Photomatix

HDR Imaging for Photography

Introduction

High Dynamic Range (HDR) photography is a combination of a specialized image capture technique and image processing.

Photomatix Pro combines several exposures of a single scene, exposed for the darkest shadows to the brightest highlights. By capturing multiple images at different exposures, you can use Photomatix Pro to achieve detail throughout the tonal range.

This manual offers step-by-step instructions for using the Photomatix Pro software. This manual uses the following helpful icons:

☆ Useful information about the program's capabilities.

⚑ Tips and recommendations for using the software.

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Section 1: Tips for Taking Successful Source Images

A great final HDR photograph starts with several differently exposed source images of the same scene.

Photographs can be made with compact digital cameras, advanced-feature digital SLR cameras, or film-based SLR cameras (from images scanned into your computer). Photomatix can merge 8- and 16-bit photographs in JPEG, PSD or TIFF format. It can also create a 32-bit HDR image from RAW files of several camera models.

Two pieces of universal advice for creating differently exposed source images:

> 1) Make sure to take enough exposures to properly cover the dynamic range of your scene from the darkest shadows to the brightest highlights.

> 2) It is suggested to use a tripod to keep your images completely aligned. Photomatix incorporates Image Alignment functions, but using a tripod is still recommended.

Auto-Exposure Bracketing (AEB) method for DSLR and compact digital cameras

- It is recommended to shoot with available light. A flash may try to balance the exposure of all the images, when a range of exposures is the goal.
- Select a low ISO to minimize image noise.
- Select Continuous shooting mode on the camera's drive setting to ensure that the bracketed photos will be captured with a single depression of the shutter button.
    - o Consult the camera manual for model-specific instructions on choosing this setting.
- If possible, use the camera's self-timer setting, or a cable release to minimize camera shake.
- Set the camera to Auto Exposure Bracketing (AEB), which takes several photographs of a scene in a row: one at the proper exposure, some underexposed, and some overexposed.
    - o Most current DSLRs and compact digital cameras allow the user to select the amount of over/under exposure in one-third or one-half increments. The suggested exposure increment is +/- 2 for optimal exposure range. If your camera does not offer +/- 2 exposure increment, select the maximum possible. Consult the camera manual for model-specific instructions on choosing this setting.

*DSLR LCD window showing AEB icon with +/-2 increments selected.*

- o Select an appropriate number of auto-bracketed frames if your camera offers different options for the number of frames. For instance, if your camera can auto-bracket at a maximum of +/-1 EV increments, then select 5 or more frames if your camera allows it. 5 frames spaced by +/-1 EV increment will give you the same dynamic range coverage as 3 frames spaced by +/-2 EV increments.

- After capturing the bracketed images, check the histogram previews in playback mode to ensure that you have captured a good range of exposures.

It is important to remember that the number of exposures needed depends on the dynamic range of the scene in addition to the exposure increment. For most outdoor scenes, three exposures taken at +/- 2 exposure increment will be sufficient, provided the scene does not include the sun. However, for the interior of a room with a bright view out of the window, for instance, you will need at least five images taken at +/- 2 exposure increment, or 9 images taken at +/- 1 exposure increment.
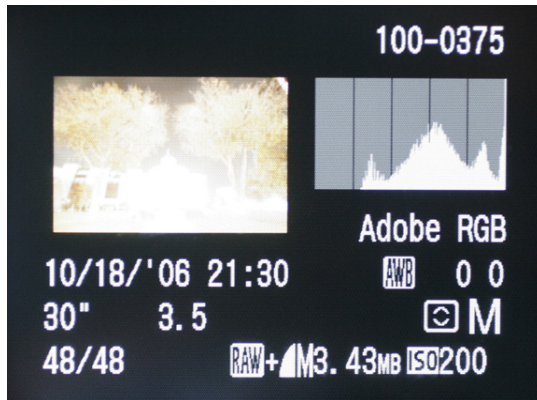
Manual Exposure Bracketing for DSLR cameras

In scenes with extreme differences between light and dark details, manual exposure bracketing over a greater exposure value range may provide better source images than Auto Exposure Bracketing.

