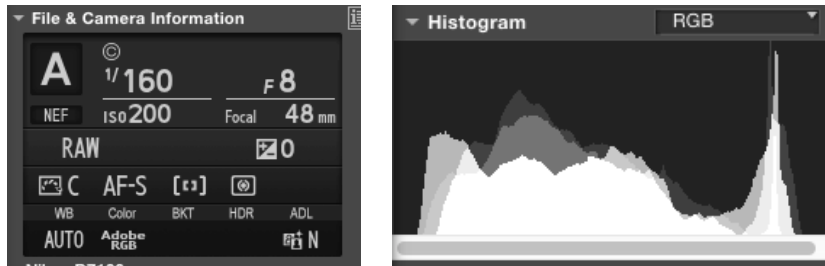


Realistic HDR Histograms Camera Raw



Wednesday September 2nd 2015 6:30pm – 8:30pm
Simsbury Camera Club
Presented by Frank Zaremba

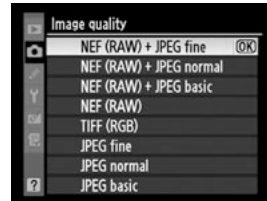
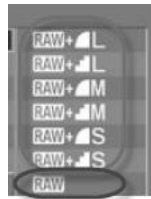
fhcephoto@comcast.net

There are no bad pictures;
that's just how your face looks sometimes.
— Abraham Lincoln

The single most important component of a
camera is the twelve inches behind it.
– Ansel Adams

All digital cameras can process the image from the sensor into a **JPEG** file using settings for white balance, color saturation, contrast, and sharpness that are either selected automatically or entered by the photographer before taking the picture.

Additionally all digital cameras can capture the image in **RAW** format and some will allow the capture of both.



Raw files are named so because they are not yet processed and therefore are not ready to be printed or edited with a bitmap graphics editor. Normally, the image is processed by a raw converter in a wide-gamut internal color space where precise adjustments can be made before conversion to a "positive" file format such as TIFF or JPEG for storage, printing, or further manipulation.

A camera raw image file contains minimally processed data from the image sensor of a digital camera.

There are dozens of raw formats in use by different models of digital equipment.

Raw filename extensions and
respective camera manufacturers

| | |
|----------------------------------|--------------------------------|
| .3fr (Hasselblad) | .mrw (Minolta, Konica Minolta) |
| .ari (ARRIFLEX) | .nef .nrw (Nikon) |
| .arw .srf .sr2 (Sony) | .orf (Olympus) |
| .bay (Casio) | .pef .ptx (Pentax) |
| .crw .cr2 (Canon) | .pxn (Logitech) |
| .cap .iiq .eip (Phase_One) | .R3D (RED Digital Cinema) |
| .dcs .dcr .drf .k25 .kdc (Kodak) | .raf (Fuji) |
| .dng (Adobe) | .raw .rw2 (Panasonic) |
| .erf (Epson) | .raw .rwl .dng (Leica) |
| .fff (Imacon/Hasselblad raw) | .rwz (Rawzor) |
| .mef (Mamiya) | .srw (Samsung) |
| .mdc (Minolta, Agfa) | .x3f (Sigma) |
| .mos (Leaf) | |

RAW images will always be larger file sizes than JPEG's.

For each pixel in your image, the tonal value or brightness of the scene you are photographing is stored in the image file on your memory card, along with the color. Computer files store information in zeros and ones. Bit depth refers to how many digits the tonal information for each pixel is stored in.

if the camera records:

- 12 bits of data then each pixel can handle 4,096 brightness levels
- 14 bit then it can record 16,384 different brightness levels.
- 8 bit mode and you will only ever have 256 brightness levels (JPG).

A twenty four megapixel camera shooting at 14 bit depth means that each of the twenty four million pixels can have 16,384 levels of brightness along with one of 16,777,216 colors

Cameras that produce raw files save these settings in the file, but defer the processing. This results in an extra step for the photographer, so raw is normally only used when additional computer processing is intended.

To be viewed or printed, the output from a camera's raw image has to be processed, that is, converted to a photographic rendering of the scene, and then stored in a standard raster graphics format such as JPEG.

