

**Movie 3 (Chapter 4 extract)**

# Merging exposures

**Adobe Photoshop CS2 for Photographers** by Martin Evening ISBN: 0 240 51984 1

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### Other HDR applications

All those special effects used in movies such as Jurassic Park used a 32-bit color space to render the computer generated characters and make them interact convincingly with the real world film footage. So 32-bit image editing is useful in creating realistic animated special effects. The way this is usually done is to record what is known as a lightprobe image of the scene in which the main filming takes place. A lightprobe is an omnidirectional HDR image which can consist of a sequence of six or seven overlapping exposures shot using a 180 degree fisheye lens pointed in opposite directions. A basic lightprobe can be a series of photographs of a mirrored sphere taken with a normal lens. The resulting lightprobe image contains all the information needed to render the shading and textures on a computer generated object with realistic-looking lighting.

32-bit rendering is applicable to the computer games industry. The military and aeronautics industries are also particularly interested in the potential to render more realistic-looking virtual landscapes for simulation training. A wireframe landscape designed on a computer can be made to respond dynamically to different programmed lighting environments.

Paul Debevec is a leading expert in HDR imaging. His website [www.debevec.org](http://www.debevec.org) contains much interesting information on HDR and its various applications.

## 32 bits and High Dynamic Range

Photoshop CS2 now has a 32-bits per channel mode. After reading the last section this may sound like overkill because, as was pointed out, Photoshop's 16-bits per channel mode is all you really need to make the most of the data your scanner or camera can capture. But 32-bit imaging will nevertheless be useful in a number of ways.

We are used to editing images with a fixed exposure and preparing them for print. However, a 32-bit color space has the potential to contain deep-bit detailed, tonal information. A 32-bit file will be four times bigger than a standard 8-bit per channel image and the HDR format in 32-bit is able to use floating point math calculations (as opposed to regular whole numbers) to describe everything from the deepest shadows to the brightness of the sun. High Dynamic Range (HDR) imaging is not big yet, but it is predicted that digital cameras will soon start to feature HDR capture capabilities. Such cameras may not even need an exposure setting, because a single standard HDR exposure will be capable of capturing everything! And exposure decisions could then be made on the computer after the picture has been taken. That is the vision for the future of HDR stills photography. In the meantime, Photoshop CS2 is gearing up for HDR image editing by providing initial support for 32-bit per channel images.

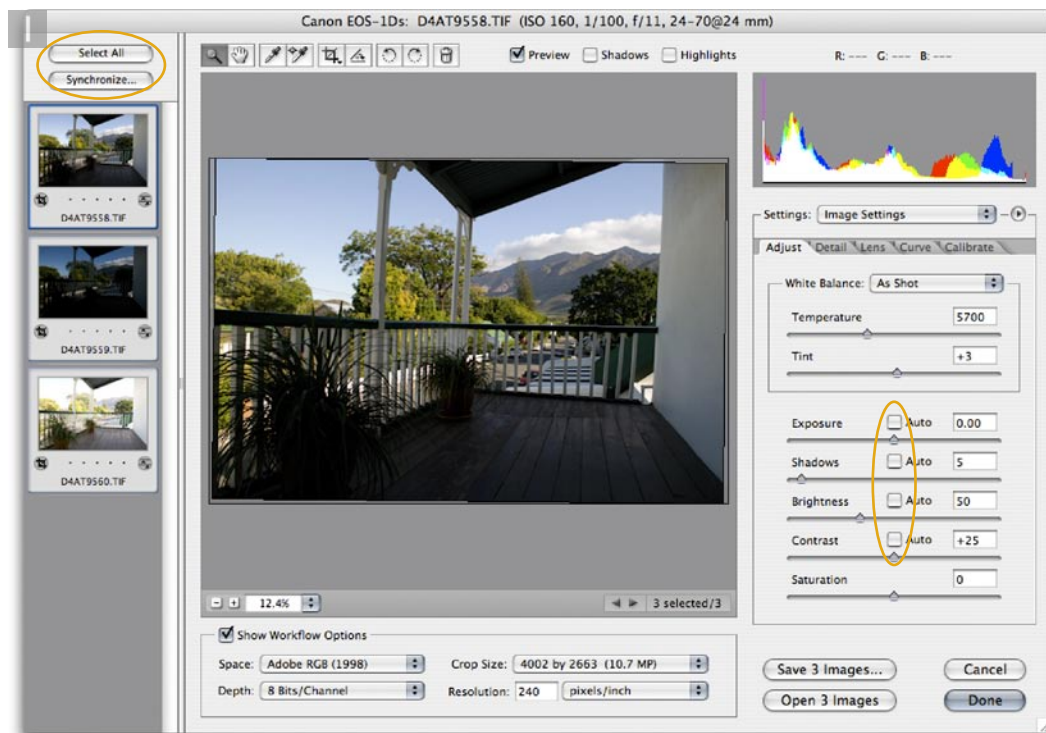
### Merge to HDR

HDR cameras are not common yet, but for now you can simulate HDR capture by using the Merge to HDR feature to combine two or more images captured at different exposures with a normal digital camera and blend the selected images together to produce a 32-bit high dynamic range image. You can then convert this 32-bit HDR file into a 16-bit per channel or 8-bit per channel low dynamic range version which you can then edit normally in Photoshop. The HDR conversion dialog provides several methods for converting the merged exposure file, the most useful of which are probably the Exposure and Gamma and the Local Adaptation methods.