- Choose a low ISO to minimize noise and make the highest quality source images.

- Keep a constant aperture and ISO. Control image exposure by changing the shutter speed in full-stop increments.

- Shoot a series of images starting with your brightest image elements (highlights) being slightly underexposed (see figure 2.1 below) to the darkest image elements (shadows) being slightly overexposed (see figure 2.2 below). You may or may not want or need to use every exposure in the series for HDR processing, but you increase your options with this method. Experiment with different combinations of the totally bracketed source images in Photomatix Pro to achieve your desired effect.

- Check your DSLR's Histogram preview in playback mode to ensure that you have captured the entire tonal range of the image.

- Self-timer mode, a cable release, and mirror lock-up options, if available, will help minimize any camera shake, especially for exposures slower than 1/15 second.
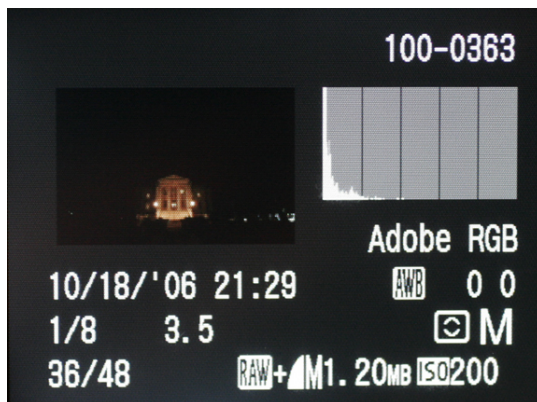
Figure 2.1 Histogram depicts the brightest elements (highlights) slightly underexposed.

Figure 2.2 Histogram depicts the darkest image elements (shadows) slightly overexposed.

Manual Exposure Bracketing with Compact Digital Cameras

Consult your camera's user manual to determine if manual exposure is possible. Follow the steps for Manual Exposure Bracketing with a DSLR.

📌 If your compact camera does not have AEB, you can use the exposure compensation setting to manually bracket. The series below shows the same scene captured at -2, 0 and +2.

LCD display

Film SLR photo techniques for creating HDR source images

- Follow the advice for shooting with a DSLR, keeping in mind that you will not have the option of previewing the live histogram to determine your exposure range.
- Scan your film or slides, not prints. Photo labs will attempt to make the best print from each of your source images, and you will not achieve good results scanning these in for HDR generation.
- Turn off your scanner's auto-exposure options, so that you are manually controlling the exposure.
- Choose the *Align images* option in Photomatix Pro to align your photos prior to HDR generation.

Section 2: HDR Generation and Tone Mapping

In order to create your final HDR photograph for display, you will have to follow a two-step process:

- The first step is to merge your differently exposed source images into a single 32-bit HDR image. Because of its high dynamic range, a true 32-bit HDR image will not display properly on conventional monitors.

- In the second step, this 32-bit HDR image is then processed, or 'developed,' via the Tone Mapping tool. This tool will 'reveal' the dynamic range captured in the HDR image and produce an image which can be properly displayed and printed on conventional Low Dynamic Range monitors and printers.

↳ Because the HDR generation process involves multiple files of the same scene, it may be a good idea to rename your source image using a logical and consistent naming format for each set of images that will be merged.