Camera Raw Editors:

- Picasa
- Gimp
- Light Zone
- IPhoto
- Photos
- ACDSEE Pro
- Canon – Digital Photo Professional
- Nikon – Capture NX-D
- Photoshop
- Photoshop Elements
- Lightroom

With a Camera Raw editor you can CHANGE the following after you capture the image:

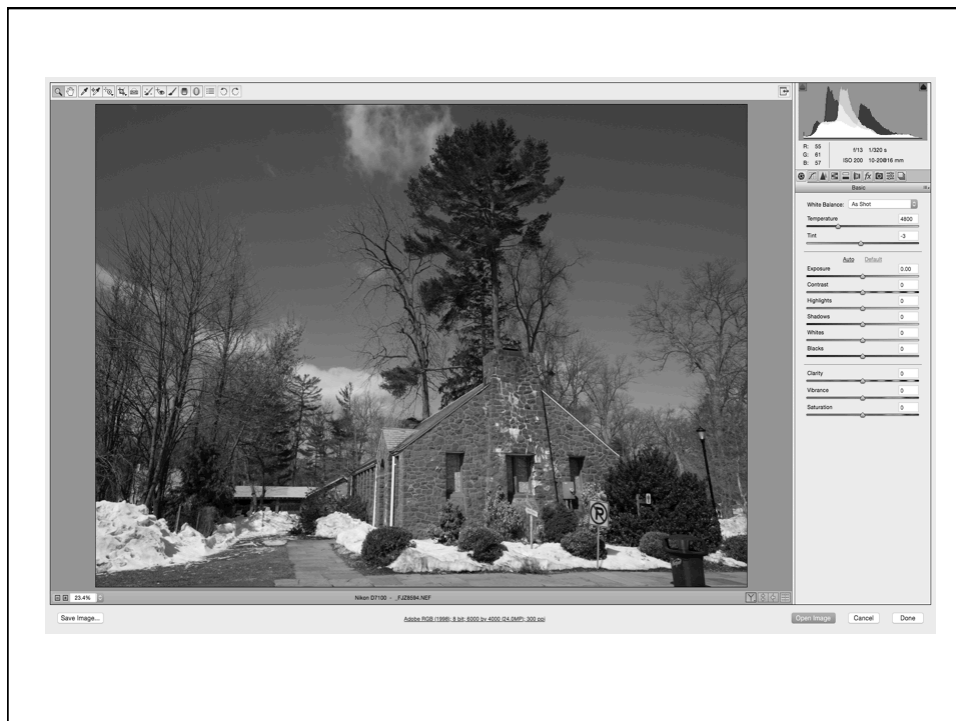
- White Balance
- Exposure – up to 10 stops
- Contrast
- Sharpening
- Noise Reduction
- Camera Profile

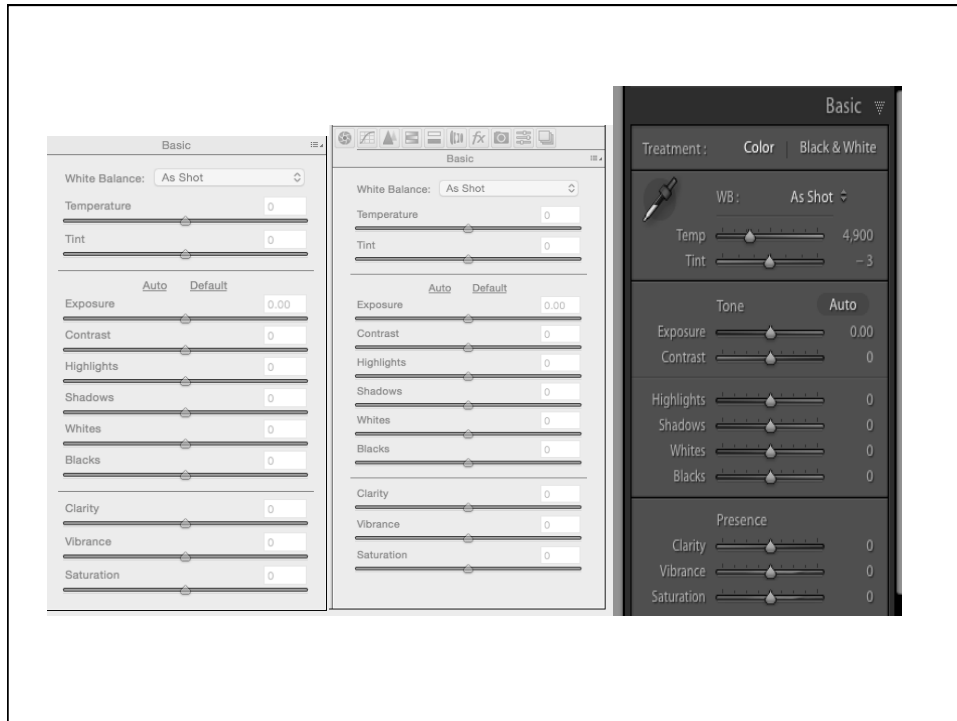
You can **NOT** CHANGE the ISO or the F-stop that you used to capture the image.

Nikon's Picture Control



Canon's Picture Styles





File XMP - Extensible Metadata Platform

Contains metadata that describes a file, such as an image and may include a file description, title, keywords, author and copyright data, and other information; saved in a standard format that can be searched by XMP-compatible applications. This is also known as a side-car file.