To use Merge to HDR, you need to think about making some bracketed exposures. Ideally, the camera should be mounted on a tripod, but if your digital camera has fast burst capture with auto bracketing, you can often get away with hand holding the camera. However, the subject matter must be perfectly still, as you won't be able to merge photographs where the subject is moving. The exposure bracketing should be between 1 and 2 stops apart and the auto exposure set to aperture priority so that the aperture remains fixed and only the exposure times vary.

### Really still, still life

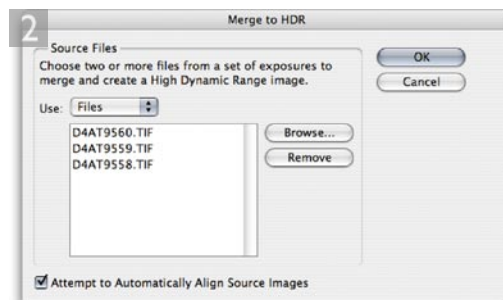
The Merge to HDR dialog can automatically align the images for you. But it is essential that everything else remains static. For example, the aperture must remain fixed, because if you bracket your images using the lens aperture, the depth of focus will vary between each exposure. This will prevent you from achieving smooth, HDR merged images.



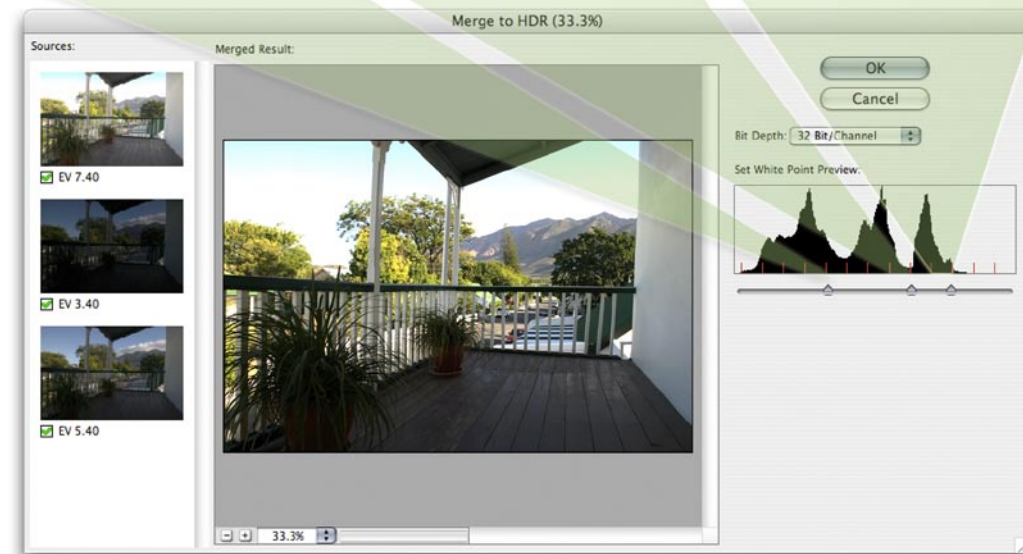
1 I began by making a selection of three raw digital capture images shot using different time exposures set at one stop or more apart. The raw settings must be set with the Auto checkboxes switched off. In this example, I used the straighten tool to apply a rotation and synchronized and applied this to all three captures.

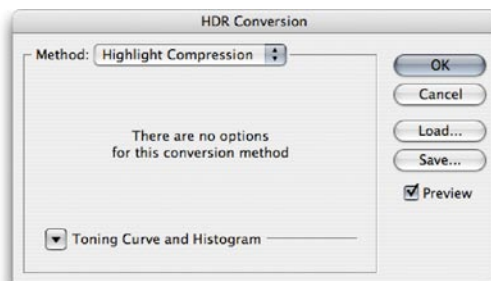
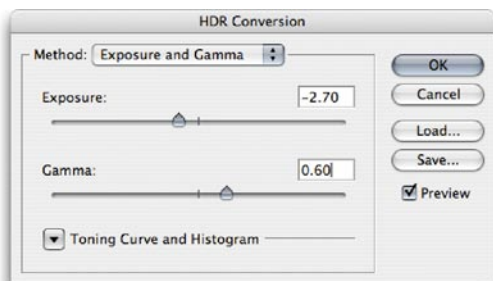


2 One can either go to the Bridge menu and choose Tools ⇨ Automate ⇨ Merge to HDR or do as I have shown here and go to the File menu in Photoshop and choose Automate ⇨ Merge to HDR. In the dialog to the right, I clicked on the Browse button and navigated to select the three images shown at step 1 that I wished to merge together. Ideally, you should plan to capture your HDR merge images with the camera firmly secured on a tripod and use a cable release. You will notice that there is an automatic alignment feature in the Merge to HDR dialog. This means that you can get away with shooting the HDR merge images with a hand held camera using an auto bracket setting. Again, remember that the aperture must remain fixed and you only want to adjust the time exposure. Try setting the camera to the aperture priority exposure mode and the bracket function to three exposures at 1–2 stops apart.