I
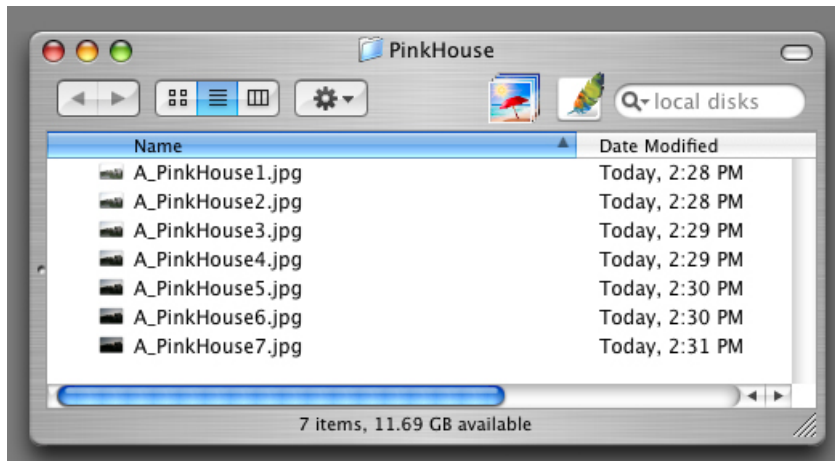
I*n the example above we have both alphabetized and numbered our descriptive file names for easy reference during processing.*

If you choose to re-title your source images with more descriptive filenames, such as 'castle', and 'mountain' it is suggested to follow a similar alphabetical convention: castle1.jpg, castle2.jpg, castle3.jpg and mountain1.tif, mountain2.tif, mountain3.tif.

Following these logical alphabetical naming conventions will help keep the differently exposed source images organized for the user, and will also work with the alphabetical logic of the Batch Processing feature of Photomatix Pro. (See section 4 for more on Batch Processing.)

In any case, the ordering of files part of the same bracketing sequence does not matter. Photomatix will systematically sort the files based on their exposure information retrieved from the Exif data, or their brightness level when the Exif data are not available.

HDR Generation

Step 1: Use the *HDR>Generate HDR* command path. The "*Generate HDR–Loading source images*" window will display.
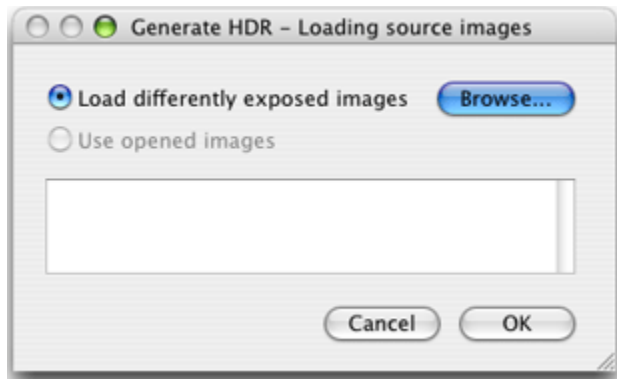
☆ When your source images are large files, use instead Batch Processing to generate the HDR image. Batch Processing includes an option, named strip-processing, that lets you create HDR images from large source images in TIFF format without exceeding available RAM.

Step 2: Click *Browse*. The "Select differently exposed images" window will display to follow a path to load your source files.

