

High Dynamic Range, or HDR, photography.

You've very likely seen HDR photos all around the net as photographers both pro and hobbyist experiment with this technique. I first found some examples on the web at Flickr and, being the inquisitive type, investigated further. The technique, particularly with modern digital cameras, is fairly easy and there are very low-cost ways to use it.

However, many photographers who work with HDR are creating images that, while often extremely interesting, look nothing at all like the scene they were shooting -- and even if they do get it close, they end up with photos that have an enormous amount of HDR processing artifacts, particularly halos around areas of contrast.

What you need:

1. A digital camera that allows you to set exposure manually – or, better still, with auto exposure bracketing.
2. A sturdy tripod – though you can hold the camera against something solid.
3. A subject (i.e., what you're taking the picture of) that, in the main, does not move - though there can be some quite artistic effects obtainable with a few moving elements.
4. A computer with an HDR processing program installed. (More on these later).

If you have a camera that supports it, it also helps to have a remote shutter release of some kind, so you don't get any camera shake.

First off, you need to take the photographs. Not all scenes in your viewfinder will suit the HDR technique, simply because not all scenes will *have* a High Dynamic Range! So you either set out to deliberately look for views that have the high range or you just keep your HDR abilities ready for those occasions when you meet a scene that has completely dark shadow areas, with no detail, and at the same time has washed out areas – perhaps the sky or other very light objects that also have no detail. We know, as photographers, that we *could* take pictures of those areas separately, giving different exposures to each, and we could get one picture with plenty of detail in the light areas but totally black shadows, or, conversely, details in the shadows but completely washed out sky or other light areas. If we could have a camera that was able to handle both ends of the light (or luminance) range, we wouldn't need to bother with this technique. The human eye can find details at a far higher range than any camera. For example, look out of the window from an unlit room – you can see details both inside and outside. Without actually doing it, we know that if we took a picture of what the eye is seeing we'd be left with either the inside or outside being badly exposed, but certainly not both. (Interestingly, many real estate agents, and their photographers if they have them, are now using HDR to photograph interiors which also show the outside view through the windows, or the fully detailed room view without shadows.)

Because you are attempting to create a high-dynamic-range image, it makes sense for you to shoot your photographs in your camera's RAW mode. The reason for this is that the RAW format captures more dynamic range data than is available in the alternative, the JPEG file. It also gives you a great deal of colour temperature latitude -- you can set the colour temperature of all of your photos very easily after the fact. Tripod your camera so that it doesn't move, then compose the scene you want to shoot. Also, if your camera has a changeable ISO setting (most do), set it as low as possible to avoid noise – not on Auto ISO. Don't worry if that gives long exposure times – the tripod should cancel that out. If you have a camera that has “Shake Reduction”, turn that off – hopefully there won't be any!

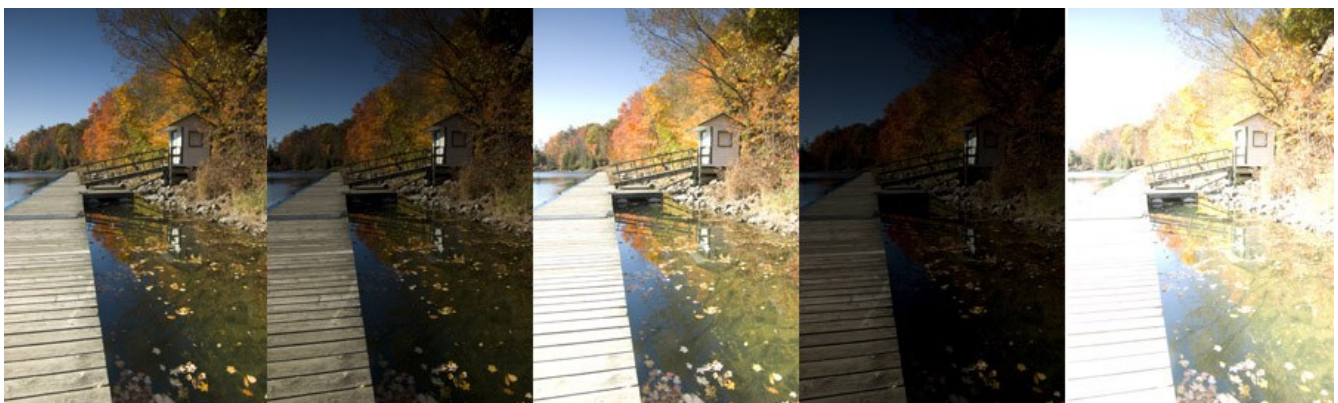
Use Aperture priority setting on your camera – nothing else 'auto' – we only want shutter speeds to alter, not the aperture (because it would change to different Depth of Field for each shot, leaving some pictures sharp and some blurred) or ISO (because different ISO ratings would confuse the whole set of exposures and soften the picture). Take a picture of your scene and note (just visually) how much difference there is between the light and dark areas. You don't really need to worry about this, though you could point your camera at different areas and see what the difference is between exposure values (Evs) or how many “stops” of difference are in the scene – this will give you an idea of how many exposures you want to take to cover the scene, and how many “stops” apart they might be to cover it all.

Your camera, with its built-in bracketing, may give you the choice of having three or five (even more with some high-end cameras) different exposures and each of these can be, as selected, in increments of 0.3 of a stop, up to 2 stops. So you can see that you could have five exposures – one at “normal”, and others at +2stops, +4 stops, -2 stop and -4 stops. That gives a quite vast range of eight stops – a difference of, for example, 1/50th, 1/125th, 1/250th, 1/500th, and 1/1000th of a second. (Resetting the camera to higher and lower start Evs could give a vast coverage of as many stops as you like – many people say that nine or more exposures is best!). If your camera has less auto-bracketing capability than you'd like, or is fully manual, you can see from the above that you would have to set each picture's shutter speed manually between shots – not so easy but perfectly possible if your camera is on a firm platform.

