You can choose Matrix, Center-weighted, or Spot metering. This button also doubles as one of the two-button format buttons.



1.1 Top-of-the-camera controls



For more on Metering modes, see Chapter 2.

Exposure Compensation button. Pressing this button in conjunction with rotating the Main Command dial allows you to modify the exposure that's set by the D90's light meter or the exposure you set in Manual mode. Turning the Main Command dial to the right decreases the exposure, while turning the dial to the left increases the exposure.



You can reset the camera to its default settings by pressing the Exposure Compensation button and the AF mode button at the same time and holding them down for about 2 seconds.

Release mode button. Pressing this button and then rotating the Main Command dial changes the Release mode of the camera. You can choose from Single Frame, Continuous Low Speed, Continuous High Speed, Self-timer, Delayed Remote, and Quick Remote. In order to use the remote function, you must purchase an ML-L3 wireless infrared remote.

AF (Autofocus) mode button. Pressing this button and then rotating the Main Command dial allows you to choose the AF mode. Your choices are AF-A, AF-S, or AF-C.



For more on the ML-L3 wireless infrared remote, see Appendix A. For more on AF modes, see Chapter 2.

- LCD control panel. This monochrome LCD panel displays camera settings. This feature is covered later in this chapter.
- 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 Nikon's brand-new SB-900 Speedlight.
- 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 that have M/A–A switches, you can manually adjust the focus at any time. On other lenses — typically older, low-end AF-S lenses that have an A-M switch, such as the Nikkor 18-55mm f/3.5-5.6 and non-Nikon lenses — you must switch the lens to Manual mode or disable the focusing mechanism by using the AF/M switch on the camera body. With the kit lens, you must switch to Manual mode.



Rotating the focus ring while the lens is set to Autofocus can damage your lens and/or camera.

- Zoom ring. Rotating the zoom ring allows you to change the focal length of the lens. Prime lenses don't have a zoom ring.
- Focal length indicators. These numbers indicate to which focal length in millimeters your lens is zoomed.

Cross-Reference For more on lenses, see Chapter 4.

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. You also find several key features on the back of the camera, including the all-important viewfinder and LCD:

- LCD. This is the most obvious feature on the back of the camera. This 3-inch, 920,000-dot liquid crystal display (LCD) screen is a very bright, high-resolution screen that's the same as the higher-end D3, D700, and D300 Nikon cameras. The LCD is where you review your images after shooting. The Shooting Info Display also appears here, and this is where you view all the menus.
- Viewfinder. This is what you look through to compose your photographs. Light coming through the lens is reflected through a pentaprism, which enables 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.



^{1.2} Back-of-the-camera controls

- 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 then rotate the diopter control until the viewfinder information is sharp. You can also press the Shutter Release button halfway to focus on something. If what you see in the viewfinder isn't quite sharp, rotate the diopter control up or down until everything appears in focus.
- AE-L/AF-L. The Autoexposure/ Autofocus Lock button is used to lock the Autoexposure (AE) and Autofocus (AF). You can also customize the button to lock only the AE or only the AF. It can also be set to lock the exposure with a single press and reset with a second press (AE Lock (hold)). You can set the button to initiate AF (AF-On) and to lock the flash exposure value (FV Lock). This can be set using CSM f4.

Cross-Reference

For more on customizing the AE-L/ AF-L button, see Chapter 3.

Main Command dial. This dial is used to change a variety of settings depending on which button you press in conjunction with it. By default, it's used to change the shutter speed when in Shutter Priority and Manual modes. It's also used to adjust exposure compensation as well as change the Release, AF, and Flash modes. Tip

- Setting the AE-L/AF-L button to AE Lock (hold) when shooting video allows you to lock the exposure so that the video doesn't fluctuate between light and dark when filming in a setting with areas that have high contrast between the highlights and shadows, such as with spotlights at a performance or under dappled sunlight.
- Live View (Lv) button. Pressing this button activates the Live View function. Pressing the button a second time disables Live View and returns the camera to the standard Shooting mode.
- Multi-selector. The Multi-selector also serves a few different purposes. In Playback mode, the Multiselector 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 certain Shooting modes, the Multiselector can be used to change the active focus point when in Single Point or Dynamic Area AF mode. You also use the Multi-selector to navigate the camera's menus.
- OK button. When in Menu mode, press this button to select the menu item that's highlighted. When Live View is activated, pressing this button starts recording video by using D-Movie mode.



