

HDR images using Photomatix: David Baine

Complete user manual found at:

<http://www.multimediamphoto.com/pm/ManualPhotomatixPro3Mac.pdf>

Additional information was obtained from Ben Willmore (whereisben.com), *High Dynamic Range Imagery*, Photoshop World, Las Vegas, 2008. The specific values suggested from each variable have been suggested by Willmore.

First, using a tripod, take 3-7 pictures of the same scene. Generally, take one picture at natural exposure and two pictures, one at +2 stops and one at -2 stops^(Note); additional pictures may be taken at intermediate exposures. To insure that each exposure has the same depth of field, set your camera at *aperture priority* to fix the same depth of field for each exposure – thus, each exposure variation must be taken by adjusting length of exposure.

Check your images

Examine the **darkest shot** and make sure no highlights are blown out – **there should be no blinkies** anywhere in the image; the only areas that can be overexposed in the darkest exposure are the noon day sun or reflections of very bright light sources on glass, metal and water.

In the lightest shot, make sure the darkest areas look well lighted – in some situation, this may call for five rather than 3 exposures.

*****ADJUST THE WHITE BALANCE OF EACH OF THE PHOTOS BEFORE MERGING THEM.***

Opening Images in Photomatix

1. Double-click on the Photomatix icon on the desktop
2. Choose one of: a) **Generate HDR image (leads to Tone Mapping – offers greatest control of variables) PREFERRED**
 - b) *Exposure Blending* (simpler method – gives you less control)
 - c) *Batch Processing*
3. Browse for and select 3-7 images each shot at a different exposure; select O.K.
Check: Align Source Images
Check: Attempt to Reduce Ghosting
Check: Take Tone Curve of Color Profile
4. Select **Tone Mapping (PREFERRED)**
5. (First, save HDR image before proceeding so that you can return to it later if you want).

tone mapping: There are two methods: Details Enhancer (PREFERRED) and Tone Compressor

At the top of the pane, select one of the two tabs: **Details Enhancer** (PREFERRED) or **Tone Compressor**. Try both methods for each HDR image, then choose the best for that image. Note: HDR images do not show well on most monitors as the dynamic range of values exceeds the low dynamic range of standard monitors, therefore, the image you are working with may not look great on your monitor.

- a. **Details Enhancer (PREFERRED)**: offers 15 adjustments; problem: can produce painterly effect; can make noise and halos more visible. Tone Compression produces a more photographic look; reduces noise and halo. Listed below are the adjustments that can be made and the nature of each adjustment.

Note the arrow at the bottom of the page – permits you to undo any adjustment made.

As you make changes, monitor the histogram for effects such as clipping at tails of distribution or reducing range of distribution.

THE ADJUSTMENTS ARE LISTED IN THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM: The numbers ONE, TWO ... indicate the order in which Willmore adjusts his photos.

ONE: Strength: amount of contrast (local and global) 100=maximum increase both locally and globally (START WITH SLIDER @ 100% AND LOWER AS PREFERRED – MAY LOWER AFTER ADJUSTING ALL OTHER SLIDERS)

TWO: Color Saturation: overall RGB (START @ 100%; ONLY LOWERED ON 5% OF IMAGES)

SIX: Light Smoothing: higher values produce large but less apparent halos and give more natural look; low values produce small but obvious halos (IF YOU WANT A PHOTOGRAPHIC LOOK, USE HIGHER VALUES; IF YOU WANT AN ILLUSTRATION LOOK, USE LOWER VALUES)

FIVE: Luminosity: move to Right: boosts shadow detail
move to Left: more natural (DON'T BE AFRAID TO MAX OUT THIS SLIDER – WATCH THE DARK PART AND ADJUST UNTIL IT IS BRIGHT ENOUGH).

Select Tone Tab

THREE/FOUR: White and Black Points: both sliders B/W control how the minimum and maximum values of the tone mapped image are set. Moving the sliders to the right increases global contrast. Moving them to the left reduces clipping at the extremes.

White Clip slider (pure white or level 255) controls how large an area will be solid white (ALWAYS BRING THIS SLIDER UP A BIT).

Black Clip slider (pure black or level 0) controls how large an area will be totally black (BRING IT ABOVE ZERO TO MAKE SURE THERE IS SOME BLACK – ADJUST BLACK AND WHITE TO INSURE YOUR IMAGE CONTAINS THE FULL BRIGHTNESS RANGE).

SEVEN: Gamma: adjusts mid-tones: (brightens and darkens globally) (RARE TO USE THIS ADJUSTMENT)

Select Color Tab

THIRTEEN: Temperature: right is warmer (orange); left is colder (blue) (NOT REQUIRED IF WHITE BALANCE OF EACH PHOTO HAS BEEN ADJUSTED BEFORE THE PHOTOS ARE MERGED)

FOURTEEN: Saturation highlights: values above zero increase saturation of highlights (RARELY ADJUSTED)

FIFTEEN: Saturation shadows: values above zero increase saturation of shadows

Select Micro Tab

EIGHT: Micro Contrast (accentuates local details) (IF YOU WANT A PHOTOGRAPHIC LOOK > LOW SETTING; ILLUSTRATIVE LOOK > HIGH SETTING)