The XMP file stores information on the file in HTML format (Hyper Text Markup Language). The information is basically text and can be displayed in any text editor (notepad, word, excel, notes, pages, numbers,...)

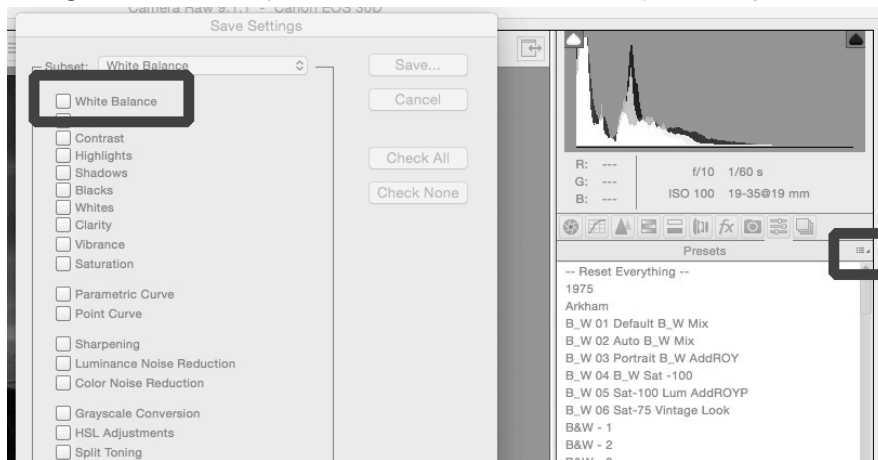
```

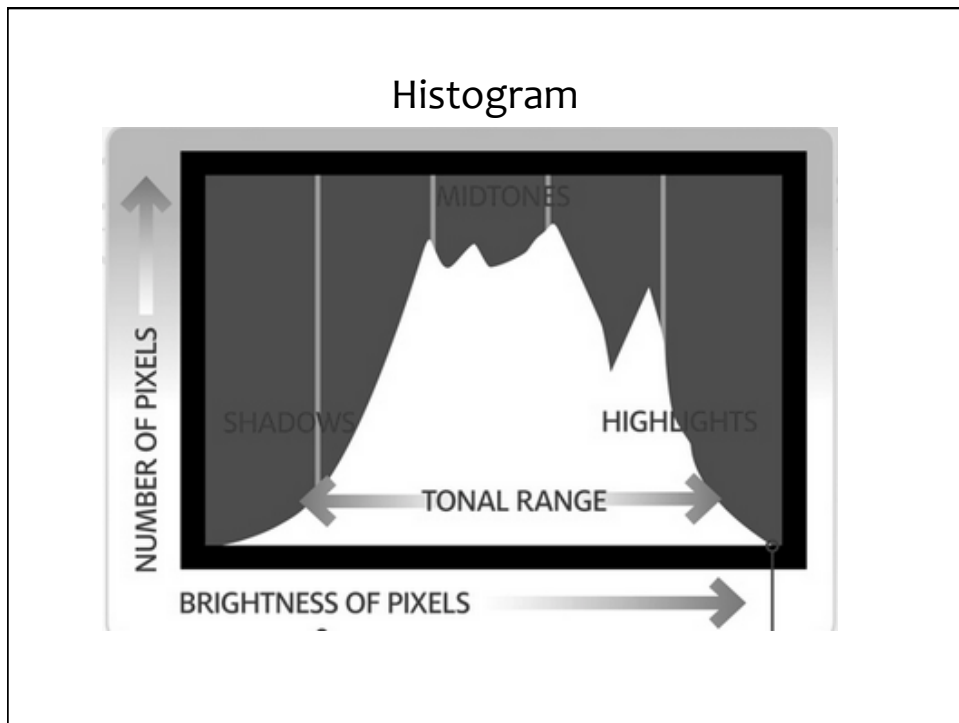
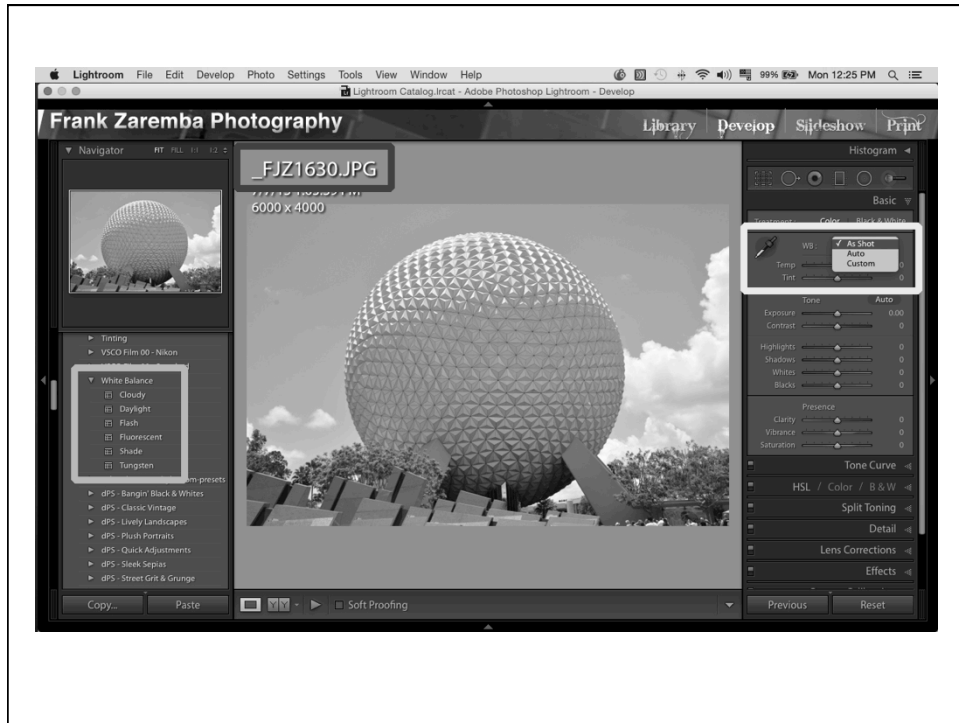
tiff:Make="NIKON CORPORATION"
tiff:Model="NIKON-D7100"
tiff:Orientation="1"
exif:ExifVersion="0221"
exif:ExposureTime="1/160"
exif:ShutterSpeedValue="7321928/1000000"
exif:FNumber="10/1"
exif:ApertureValue="6643856/1000000"
exif:ExposureProgram="3"
exif:SensitivityType="2"
exif:ExposureBiasValue="0/6"
exif:MaxApertureValue="41/10"
exif:MeteringMode="5"
exif:LightSource="0"
exif:FocalLength="350/10"
exif:SensingMethod="2"
exif:FileSource="3"
exif:SceneType="1"
exif:FocalLengthIn35mmFilm="52"
exif:CustomRendered="0"
exif:ExposureMode="0"
exif:WhiteBalance="0"
exif:SceneCaptureType="0"
exif:GainControl="0"
exif:Contrast="0"
exif:Saturation="0"
exif:Sharpness="2"
exif:SubjectDistanceRange="0"
exif:DigitalZoomRatio="1/1"
exif:FocalPlaneXResolution="83841555/32768"
exif:FocalPlaneYResolution="83841555/32768"
exif:FocalPlaneResolutionUnit="2"
exif:DateTimeOriginal="2015-06-10T10:52:48.80"
dc:format="image/x-nikon-raw"
xmp:CreatorTool="Ver.1.02"
xmp:ModifyDate="2015-06-10T10:52:48.80"
xmp:CreateDate="2015-06-10T10:52:48.80"
xmp:Rating="0"
xmp:MetadataDate="2015-08-10T00:12:07-04:00"
aux:SerialNumber="2504880"
aux:LensInfo="18.0/14.00/10.35/10.56/10"
aux:Lens="18.0-140.0 mm f/3.5-5.6"
aux:LensID="160"
aux:ImageNumber="13241"
aux:ApproximateFocusDistance="4294967295/1"
photoshop:DateCreated="2015-06-10T10:52:48.80"
photoshop:SidecarForExtension="NEF"
photoshop:EmbeddedXMPDigest="A3A6AAC3C8FB340C7C09F1A12F19CF8B"
xmp:MM:DocumentID="DC5B90DA8BBA921CE480DFBA4AC56CE6"