For more on D-Movie mode, see Chapter 7.

 Focus selector lock. This switch allows you to lock the selected focus area so that it can't be accidentally changed.

- Information (info) button. Pressing this button causes the Shooting Info Display to appear. This shows some camera settings, such as aperture, shutter speed, and others. Pressing the Shutter Release button lightly returns you to the default Shooting mode. Press this button again while viewing the Shooting Info Display to enter the Quick Settings Display, which allows you to quickly access some commonly used features. The Shooting Info Display and Quick Settings Display are discussed later in this chapter.
- Memory card access lamp. When this light is blinking, the camera is transferring data to the memory card. Under no circumstances should the memory card be removed when this is lit. This can damage your camera or the card and will almost certainly result in a loss of images.
- Delete button. When reviewing your pictures, if you find some that you don't want to keep, you can delete them by pressing the 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.

Note

You can format the SD card by pressing the Metering mode button and the Delete button at the same time and holding them down for about 2 seconds then release the buttons and press them again.

- Playback button. Pressing this button displays the most recently taken photograph. You can also view other pictures by pressing the Multi-selector left or right.
- Menu button. Press this button to access the D90 menu options. There are a number of different menus, including Playback, Shooting, Custom Setting, Setup, Retouch, and Recent Settings/My Menu. Use the Multi-selector to choose the menu you want to view.
- White Balance/Help/Protect. This button has the icon of a key and question mark on it. Above it is WB. This button actually has a few different uses. When in Shooting mode, press this button and then rotate the Main Command dial to change the white balance (WB) setting. Rotating the Sub-command dial allows you to fine-tune the current WB setting, making it warmer or cooler. The WB setting can only be changed when using the M, A, S, and P settings. When in Playback mode, this button is used to lock an image to prevent it from accidentally being erased. When viewing the image you want to protect, simply press this button. A small key icon is displayed in the upper right-hand corner of images that are protected. When viewing the menu options or when the camera is set to a Scene mode, pressing this button displays a help screen that explains the functions of that particular menu option or Scene mode.

 ISO/Thumbnail/Zoom Out button. When the camera is in Shooting mode, pressing this button allows you to manually adjust the ISO sensitivity. When using a Scene mode in which the Auto ISO function is set, using this option allows you to override the Auto ISO setting. In Playback mode, pressing this button allows you to go from fullframe playback (or viewing the whole image) to viewing thumbnails. You can view either four, nine, or 72 thumbnails on a page. Pressing this button a fourth time shows a calendar view that displays images taken on a specific day. When you're zoomed into an image during playback or Live View, this button allows you to zoom out.

Quality (QUAL)/Zoom In button. When in Shooting mode, press this button and then rotate the Main Command dial to change the image quality and JPEG compression. You can choose from RAW, fine, normal, or basic JPEG or RAW + fine, normal, or basic JPEG. Rotating the Sub-command dial allows you to choose the size of your JPEG files: Large, Medium, or Small. 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 Multiselector 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.

Depending on how much you've zoomed in, you may have to press the Zoom Out button multiple times.

Front of the camera

The front of the D90 (lens facing you) is where you find the buttons to quickly adjust the flash settings, bracketing, and some focusing options, and with certain lenses, you find some buttons that control focusing and Vibration Reduction (VR).

Right front

Flash pop-up button/Flash mode button/Flash Exposure Compensation button. Press this button to open and activate the built-in Speedlight when in M, A, S, or P mode. Rotate the Main Command dial to change the Flash mode, and rotate the Subcommand dial to adjust the Flash Exposure Compensation (FEC) button. When using Scene modes, this button functions differently for different modes.

Cross-Reference For more on Scene modes, see Chapter 2.

Bracketing (BKT) button. This button allows you to activate exposure bracketing. Pressing this button and then rotating the Main Command dial, you can set the number of bracketed exposures. You can bracket up to three frames. The choices are 3 frames (metered, over, under), -2 (metered, under), and +2 (metered, over). Pressing this button and then rotating the Sub-command dial allows you to

choose the exposure value increment (EV). These are adjusted in 1/3-stop increments from 0.3 EV to 2.0 EV.



- Microphone. This built-in condenser microphone allows you to record sound when shooting video.
- Infrared receiver. This allows you to wirelessly control the Shutter Release by using the optional ML-L3 wireless infrared remote.