☆ Photomatix Pro can generate an HDR image from 8-bit, 16-bit and RAW source files. Supported file types include JPEG, TIFF, and RAW files from Canon, Nikon, Fuji, Olympus, Kodak, Minolta, Sony, Pentax and Panasonic.
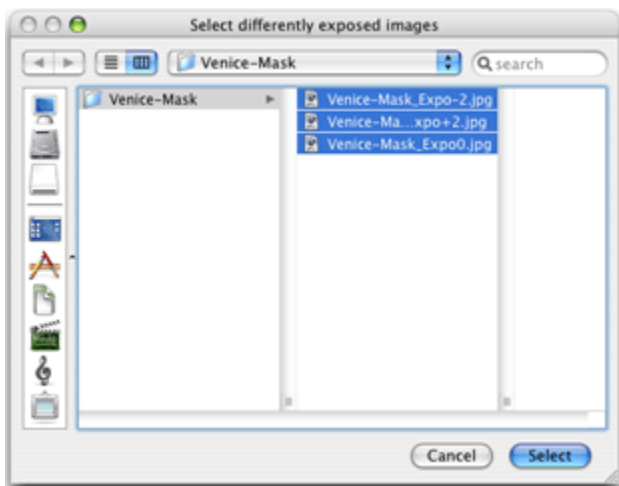
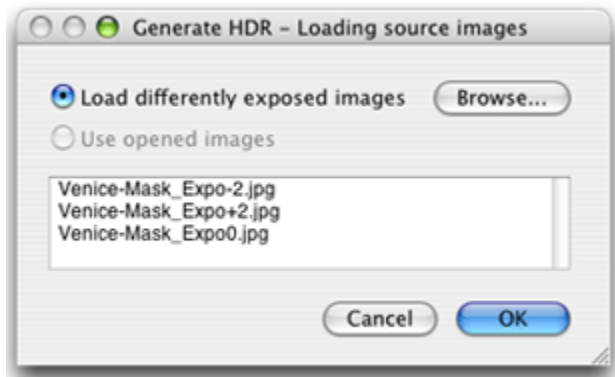Step 3: Highlight the differently exposed source images for HDR Generation and click *Select*. The "Generate HDR-Loading source images" window will display.

Step 4: The selected images will appear in the "Generate HDR-Loading Source Images" window. Click *OK*.

☆ If the exposure information can not be found in the Exif data, Photomatix will show a window where you can input the Exposure Values for each one of your images. This window will also show if two or more source images have the same exposure setting.

The "Generate HDR- Options" window will appear.
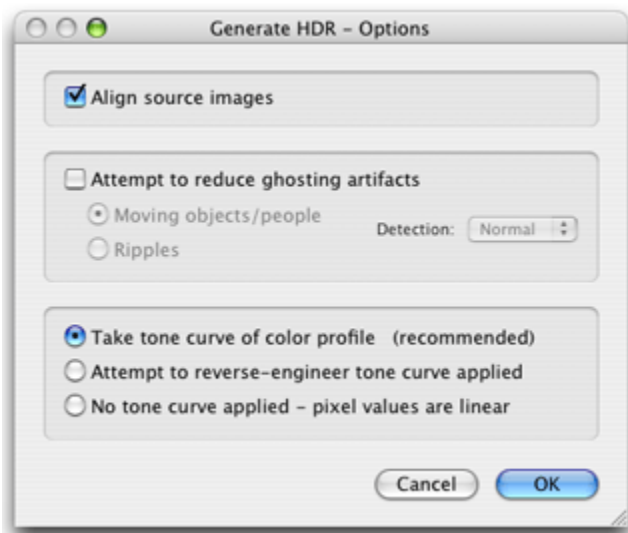
The above window is for the case when the source images are JPEG, TIFF or PSD files. When they are RAW files, the window will display slightly differently as shown on the next page.

Step 5: Check the desired options on the "Generate HDR- Options" window.

The "*Align source images*" option is checked by default. This option corrects for misalignment problems if the camera moved slightly between the bracketed frames, which may happen even when shooting with the aid of a tripod.

If the scene has moving objects and you find the resulting 'ghosts' are not desirable, then check "*Attempt to reduce ghosting artifacts*" with the option "*Moving objects/people*" selected. If there are elements in the scene that follow a rhythmic pattern (flowing water for instance) oscillating between shadows and highlights, then select instead the option "*Ripples*". In both cases, try first with the *Detection* option set to *Normal*. If you find that the resulting HDR image still shows too much ghosting, then try again with the option set to *High*.

Only check the "*Attempt to reduce ghosting artifacts*" option if it is needed. Checking it in other cases will lower the quality of the resulting HDR image.

When the source images are JPEG, TIFF or PSD files:

The recommended option "*Take tone curve of color profile"* is selected by default and is usually the best option when the images files come from a DSLR camera or have been converted from RAWs. This option looks up the Tone Reproduction Curve data in the ICC color profile associated with the source images in order to determine the non-linear function applied to the raw sensors data. If no profile is available, it takes the tone reproduction curve of Adobe RGB.