xmp:MM:OriginalDocumentID="DC5B90DA8BBA921CE480DFBA4AC56CE6"
xmp:MM:InstanceID="xmp:ida:7b41b99-30ee-4557-b992-25841cabd392"
crs:RawFileName="FJZ2693.NEF"
crs:Version="9.0"
crs:ProcessVersion="6.7"
crs:WhiteBalance="Daylight"
crs:AutoWhiteVersion="134348800"
crs:Temperature="5500"
crs:Tint="10"
crs:Saturation="0"
crs:Sharpness="73"
crs:LuminanceSmoothing="0"
crs:ColorNoiseReduction="25"
crs:Vibrance="38"
crs:ParametricShadowSplit="25"
crs:ParametricMidtoneSplit="50"
crs:ParametricHighlightsSplit="75"
crs:SharpenRadius="0.7"
crs:SharpenDetail="40"
crs:SharpenEdgeMasking="55"
crs:PostCropVignetteAmount="0"
crs:GrainAmount="0"
crs:ColorNoiseReductionDetail="50"
crs:ColorNoiseReductionSmoothness="50"
crs:LensProfileEnable="0"
crs:LensManualDistortionAmount="0"
crs:PerspectiveVertical="0"
crs:PerspectiveHorizontal="0"
crs:PerspectiveRotate="0"
crs:PerspectiveScale="100"
crs:PerspectiveAspect="0"
crs:PerspectiveUpright="0"
crs:AutoLateralCA="0"
crs:Exposure2012="+1.05"
crs:Contrast2012="-8"
crs:Highlights2012="-100"
crs:Shadows2012="+100"
crs:Whites2012="+16"
crs:Blacks2012="-44"
crs:Clarity2012="+50"
crs:DeFringePurpleAmount="0"
crs:DeFringePurpleHueLo="30"
crs:DeFringePurpleHueHi="70"
crs:DeFringeGreenAmount="0"
crs:DeFringeGreenHueLo="40"
crs:DeFringeGreenHueHi="60"
crs:ConvertToGrayscale="False"
crs:ToneCurveName="Medium Contrast"
crs:ToneCurveName2012="Linear"
crs:CameraProfile="Camera Landscape"
crs:CameraProfileDigest="A4189FC7945B2D4A35BF703ECE8C28E8"
crs:LensProfileSetup="Lens Defaults"
crs:HasSettings="True"
crs:HasCrop="False"
crs:AlreadyApplied="False"
<exif:ISOSpeedRatings>
<rdf:Seq>
<rdf:li>200</rdf:li>
<dc:creator>
<rdf:Seq>
<rdf:li>Frank Zaremba</rdf:li>
</rdf:Seq>
</dc:creator>
</rdf:Alt>
<rdf:li xml:lang="x-default">Frank Zaremba</rdf:li>
</rdf:Alt>
</dc:rights>