- Lens Release button. This button disengages the locking mechanism of the lens, allowing you to rotate and remove the lens from the lens mount.
- Lens Focus mode selector. This switch is used to quickly choose between using the lens in Auto or Manual mode. Not all lenses are equipped with these switches.



Image courtesy of Nikon

1.3 Front-right camera controls

- VR switch. This allows you to turn the Vibration Reduction (VR) on or off (if your lens is VR-equipped). When shooting in bright light with fast shutter speeds or using a tripod, it's best to turn the VR off to reduce battery consumption.
- Focus mode selector. This switch is used to choose between using the lens in Auto or Manual mode. You also use this switch if a lens doesn't have its own switch, such as a non-AF-S lens.

Left front

 Built-in flash. This 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-900, SB-800, or SB-600, the built-in flash can be used very effectively and is great for snapshots. You can also use the built-in flash as the commander for wireless remote flash.

Cross-Reference For more on using flash, see Chapter 6.

 AF-assist illuminator. This is an LED (light-emitting diode) that shines on the subject to help the camera focus when the lighting is



Depth of Field Preview button

Image courtesy of Nikon
1.4 Left-front camera controls

dim. The AF-assist illuminator only lights when in Single Focus mode (AF-S) or Autofocus mode (AF-A) when using the center AF point. When using M, A, S, or P, the AF-assist illuminator can be switched on or off in CSM a3. When using a Scene mode, this is set automatically.

- Function (Fn) button. This button can be assigned to provide different functions. You can set the button to display a framing grid in the viewfinder, change the AF Area mode, move the focus point to the center, lock the flash exposure value (FV Lock), switch the flash off, change Metering modes, access the top My Menu item, or shoot a RAW file in conjunction with the current JPEG setting. The Function (Fn) button can be assigned to a specific function in CSM f3.
- Depth of Field Preview button. Also known simply as the Preview button, pressing this button stops down the aperture of the lens so you can preview how much of the subject is in focus. The image in the viewfinder gets darker as the aperture decreases.
- Sub-command dial. By default, this dial is used to change the aperture setting. Pressing the WB button and then rotating this dial fine-tunes the current WB setting. When set to PRE WB, rotating this dial allows you to select from one of the five available custom presets that you can save.

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 camera's right side (lens facing you) are the D90's output terminals. These are used to connect your camera to a computer or to an external source for viewing your images directly from the camera.

These terminals are hidden under a plastic cover that helps keep out dust and moisture:

- DC in. This AC adapter input connection allows you to plug the D90 into a standard electrical outlet by using the Nikon EH-5 or EH-5a AC-to-DC 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 or print 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.
- HDMI out. The high-definition video output terminal is used to connect the camera to a highdefinition TV (HDTV). The camera is connected with an optional Type C mini-pin HDMI cable that can be purchased at an electronics store.



Image courtesy of Nikon 1.5 The D90's output terminals



Built-in speaker Image courtesy of Nikon 1.6 Memory card slot cover and speaker

- 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 D90 is connected with the EG-D100 video cable that's supplied with the camera.
- Accessory terminal. This port is used to connect the optional Nikon GP-1 GPS unit or the remote MC-DC2 cord.

Cross-Reference see Appendix A.

Left side

On the left side of the camera (lens facing you) is the memory card slot cover. Sliding this door toward the back of the camera

opens it so you can insert or remove your memory card. Also located here is the speaker that's used when playing back D-Movie videos.

Bottom

The bottom of the camera has a couple of features that are quite important:

- Battery chamber cover. This covers the chamber that holds the EN-EL3e battery that's supplied with your D90.
- Tripod socket. This is where you attach a tripod or monopod to help steady your camera.



Image courtesy of Nikon 1.7 The bottom of the D90

The D90 CMOS Sensor

The imaging sensor is one of the most important parts of the camera and unfortunately also one of the most misunderstood. Not many people understand how these sensors work and what the differences are between the two most common types of sensors — CMOS and CCD — so this section sheds some light (no pun intended) on exactly what's going on when the sensor is exposed.