Select the main (or 'normal', 'metered' or 'mean') aperture you wish – it might as well be small (f16 or above) as the camera isn't going to move. This gives you the starting combination of aperture and shutter speed that the other exposures (Evs) will be relative to. Once you have your scene composed in the viewfinder, your camera on the tripod, and your settings made -- take your pictures. I personally usually like to take quite a few photos over the range -- for example, I'll take five photos at the +4 to -4 EV range, as above, but if I shift my start EV up (or down) a couple of stops (by exposure compensation) I can get an even bigger range. If you're using digital, don't worry about finding each exposure again – the 'exif' information will show you which is which. You *can* get by with only two exposures, but it just doesn't give the sharpness of five or more.

Just one more tip while we're actually taking the pictures. When you have your series of different exposures in the camera, before you try the same on another scene, point your camera elsewhere and take a picture – it makes it so much easier to identify your HDR series in your computer later.

The picture below shows the five different exposures I took of a scene (which didn't particularly have a high range, but it will do for this demo).



From the left, the exposures were (standard) f5.6 @ 1/200th, then at -2 stops (1/640th), +2 stops (1/60th), -4 stops (1/2000th), and +4 stops (1/25th).

That's the capture of the exposures out of the way. If in the city, be prepared to feel a little silly with your camera on a tripod and waving the remote control at it.

A couple of points about movement in the pictures.....

Most specialised HDR software, even the least expensive, will allow you to remove 'ghosted' figures or objects, like a car that's in all shots, people who are blurs in all of them. The movement of people doesn't need to ruin a picture, though cars can be the opposite. The effect of HDR on moving water, is worth mentioning. If you take 5 or more pictures of moving water, whether it be a few ripples on a lake or Niagara Falls, the final image will lose the sense of movement, turning a lumpy Lake Ontario into a mill-pond or Niagara Falls into a huge lump of ice. Expect the unexpected – there are no rules.

So, what do we do with these pictures now? In short, we combine them. At this point I will add that you could, if you really wanted, use a standard photo editing program, like Photoshop, Elements, and a few others that allow you to work with layers, to combine them. If you put each version onto its own layer, you can erase parts that you don't want – the areas which have no detail, then adjust opacities and merge them. Easier said than done, but possible.

There are easier ways. Photoshop CS has the capability of doing the combination work and providing extra options to change lighting etc. There are also several small, inexpensive programs that do the work – some say better than Photoshop. Among these programs is “Photomatix” and “DynamicPhoto HDR”. Don't want to spend money on it (yet)? These two both have excellent free Demo versions. They are both very capable programs but for the Demo versions perhaps the favourite would be DynamicPhoto. Both have a watermark left on your end results but DynamicPhoto has only a small logo tucked into a corner, while Photomatix has its name plastered all over the place.

So, while this isn't a manual, I will mention the steps required for putting your pictures through DynamicPhoto. (The same processes happen in Photomatix but I don't know the program so well).

Obviously, you need to Open a new file and choose the pictures you want to use.

Next step is alignment. If you used a tripod there shouldn't be a problem in aligning all your pictures but the software can align a hand-held series as long as they're not too different. It's at this point that you can remove any 'ghosts' caused by objects in more than one of your images. I don't use this much as my HDRs tend to be of landscapes and even when there are people there I don't mind them blurring – it's not a totally bad effect.

We now need to get the program to work its magic and combine the pictures. The end result is – as odd as it may seem – invisible to you. Why? Well you don't have a monitor capable of displaying a true High Dynamic Range picture. Weird, eh? So what's going on? Well our new HDR image is way off the scale of the capability of even the highest grade computer monitor - I won't bother you with the technicalities, but only specialist monitors, in the film industry (like those of Pixar) can handle the amount of 'bits'. So how do we see our masterpiece? Unlikely as it sounds, we have to turn it back into a Low Dynamic Range (LDR) picture. All a waste of time, eh? Well not quite..... what happens now is the process known as “Tone Mapping”, which retains the details in all those highlights and shadows but makes the picture usable again.

Tone Mapping will give many options, and most of them concern “dynamic light” - that's light which can be applied from withing existing light in the picture, and it's the over-use of this that gives the fairly awful 'cartoon' look of some HDR pictures. The aim is to gather detail in both the highlights and the shadows at the same time, nothing more, but some people get carried away with it. The other controls are about “Vivid Colours” and saturation. I'm not trying to lay down rules for anybody, but it's worth checking out some Flickr HDR Groups before you decide how to proceed. There are over 100 groups on Flickr dedicated to HDR photography, so you can tell that it's growing in popularity. You'll see a mixture of results, some quite horrific, in one of the groups, like [HDR Group](#), while you'll see some (in my opinion) much better, more subtle use of the technique in groups like [TrueTone HDR](#) and [Realistic HDR. If HDR](#)

If HDR interests you, check out some of the other HDR groups in Flickr.

And also, for the trial versions of HDR software ...

[Artizen](#) – I didn't mention it but it's another quite good one with a free trial.

[Dynamic Photo HDR](#)

[Photomatix](#)

End result....

Bearing in mind that the scene was not particularly of a High Dynamic Range (I was using a graduated filter so the sky wasn't going to wash out). Oh, and there *is* a watermark there, I haven't removed it – which just shows that it's not a problem.