```

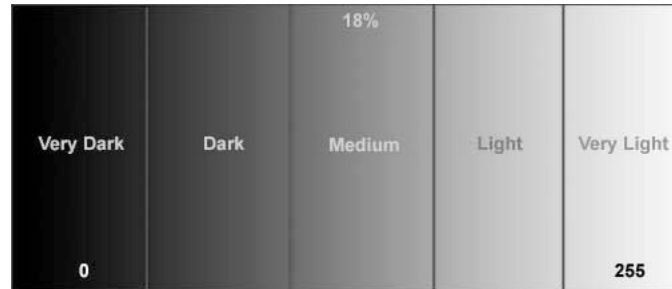
You can adjust a JPG images in Camera Raw.

Camera Raw images allow you to changes the White Balance and Camera Profile on the fly. JPG images require that you create PRESET's to accomplish the image changes. Please note only a few camera raw converters allow you to use presets.





Histogram

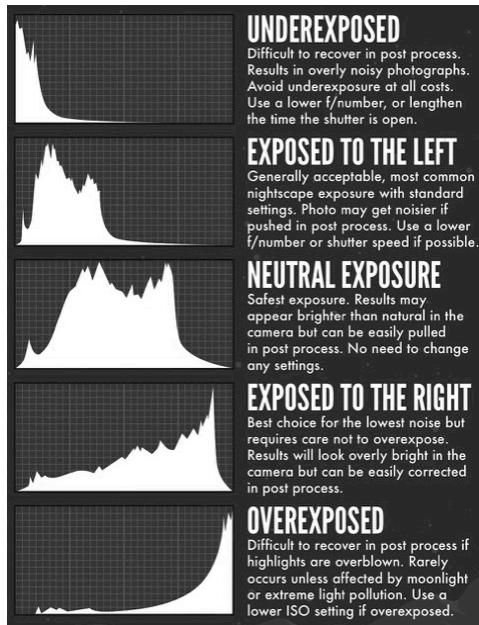
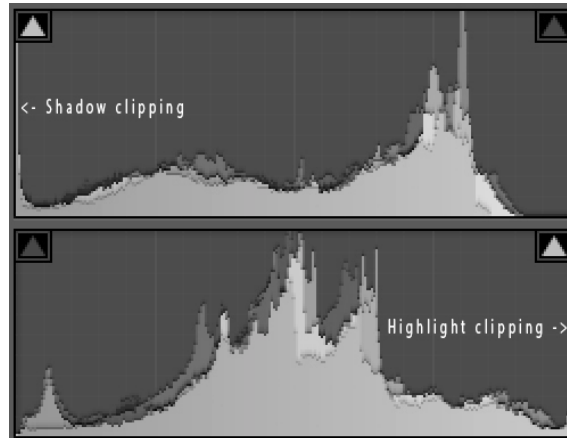


The standard histogram – found on all DSLRs – plots the brightness or luminosity of every pixel in the picture.