The Nikon D90 has a 12.3-megapixel CMOS sensor with an integrated dust reduction system. The D90 sensor is an APS-C-sized sensor. APS (Advanced Photo System) is a film format that was designed by Kodak to make photography easier for amateurs by allowing the photographer to control the image aspect ratio in the camera. The negatives were smaller than standard 35mm negatives. There were three image sizes that you could choose from: APS-H (30.2mm imes16.7mm) 16:9; APS-C (25.1mm × 16.7mm) 3:2; and APS-P (30.2mm × 9.5mm) 3:1. The D90 sensor is actually a bit smaller than the standard APS-C film, being 23.6mm \times 15.8mm, but still has the 3:2 aspect ratio. Nikon refers to this sensor size in its proprietary term of DX, so from here on out, I refer to the sensor size as DX.

The reason for these smaller DX sensors is that manufacturing these sensors made from silicon was (and still is to an extent) very expensive, and reducing the size of the format from 36mm $\times 24$ mm (35mm film size) to APS-C allowed camera manufacturers to produce dSLRs at more affordable prices.



Image courtesy of Nikon 1.8 The D90 12.3-MGP DX-format CMOS sensor



For more on DX sensor and crop factor, see Chapter 4.

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 opens, light from the scene that you're photographing, whether sunlight or flash, travels through the lens and projects (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 the Analog/Digital (A/D) converter reads. The A/D converter renders this analog data into digital data that can be utilized by Nikon's EXPEED imaging processor.

CMOS versus CCD

About half of Nikon's dSLRs use Charge Coupled Device (CCD) sensors, although Nikon appears to be moving away from this technology by putting a CMOS sensor in the D90. 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

The name Charge Coupled Device refers 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 so the A/D converter can read it. 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. It requires a large amount of power, relatively speaking, so it uses more of the camera's battery, which equals fewer shots per charge. CCD sensors have a higher signal-to-noise ratio, which makes them less prone to high ISO noise than CMOS sensors and enables them to provide a higher image quality.

CMOS

Just like a CCD sensor, a CMOS (Complementary Metal-Oxide Semiconductor) sensor has millions of pixels and photodiodes. With the CMOS sensor, each pixel has its own amplifier, and each pixel 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 CCD sensors. 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 CCD chips.

Pixels

The more pixels the sensor has, the higher the resolution of the sensor. However, 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.

Micro-lenses

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

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% green, 25% blue, and 25% red. The green filters are luminancesensitive (brightness) elements, and the red and blue filters are chrominance-sensitive (color) elements. Twice as many green filters are used to simulate human eyesight, given that 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 demosaicing, 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.)



When shooting NEF files, the RAW converter handles the demosaicing.

Viewfinder Display

When looking through the viewfinder, you see a lot of useful information about the photo you're composing. Most of the information is also displayed in the LCD screen on the top of the camera, but it's less handy on top when you're composing a shot.

Here's a complete list of all the information you get from the viewfinder display:

 Focus points. The first thing you're likely to notice when looking through the viewfinder is a small bracket 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, the focus point isn't shown until the Shutter Release button is half-pressed and focus is achieved.

- Framing grid. When this option is turned on in the Custom Setting menu (CSM d2), you 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).
- 8mm [center-weighted] reference circle. These curves located at the top and bottom of the AF Area brackets give you an idea of how much of an area of the frame is used for Center-weighted metering. The curves show you an area of 8mm, which is the default circle size for Center-weighted metering. Note that although you can change the size of the area for Centerweighted metering (CSM b3), this display doesn't change.
- Black and White indicator. This icon appears when the Picture Control is set to monochrome (MC).

Cross-Reference

For more on Picture Controls, see Chapter 2.

Battery indicator. This icon appears when the battery charge is getting low. When this icon is blinking, the battery has been depleted and you can't take any more pictures until the battery has been charged and replaced or a charged backup battery is installed.



1.9 The viewfinder display. Note that this figure displays all possible focus points. Only the active focus points are visible in actual shooting conditions.

 No memory card warning. This icon flashes when there's no memory card inserted in the camera.

Note

The Black and White indicator, low battery indicator, and memory card warning can be turned off by using CSM d4. 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 also appear here. From left to right, these items are:

 Focus indicator. This is a green dot that lets you know if the camera detects that the scene is in focus.

When focus is achieved, the green dot lights up; if the camera isn't in focus, no dot is displayed. When the camera attempts to find focus, this indicator blinks.

- AE Lock indicator. When this is lit, you know that the Autoexposure Lock button has been pressed.
- 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 (Fn) button has been set to do this.
- Shutter speed display. This shows how long your shutter is set to stay open.
- Aperture/f-stop display. This shows what your current lens opening setting is.
- Electronic analog exposure 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're at the proper settings for good exposure; when the bars are to the left, you're underexposed; and when the bars are to the right, you're overexposing your image. This feature is especially handy in getting the proper exposure when using Manual mode. When in P, S, and A mode, this meter shows you the exposure level when exposure compensation is being applied.
- Battery indicator. This icon displays how much of a charge remains in the battery.

