HDR: Changing The Rules

By Steve Traudt

From the very beginning of photography, photographers have been challenged by the camera's inability to record the scene as we see it. Who among us has not lamented washed out skies and murky shadows? As slide shooters we were taught to "expose for the highlights". This meant we were willing to accept blocked up shadows in exchange for properly exposed highlight areas.

Many methods have been devised to cheat the devil, as it were. Photography was only 32 years old when Henry Peach Robinson perfected the art of the photo-montage. His famous photograph, "Fading Away", was a montage of 5 separate negatives, which allowed him to have details both in the sky thru the window and the rather dark interior. A year earlier, Oscar Rejalander created a 32 image (layers??) montage which took him 6 weeks to produce. You start to realize that Photoshop is not quite as revolutionary as it seems! In more recent times, we have the darkroom majesty by the likes of Ansel Adams. By careful exposure, development and dodging/burning, he was able to coax the maximum detail from otherwise impossible scenes.

The problem, now as then, is simple: most scenes contain a dynamic range (DR) greater than the film or digital sensor's recoding capability. Dynamic range refers to the range of luminance from the brightest to the darkest areas of a scene.

Consider a typical outdoor scene where a dynamic range of 100,000: 1 (17 stops) is not unusual. This means the brightest area is 100,000 times brighter than the darkest shadow. Even more startling is the human eye's ability to record a dynamic range of up to 1,000,000 to 1, representing a 20 stop difference! (assuming you were not partying the night before!)

By contrast (pun intended), a digital SLR can only record a DR of about 6 f-stops. We might then call our digital camera an LDR (low dynamic range) device. By its' very nature, a JPEG file is also LDR. A single RAW file can record about 10 f-stops which is good but still falls short of capturing the full range of many scenes. A RAW file could be considered an MDR (medium dynamic range) capture.

We what we need then is a method for capturing a "high dynamic range" file, or HDR. The most common method of achieving such HDR files is first by taking at least 2 photos (often more), at different exposures and then processing them in such a way as to maximize the DR.

A suggested starting point is to shoot 3 exposures: -2EV; 0EV and +2EV. An EV is the equivalent of an f-stop. Such a 3 shot spread gives us about a 10 EV or f-stop range. Many scenes will require even more shots such as 5 exposures with a 2 EV spacing. Sometimes, even 7 or 9 exposures will be needed.

After working with HDR for awhile now, I realize the final image quality is due about 75% to the quality and technique of your image capture and about 25% due to software. If you start with crappy image sets, the software will yield crappy HDR!

Ideal Camera Setup:

- Tripod and Cable Release
- Aperture Priority Mode & AEB
- Otherwise, Manual Exposure Mode
- RAW file capability & Low ISO setting

General Procedure:

- Select composition
- Choose appropriate aperture via A-priority
- Enable AEB: typically 3 shots, 2 EV apart or 5 shots, 1 EV apart
- Set low ISO if possible; set to capture RAW
- Using cable release, take image set as fast as possible
- Mirror Lockup may be useful too
- Examine image set Histograms. The lightest exposure should not have any pixels touching the left side of histogram. The darkest exposure should not have any pixels touching the right side of histogram.
- You may need to re-shoot sequence, starting out either darker or lighter to get proper spread. Or you may need to take more images in the sequence.

Some Comments:

- Most folks do not over-exposure the shadows enough. If you don't, noise will be a problem.
- Movement always a problem so shoot fast!
- Never vary the aperture; only the shutter speed. Otherwise, changes in depth of field are a problem
- If you don't have RAW ability, use high quality JPEG. They will work quite well too.
- If you don't have AEB, change exposures manually, via shutter speed. Count the "clicks" as you rotate the dial.
- You do not have to spread the exposures by even increments. You could, for instance, have the spacing be 1 & 1/3 EV
- If you get good at this, you can try hand-holding a burst (tripod still best though!)
- You can even do HDR with "point & shoot" cameras
- You don't have to use all the shots in an image set. For instance, you might just use 2 out of 3, to minimize motion effects.
- Sensor dust will be exaggerated as will high ISO noise
- A "pseudo" HDR can be created from a single RAW file, but don't think this is more than it is! Or…you can create 3 different exposures, from the same RAW file, save those as 16bit TIFF and then process those in Photomatix.
- Create a Panorama HDR: I first tone-map the pano segments then stitch those together.
- You can create a stunning black/white HDR using Photoshop controls.
- For some really "grungy" looks, you can repeatedly tone-map the same image.

Software…

Now that you have captured a set of images, you use software to generate the HDR files. Although there are many software products on the market, most discussions come down to 2 possibilities. If you have Photoshop Version CS2 or higher, then you already have an HDR capability. Photoshop calls it "Merge to HDR" and it is found under File>Automate. If you already own one of these versions, you should certainly give the Merge to HDR function a try. It does indeed produce an HDR file but the main criticism is the relative lack of control over the process and the necessity to do quite a bit more post-processing work on the file to get it looking like you want. I would not suggest you run out and buy CS4 just for the HDR function; rather, see the next paragraph.

This brings us to the hands-down favorite of most photographers working in HDR: Photomatix Pro. This versatile and easy to learn software is available from the www.hdrsoft.com website. It runs on PC or Mac and you can download a free trial version and play with it. Notice the word, "play" for this is the best way to learn the software. There really is no right or wrong when it comes to the various sliders and options. You can go for a very subtle effect all the way to an extreme, in-your-face HDR! You can get 20% off the software purchase by using my discount code: **SteveTraudt20** on the HDR website checkout. The HDRsoft website also has some good tutorials and resources so spend some time there.

Closing Thoughts…

HDR is all the rage these days. But it still comes down to basics. You have to find interesting subjects and create strong compositions. HDR is just another tool for us to consider. Not every scene will lend itself to HDR; think motion! HDR can actually help you become a better photographer since you'll be mostly working carefully and slowly from a tripod, using good technique and previsualizing a scene. And there is no downside to shooting HDR image sets, since you can always just use the best exposure from the set in a conventional manner.

Keep in mind that HDR is a very new technology and is evolving rapidly. Nearly every week I read about a new HDR technique or philosophy. There really are no rules; what I discussed in this paper is just meant to get you started. But half the fun of HDR is asking, *What if?* Don't be afraid to play and experiment.

Please visit my website: www.synvis.com for a gallery of HDR images. Now, get out there and make some magic!

steve