There is no such thing as the ‘perfect’ histogram – different subjects and photographic styles will produce different results. For example taking a silhouette shot might produce a histogram with peaks at both ends of the spectrum and nothing much in the middle of the graph. Taking a shot of someone at the snow will obviously have a histogram with significant peaks on the right hand side.... etc

A histogram is a graphical representation of the tonal values of your image. In other words, it shows the amount of tones of particular brightness found in your photograph ranging from black (0% brightness) to white (100% brightness). As shown in the image above, dark tones are displayed on the left side of the histogram. As you move rightward, tones get lighter. The middle portion of the histogram represents midtones, which are neither dark nor light. Vertical axis of a histogram displays the amount of tones of that particular lightness.

If a certain portion of the histogram is “touching” either edge, it will indicate loss of detail, also called clipping. Highlight clipping (areas that are completely white and absent detail) occurs if the graph is touching the right side of histogram. Shadow clipping (areas that are completely black and absent detail) occurs if the graph is touching the left side of histogram. Either case can be often fixed by altering exposure settings.



What is HDR?

HDR stands for High Dynamic Range. Dynamic range is basically just the difference between the lightest light and darkest dark you can capture in a photo.

Once your subject exceeds the camera's dynamic range, the highlights tend to wash out to white, or the darks simply become big black blobs. It's notoriously difficult to snap a photo that captures both ends of this spectrum, but with modern shooting techniques and advanced post-processing software, photographers have devised ways to make it happen.

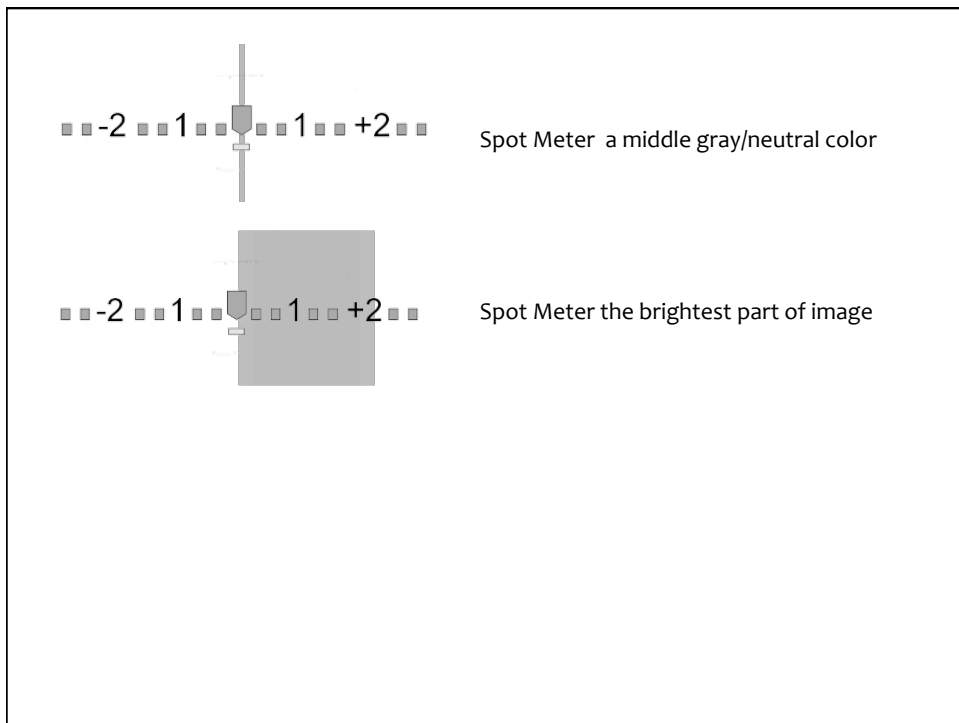
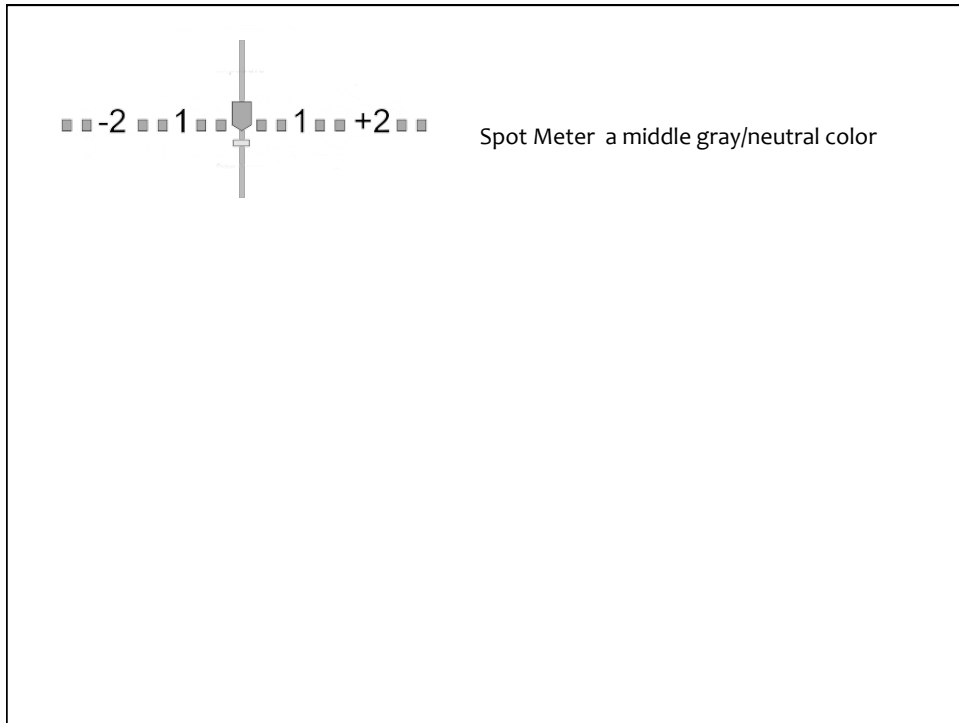
This is basically what HDR is a specific style of photo with an unusually high dynamic range that couldn't otherwise be achieved in a single photograph.