- FEC indicator. When this is displayed, your Flash Exposure Compensation is on.
- WB bracketing indicator. This icon is shown when your auto-bracketing is set to white balance and bracketing is turned on. You can change the bracketing set in CSM e4.
- Bracketing indicator. This icon appears when auto-bracketing is turned on.
- Exposure compensation indicator. When this appears in the viewfinder, your camera has exposure compensation activated and you may not get a correct 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.
- ISO sensitivity indicator. This tells you what the ISO sensitivity is currently set to.
- Remaining exposures. By default, this set of numbers lets you know how many more exposures can fit on the 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. When recording a WB preset, this flashes PRE. When setting Flash Exposure

Compensation or exposure compensation, the EV number is displayed here. When the camera is connected to a computer running Camera Control Pro 2, this displays PC. This can also be set in CSM d3 to default to show the ISO setting.

- K. This lets you know that there are more than 1000 exposures remaining on your memory card.
- Flash-ready indicator. When this is displayed, the flash, whether it's the built-in flash or an external Speedlight attached to the hot shoe, is fully charged and ready to fire at full power.

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.

Because there is so much information contained in the LCD display, it is broken up over two figures. In figure 1.10, you can see these settings:

 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. Pressing the Exposure Compensation button and then rotating the Sub-command dial displays the EV compensation number.
- Flash Exposure Compensation value. Pressing the Flash mode button and then rotating the Subcommand dial displays the Flash Exposure Compensation value.
- WB fine-tuning. Pressing the WB button and then 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.

Cross-Reference

For more on white balance and Kelvin, see Chapter 2.

- WB preset number. When the WB is set to one of the preset numbers, pressing the WB button displays the preset number that's currently being used.
- Battery indicator. This display shows the charge remaining on the active battery.
- Flash mode. These icons denote which Flash mode you're using. The Flash modes include Red-Eye Reduction, Red-Eye with Slow Sync, Slow Sync, Slow/Rear Sync, and Rear-Curtain Sync.
- Image size. When shooting JPEG or RAW + JPEG files, this tells you whether you're recording Large, Medium, or Small files. This display is turned off when shooting RAW files.



^{1.10} Settings on the D90's LCD

- Image quality. This displays the type of file format you're recording. You can shoot RAW or JPEG. When shooting JPEG or RAW + JPEG, it displays the compression quality: FINE, NORM, or BASIC.
- WB fine-tuning indicator. When the white balance fine-tuning feature is activated, these two arrows are displayed to inform you that the WB is altered from the default setting.
- WB indicator. This shows you which white balance setting is currently selected.
- ISO sensitivity compensation indicator. Although Nikon gives this a lengthy and confusing name, this is basically the last zero in the ISO sensitivity number.

- K. This appears when the number of remaining exposures exceeds 1000. This isn't to be confused with the K that may appear in the WB area, which is used to denote the Kelvin temperature.
- Beep indicator. This icon, which looks like a musical note, informs you that the camera beeps when the self-timer is activated or when the camera achieves focus when in Single Focus mode. When the musical note appears inside a circle with a slash, the beep function is turned off. This can be done in CSM d1. Turning the beep off is usually the first thing I do when I configure a new camera.
- GPS connection indicator. This icon appears in the LCD control panel when a GPS system is connected to the D90's accessory terminal.

- Release mode. This set of icons shows which Release mode the camera is set to: Single, Continuous Low, Continuous High, Self-timer, Remote, or Delayed Remote.
- F-stop/Aperture indicator. At default settings, this displays the aperture at which the camera is set.
- Color temperature. This icon, which appears as a K, appears directly after the number when setting the white balance by selecting a color temperature.

In figure 1.11, you can see these settings:

 FEC indicator. When this is displayed, your Flash Exposure Compensation is on.

- Exposure compensation indicator. This icon is shown in the control panel when you press the Exposure Compensation button to adjust the exposure compensation or when exposure compensation has been applied.
- Bracketing indicator. This indicator appears when auto-bracketing is activated.
- WB bracketing indicator. When WB bracketing is selected for the Auto bracketing set (CSM e4), the WB icon appears in front of the bracketing indicator.
- Clock indicator. When this appears in the control panel, the camera's internal clock needs to be set.