When the images are scanned films or taken with a compact camera, it may be worthwhile checking the option "*Attempt to reverse-engineer tone curve applied*".

If your source images are 16-bit TIFF files that have been converted from RAWs with a special option in the RAW converter to leave the image in linear space, then check the option "*No tone curve applied – pixel values are linear*". Only check this option, though, if you are 100% sure that the tonal values of the image are linear relative to the values of light captured. Please note that the terminology linear may be used with a different meaning depending on the RAW converter (in Adobe Camera RAW for instance, linear is relative to the Adobe RGB color space and not to the values of light).

When the source images are RAW files:

The "Generate HDR - Options" window will display with additional options:

By default, Photomatix will use the "*As Shot*" White Balance (read in the Exif metadata) when converting the RAW data to HDR. You can adjust the White Balance by selecting a pre-defined white balance from the drop-down menu or specify the color temperature in Kelvin. A preview lets you see the effect of the change on the source image.

The RAW data are in a color space specific to the camera. Photomatix will convert the data into a standardized color space, by default Adobe RGB, but you can select sRGB or ProPhoto RGB instead. It is important to note that the selected color space is used for its color primaries only, and not for its tone reproduction curve. Since HDR image are in linear space, they do not have a tone curve.

The tone curve of the profile associated with the image will only be applied in the tone mapping step, and not to the HDR image itself.

Step 6: Click OK to create the 32-bit HDR image.

A progress bar will display in the "Generate HDR –Options" window. Once the HDR is generated, the HDR image and HDR Viewer window will display on-screen.

Step one of the two-step process is complete.

Until Tone Mapping is applied, the 32-bit image seen on screen can not display its full tonal range.

The small window called HDR viewer shows a local section of the HDR image viewed at the appropriate exposure.

✎ Saving the 32-bit HDR image at this point will allow you to apply different Tone Mapping settings to the HDR source image without repeatedly following the "Generate HDR" procedure. However, please note that the color profile information of the source images will not be preserved once the HDR image has been saved as Radiance or OpenEXR file.