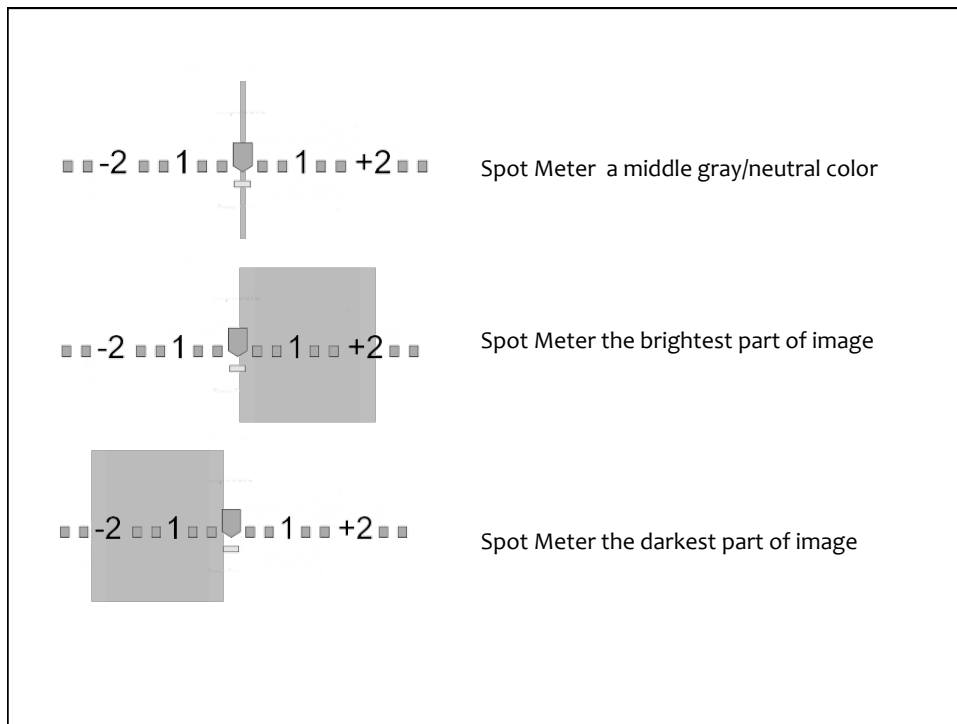
It is the difference between the brightest and the darkest part of an image.

Our eyes can see anywhere from 10-14 f-stops of dynamic range.

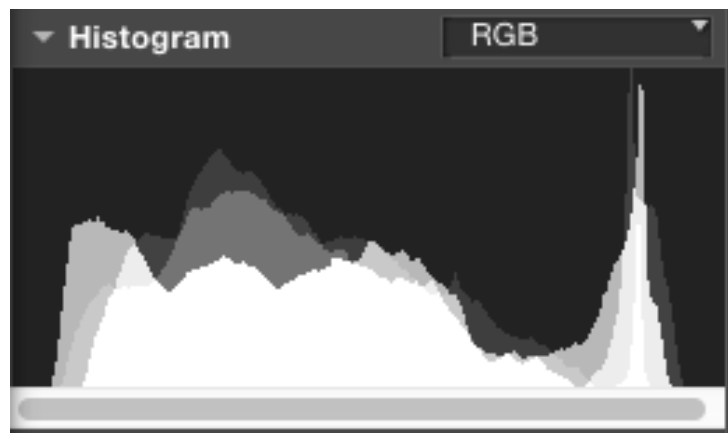
Most compact cameras 5-7 stops of dynamic range.

Digital SLR cameras 8-11 stops of dynamic range.