1.11 Settings on the D90's LCD

Exposure compensation indicator FEC indicator

 Flexible Program indicator. This icon appears as a P with an asterisk only in Programmed Auto (P) mode. It indicates you have changed the default autoexposure set by the camera to better suit your creative needs.



For more on Flexible Program mode, see Chapter 2.

- Metering mode. This shows you which Metering mode the camera is currently set to: Matrix, Centerweighted, or Spot.
- Autofocus display. This shows you which AF Area mode the camera is set to and displays the active focus point when in Single Point AF or 3D Tracking mode.
- Autofocus mode. This tells you which of the camera's autofocus modes are in use (Single [AF-S], Continuous [AF-C], or Autofocus [AF-A]). The camera chooses between AF-S or AF-C by determining the subject.
- Black and White indicator. This icon (B/W) appears when the Picture Control is set to monochrome.
- Exposures remaining. This displays the number of exposures remaining on your SD card. Half-pressing the Shutter Release button to focus changes the display to show the remaining shots in the camera's buffer. In preset WB, the icon PRE appears when the camera is ready to set a custom WB. You can set your camera to display the ISO setting in this area when the light

meter is active by setting CSM d3 to Show ISO sensitivity. When connected to a computer running Nikon Camera Control Pro 2, PC appears.

- ISO/Auto ISO indicator. ISO is displayed when the ISO setting appears on the control panel. If the camera is set to Auto ISO, the word AUTO appears after ISO.
- Bracketing progress indicator. This icon shows you how many frames remain in your bracketing sequence.
- Multiple exposure indicator. This icon indicates the camera is set to record multiple exposures.

Shooting Info Display

The Shooting Info Display shows some of the same shooting information that appears in the viewfinder, but there are also some settings that are only displayed here. When this is displayed on the LCD, you can view and change the settings without looking through the viewfinder. To view this screen, simply press the Information (info) button near the right side of the LCD. The information remains on display until no buttons have been pushed for about 8 seconds or until the Shutter Release button is pressed.

This display shows you almost everything you need to know about your camera settings. This display comes in handy when the camera is set up on a tripod or if your eyes aren't very good and you have trouble seeing the LCD control panel. This display can show you a lot of information. To make it easier to decipher, it is broken up over two figures. In figure 1.12, you see these settings:

 Shooting mode. This displays the Shooting mode that your camera is currently set to. This can be one of the Scene modes, in which case the display is the appropriate icon or one of the semiautomatic modes, such as P, S, A, or M, in which case the display shows the corresponding letter. This display changes when the Mode dial is rotated.

 Flexible Program indicator. This asterisk appears when using Programmed Auto mode and you tweak the settings for the metered exposure.



1.12 Settings on the Shooting Info Display

- 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 pressed:
 - Exposure compensation value. Press the Exposure Compensation button to display the EV compensation number then rotate the main command dial to adjust.
 - FEC value. Press the Flash mode button to display the FEC number then rotate the subcommand dial to adjust.
 - WB fine-tuning. Pressing the WB button and then rotating the Sub-command dial finetunes 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.
- F-stop/Aperture indicator. At default settings, this displays the aperture at which the camera is set. This indicator also displays autobracketing compensation increments. The exposure bracketing can be adjusted to over- and underexpose in 1/3-stop increments. When the Function (Fn) 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.

- Release mode. This set of icons shows which Release mode the camera is set to: Single, Continuous Low, or Continuous High.
- Continuous shooting speed. This displays the continuous shooting speed in frames per second (fps).
- Self-timer/Remote. These icons can show separately or together. When both icons are lit, the camera is in Delayed Remote mode.
- ISO sensitivity indicator. This appears above the ISO sensitivity setting number. When Auto ISO is activated, AUTO appears after ISO.
- Beep indicator. This icon, which looks like a musical note, informs you that the camera beeps when the self-timer is activated or when the camera achieves focus when in Single Focus mode. When the musical note appears inside a circle with a slash, the beep function is turned off. This can be done in CSM d1. Turning the beep off is usually the first the thing I do when I configure a new camera.
- K. This appears when the number of remaining exposures exceeds 1000. This isn't to be confused with the K that may appear in the WB area, which is used to denote the Kelvin temperature.
- White balance settings. These icons indicate which WB setting the camera is set to. A set of opposing arrows appears if the WB setting has been modified by applying fine-tuning.