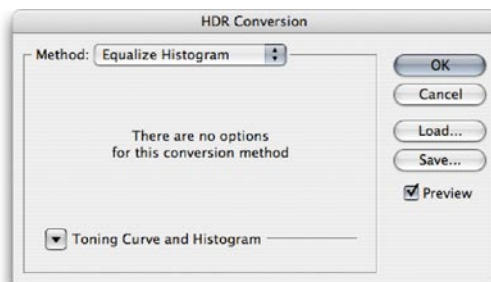
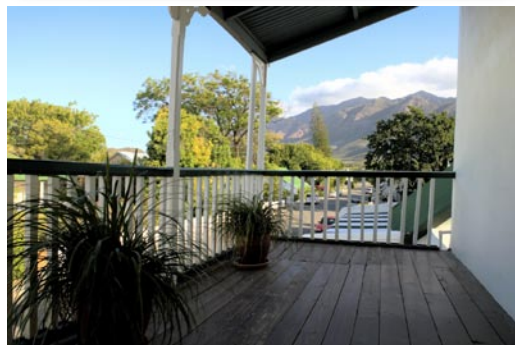


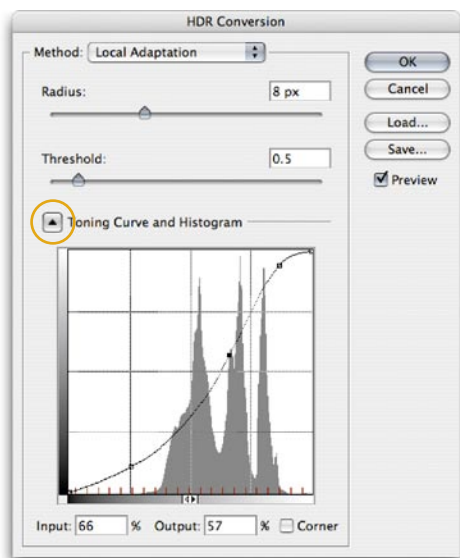
3 After you click OK, the Merge to HDR dialog will attempt to display the merged HDR image. This is impossible to do on a standard computer monitor, so the slider beneath the histogram will allow you to preview slices of the HDR image. At this stage you can deselect or select the source image thumbnails on the left to see how this will affect the merged HDR picture.





4 After you have chosen the desired images to blend together to make the merged HDR, all you need to do is set the bit depth (which should be 32-bits per channel) and click OK to render a 32-bit per channel HDR composite image. This can then be saved as a Portable Bit Map (.pbm) master image. If you wish to convert this HDR format image and compress the high dynamic range to create a normal Photoshop image, then go to the Image menu and choose Mode ⇌ 16-bits (or 8-bits) per channel. This will pop up the HDR conversion dialog shown here, which provides four methods for converting the image data. Exposure and Gamma provide two slider controls. You can use the Gamma slider to (effectively) reduce or increase the contrast and the Exposure slider to compensate for the overall exposure brightness. These controls are rather basic, but they do allow you to create a usable conversion from the HDR image data, which of course can then be further modified using the image adjustment controls in Photoshop. The Highlight Compression simply compresses the highlights, preserving all the highlight detail. It can render good midtones and highlights at the expense of losing detail in the shadows. The Equalize Histogram option attempts to map the extreme highlight and shadow points to the normal contrast range of a low dynamic range Photoshop image, but this too can be a rather blunt instrument to work with.





5 The final method is called Local Adaptation. And you will notice that the controls here bear some similarity to those found in the Shadow/Highlight image adjustment dialog. It is best to start with a low Threshold setting of 0.5 and then adjust the Radius slider to determine the ideal radius setting that will produce a reasonably good looking conversion. You can then switch to adjusting the Threshold slider again to fine-tune the adjustment, but take care to make sure that you don't create any ugly haloes around the high contrast edges.

If you now click on the disclosure triangle in the HDR Conversion dialog you will display the Toning Curve and Histogram. You can now treat this as a Curves adjustment tool with which you can create a tone enhancing contrast curve that will be applied during the HDR conversion. Click OK and Photoshop will apply whichever conversion method you have selected and create a finished image like the one shown here.

It has to be said that HDR merged images can sometimes look pretty freaky because the temptation is, as shown here, to try and squeeze a wide dynamic range scene into a low dynamic range print. Just because you can preserve a complete tonal range does not mean you must always represent it in print.