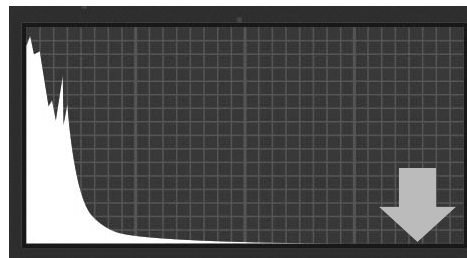
You do **not** need HDR for every image, as long as you have details in both the Highlights and the Shadows.



Auto Exposure Bracketing(AEB) is a very useful option for taking HDR scenes. However, AEB was not really intended for HDR shots initially, but rather for ensuring that at least one of the shots will be as close to perfectly exposed as possible. This is probably why some camera models only make it possible to auto bracket three shots at a maximum of one EV stop difference.

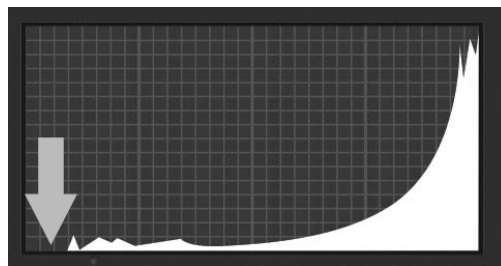
The most common practice for HDR photography is three exposures at two stops difference in exposure.

You need to be sure that Auto ISO is turned OFF.



While taking exposures for an HDR image you need to be sure that that one Image is exposed to capture Highlights.

While another one is exposed to capture Shadows.



Depending on what exposure mode the camera is operating in, the following table shows the exposure variable that will be adjusted depending on the exposure mode the camera is in.

| <u>Mode</u> | <u>Adjusted</u> |
|---------------------------|------------------------|
| Manual (M) | Shutter Speed |
| Aperture Priority AE (Av) | Shutter Speed |
| Shutter Priority AE (Tv) | Aperture |
| Program AE (P) | Shutter Speed |

You may need to take anywhere from 3 thru 9 images , with exposure stop from 1/3 to 3 stops each – both over and under exposed.

If you are not using a tripod, most software will align the images for you.

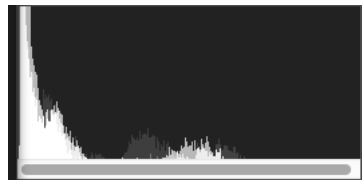
In addition to aligning the Images the software will also correct any movement in the images called – de-ghosting.

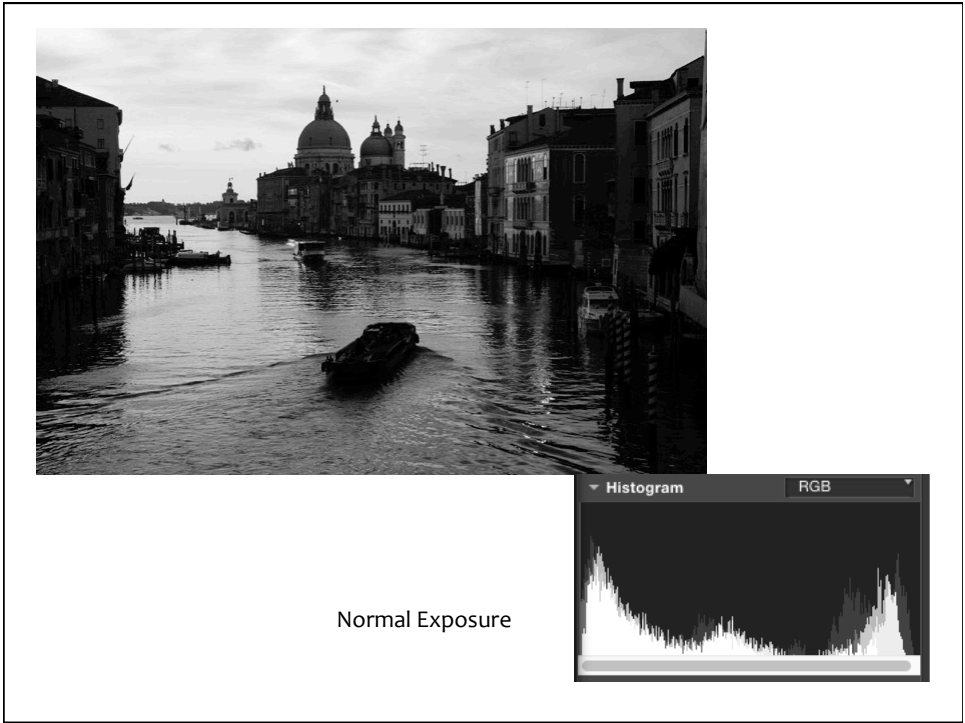
HDR Software

Photomatix Pro
HDR Efex Pro
Paint Shop Pro
Lightroom CC
Photoshop CC
Photoshop Elements 13



Exposure for Highlights







Lightroom



HDR Effect Pro 2



Elements



Photomatic