- AE-L/AF-L button assignment. This tells you what custom function is assigned to the AE-L/AF-L button. This button can be assigned in CSM f4.
- Function button assignment. This tells you what custom function is assigned to the Function (Fn) button. This button can be assigned in CSM f3.
- Picture Control indicator. This icon shows which Picture Control setting is activated.



- Active D-Lighting indicator. This icon alerts you to the status of the Active D-Lighting option. The settings are Auto, High (H), Normal (N), Low (L), and Off.
- High ISO noise reduction indicator. This lets you know if Long Exposure NR is being applied. The settings are High (H), Normal (N), Low (L), or Off.
- Long Exposure Noise Reduction (NR) indicator. This lets you know if Long Exposure NR is activated.
- Metering mode display. This display shows which Metering mode you're in: Matrix, Center-weighted, or Spot.
- 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 Through-the-Lens mode (TTL), Repeating Flash mode (RPT), or Commander mode (CMD).

Cross-Reference Speedlights, see Chapter 6.

Electronic analog exposure display. As discussed previously, this is your light meter. When the bars are in the center, you're at the proper settings for a good exposure for your photograph; when the bars are to the left, your image will be overexposed; when the bars are to the right, your image will be underexposed. This is displayed full-time when the camera is set to M mode. When in P, S, or A or one of the Scene modes, this is only displayed when the current settings will cause an under- or overexposure. When in Auto mode, if the camera can't achieve a proper setting, this simply blinks.

In figure 1.13, you see these settings:

- AC adapter indicator. When the optional EH-5a AC adapter is attached, this icon is displayed.
- FV Lock indicator. This icon is shown when the FV Lock is activated. The FV Lock can be assigned to the Function (Fn) or AE-L/AF-L button.
- FEC indicator. When this is displayed, your Flash Exposure Compensation is on. Adjust the FEC by pressing the Flash mode button and then rotating the Subcommand dial.



1.13 Additional settings on the Shooting Info Display

- Exposure compensation indicator. When this appears in the Shooting Info Display, your camera has exposure compensation activated. This affects your exposure. Adjust the exposure compensation by pressing the Exposure Compensation button and then rotating the Main Command dial.
- Multiple exposure indicator. This icon informs you that the camera is set to record multiple exposures. You can set multiple exposures in the Shooting menu.
- Auto-bracketing indicator. When in Autoexposure mode or Flash Bracketing mode, this appears on the control panel; when using WB bracketing, a WB icon also appears above the icon. When using Active D-Lighting (AD-L) bracketing, you see an ADL icon in conjunction with BKT. You set auto-bracketing in CSM e4.
- Active D-Lighting indicator. This icon alerts you to the status of the Active D-Lighting option. The settings are Auto, Extra High (H*), High (H), Normal (N), Low (L), and Off.

- Image comment indicator. This icon is shown when the image comment option is enabled. You can add an image comment in the Setup menu.
- Autofocus mode. This shows you the AF mode that the camera is currently set to. The choices are Auto AF (AF-A), Single (AF-S), and Continuous (AF-C).
- ISO sensitivity indicator. These numbers indicate the ISO sensitivity settings.
- Exposures remaining. This number indicates the approximate amount of exposures you can store on your memory card.
- GPS connection indicator. When the optional GPS unit (GPS-1) is attached, this icon appears.
- AF Area indicator. This shows which AF Area mode the camera is set to. Information includes 3D Tracking, Wide Area Center AF Point, Auto Area, and Single AF Point.

- Image quality. This tells you the type and quality of file that's being written to your memory card as you take photos. The options are RAW, RAW + JPEG, and JPEG. JPEG and RAW + JPEG compression options (quality) are Fine, Normal, and Basic. Change this by pressing the Quality (QUAL) button and then rotating the Main Command dial.
- Image size. This tells you the resolution size of the file when saving to JPEG or Large (L), Medium (M), or Small (S). Change this setting by pressing the Quality (QUAL) button and then rotating the Subcommand dial.
- Clock indicator. This icon appears if the camera's internal clock hasn't been set. You can set the clock in the Setup menu by selecting World time.
- Battery indicator. This is where you can check the power levels of your camera's batteries. When the optional MB-D80 grip is attached by using two EN-EL3e batteries, two battery icons are shown.