NINE: Micro Smoothing: smooths local detail, reduces noise and gives a cleaner look to results (LOW: ILLUSTRATIVE; HIGH: PHOTOGRAPHIC)

Select S/H Tab

TEN: Highlights Smoothing (move to Right reduces contrast in

highlights) prevents white highlights from turning grey and a uniform blue sky from becoming dark blue-grey; reduces halos around objects against bright backgrounds (ONLY USE OCCASIONALLY – USE ONLY WHEN THE DARKEST EXPOSURE HAS BLOWN OUT HIGHLIGHTS)

ELEVEN: *Shadow Smoothing* (move to Right reduces contrast in shadows) (USE ON < 5% OF THE PHOTOS)

TWELVE Shadow Clipping forces the darkest areas of your image to solid black without affecting the rest of your image (USE IF THE DARKEST AREAS OF YOUR PHOTO DO NOT APPEAR SUFFICIENTLY BLACK)

- You can recycle through the foregoing adjustments, when you are satisfied with the results, select PROCESS to obtain the final draft of the photograph (the final image is 16 bit).

If you are dissatisfied with the results: PROCESS > UNDO TONE MAPPING: will revert to 32 bit HDR image and can be Tone Mapped again.

SAVE PROCESSED PHOTO: FILE > SAVE AS TIFF

CONTINUE PROCESSING THE FILE IN Photoshop RAW

OPEN Bridge: select photo OPEN in CAMERA RAW This will allow you to quickly fine tune the image without having to navigate multiple dialog boxes in Photoshop.

When you open the file, if it is every greyed-out: TOOLS > CACHE > PURGE CACHE

If you wish to select some portions of the image for specific modifications, or do other manipulations not possible in RAW, finally, open the image in Photoshop.

Then, if you wish, process the same photographs using *Tone Compressor*, following steps 1-3, above, and on step 4, open Tone Compressor rather than Tone Mapping.

	<i>Pros</i>	<i>Cons</i>
HDR Tone	• HDR image file can be	• When source images are

Mapping	<p>saved, enabling to tone map the same image with other methods or other settings.</p> <ul style="list-style-type: none"> · Ability to preserve details in shadows and highlights even when the dynamic range is particularly high · High degree of parametrization, i.e. tone mapping methods can offer many settings to adapt image to one's liking 	<p>noisy, tone mapping may further increase noise.</p> <ul style="list-style-type: none"> · In spite of the availability of settings, controlling the tone mapping operation is not easy.
Exposure Blending	<ul style="list-style-type: none"> · Blending the images has the effect of reducing noise · Blended image is close to the source images giving it a "natural" look · Easy-to-understand process, no or few parameter setting 	<ul style="list-style-type: none"> · Lack of local contrast when dynamic range is high, "flat-looking" results in some cases · Memory required for Exposure Blending increases with the number of source images and bit-depth.

The table below lists the main pros and cons of both processes.



- b. **Tone Compressor:** *Select Highlights and Shadows* Method rather than Average Method; Select Alternative Exposure Blending: there fewer adjustment options; produces more natural looking results and less noise than Details Enhancer.

Note the arrow at the bottom of the page – permits you do undo any adjustment made.

- Brightness: controls overall brightness
- Tonal Range Compression: controls how the tonal range of the 32-bit image is compressed into the 0-256 range of 8-bit monitors. The higher the value, the more both shadows and highlights will be shifted toward the center of the histogram.
- Contrast Adaptation: sets how much the contrast is adapted to the intensity of the pixel values processed.
- White and Black Points: both sliders B/W control how the minimum and maximum values of the tone mapped image are set. Moving the sliders to the right increases global contrast. Moving them to the left reduces clipping at the extremes. The White Clip slider sets the value for the maximum (pure white or level 255). The Black Clip slider sets the value for the minimum (pure black or level 0).
- Temperature: moving the slider to the right gives a “warmer”, more yellow-orange look. Moving the slider to the left gives a “colder” bluish look. A value of zero preserves the original color temperature of the HDR source image.

- Saturation: adjusts the color saturation of the tone mapped image. The greater the saturation, the more intense the color. The value affects each color channel equally.
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Alternatively, at the opening menu to Photomatrix, select Exposure Blending rather than Tone Mapping.

Open Photomatrix, as above, browse to select 3 or more photos and proceed.

EXPOSURE BLENDING: *An alternative to Tone Mapping:* combines photos of different exposures using the Average Method (reduces noise) or PREFER: the *Highlights and Shadows Method* (produces a broader dynamic range)

- Strength: adjusts local contrast
- Color Saturation
- Blend Point: adjusts weighting given to the over- and under-exposed images

Note: a stop (whether determined by shutter speed or aperture) is defined as being the doubling or halving of any value. The amount of light that gets through a lens is proportional to the area of the opening. The aperture (f/stop) is a ratio that depends on the diameter, though, not the area of the lens opening: $area = (\pi) \times (radius)^2$ The radius is half the diameter. So, if the diameter of a circle is doubled (which doubles the radius at the same time), the resulting area is four times the original area (two squared). If the area is doubled, the diameter only increases by the square root of two. The square root of two is about of about 1.4. So, the standard f/stop series actually does represent the doubling and halving of the area of the opening, not the diameter.