☆ Photomatix Pro allows you to create a 32-bit HDR image from a single RAW file. For that, open one RAW file from *File->Open*, and Photomatix will convert it into a pseudo-HDR image. However, it is important to note that an image created with a single RAW file can not really be considered High Dynamic Range. It is a rather a pseudo-HDR image. The important characteristics of this pseudo-HDR image is that it is unprocessed. Its dynamic range, however, is not much different from the range of an already converted file.
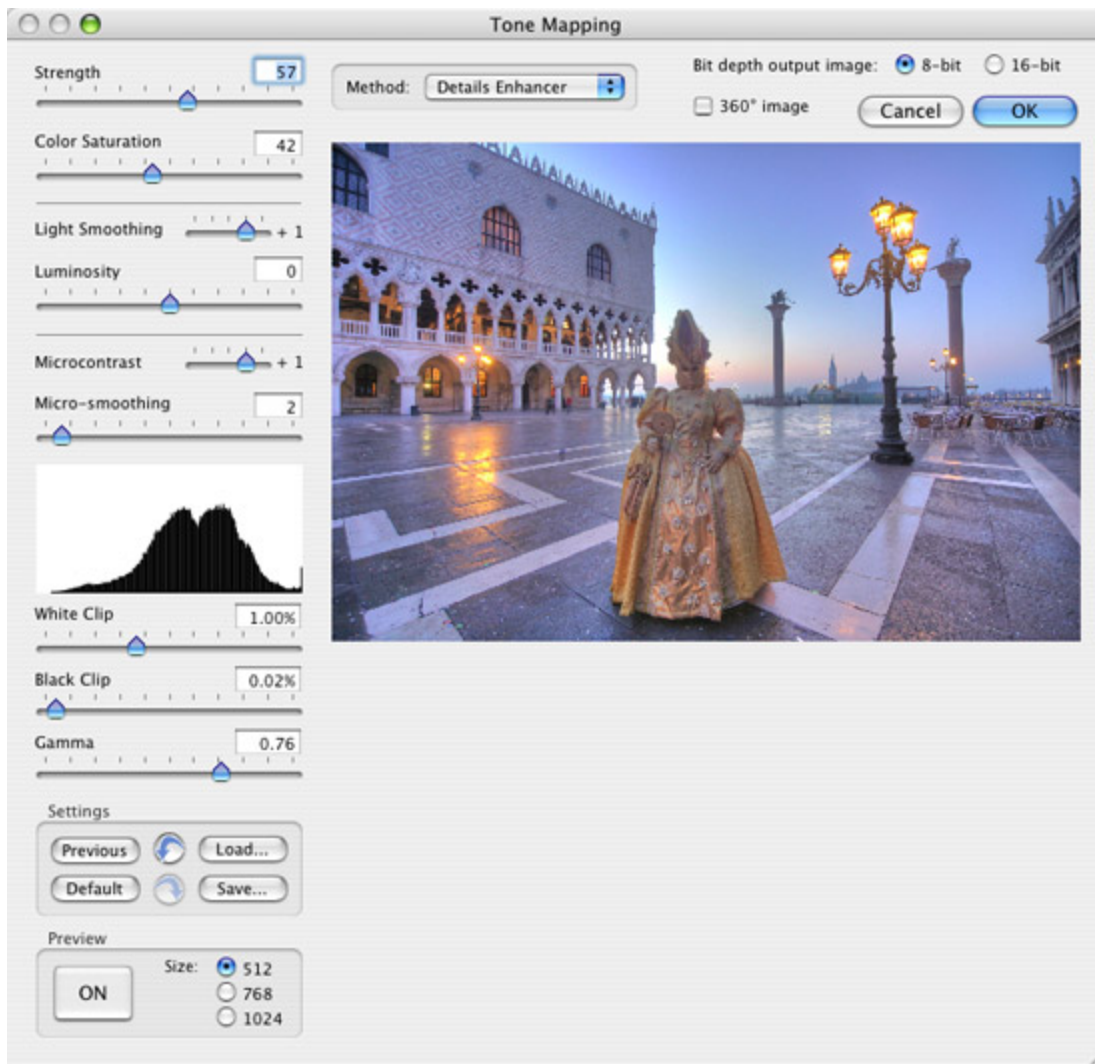
Tone Mapping

The generated HDR image can not be represented properly on screen without further processing. An unprocessed HDR image is somewhat similar to a film negative or the RAW file of a digital camera. It needs further processing for display or printing. In Photomatix Pro, this processing is called Tone Mapping.

There are two tone mapping methods for processing the HDR image: *Details Enhancer* and *Tone Compressor.*

Tone Mapping with Details Enhancer

Photomatix Pro defaults to this option when the Tone Mapping window is opened. Details Enhancer utilizes a local operator to 'develop' the HDR image. This means that it takes into account the local brightness context -- a pixel of a given value in the HDR image will be mapped differently depending on whether it is located in a bright or dark area of the image.

Step 1: *HDR>Tone Mapping* will launch the active open HDR image into the Tone Mapping tool. If you have followed the "Generate" command path to create a new HDR source image, it will be the active image. Otherwise, open a saved HDR image via File>Open.

Step 2: Use the nine slider controls to adjust the image. The preview window provides a view of what the image will look like once it is converted to an 8-bit or 16-bit image that incorporates the entire expanded tonal range of the HDR source image.

Details Enhancer incorporates the following image adjustment sliders:

- **Strength:** Controls the strength of contrast enhancements. A value of 100 gives the maximum increase in both local and global contrast.

- **Color Saturation:** Controls the saturation of the RGB color channels. The greater the saturation, the more intense the color. The value affects each color channel equally.

- **Light Smoothing:** Controls smoothing of light variations throughout the image. A higher value tends to reduce halos and give a more natural look to the resulting image. A lower value tends to increase sharpness.

- **Luminosity:** Controls the compression of the tonal range, which has the effect of adjusting the global luminosity level. Moving the slider to the right has the effect of boosting shadow details and brightening the image. Moving it to the left gives a more natural look to the resulting image.

- **Microcontrast:** Sets the level of accentuation of local details. The default value (2) is often the optimal one.

- **Micro-smoothing:** Smoothes out local details enhancement. This has the effect of reducing noise in the sky for instance, and tends to give a "cleaner" look to the resulting image.

- **White Clip - Black Clip:** Both sliders control how the minimum and maximum values of the output image are set. Moving the sliders to the right increases global contrast. Moving them to the left reduces the 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).

- **Gamma:** adjusts the mid-tone of the tone mapped image, brightening or darkening the image globally.
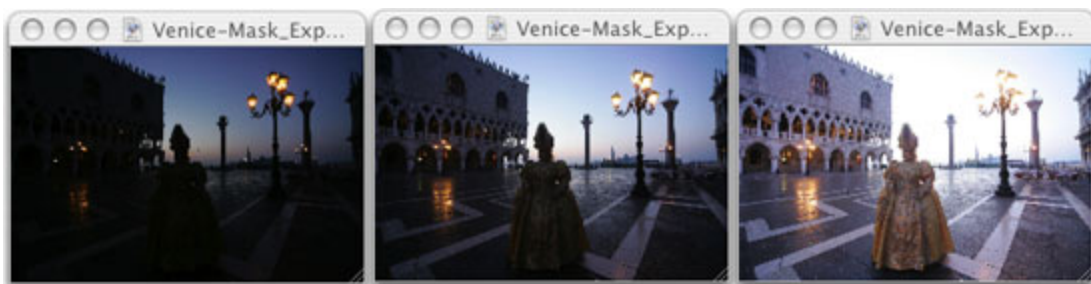
In the example above, the HDR image was generated from these three source images.

Step 3: Once you are satisfied with the results of the Details Enhancer adjustments, select a bit depth for the tone mapped image. A value of 8 means 8 bits per color channel and will allow you to save the image as JPEG. A value of 16 means 16 bits per color channel and will provide a higher precision at the expense of a larger file size on disk.

     ↳ For further processing in an image editing application, 16-bit is recommended. This is particularly recommended for print output.

Click *OK* to create the tone mapped output image.

Step 4: Save the resultant file. *File>Save*. Rename, select save location and file type, if desired. *HDR>Save settings* will save the applied tone mapping settings as an .xmp file.

     ☆ *Edit>Undo* will undo the tone mapping settings applied to the HDR output image. The output image will revert to a 32-bit HDR image which can be tone mapped again.

     ☆ If you are tone mapping a large HDR image file (more than 40 MegaPixels for instance), do not open the HDR image in Photomatix Pro. Instead, click on *HDR>Large File Processing* and load the HDR image file from there. You will get the same tone mapping window and the preview as shown above. The only difference is that the 100% magnification view will not be enabled.

The Tone Mapping window offers additional settings, which are explained after tone mapping with Tone Compressor instructions on page 14.

Tone Mapping with Tone Compressor

Step 1: *HDR>Tone Mapping* will launch the active open HDR image into the Tone Mapping tool. If you have followed the *Generate* command path to create a new HDR source image, it will be the active image. Otherwise, open a saved HDR image via *File>Open*.

Step 2: From the Tone Mapping window, highlight the Details Enhancer drop-down box and select *Tone Compressor*.

The preview window will look very similar to the preview displayed using Details Enhancer, however the image adjustment slider controls will represent the Tone Compressor functions.
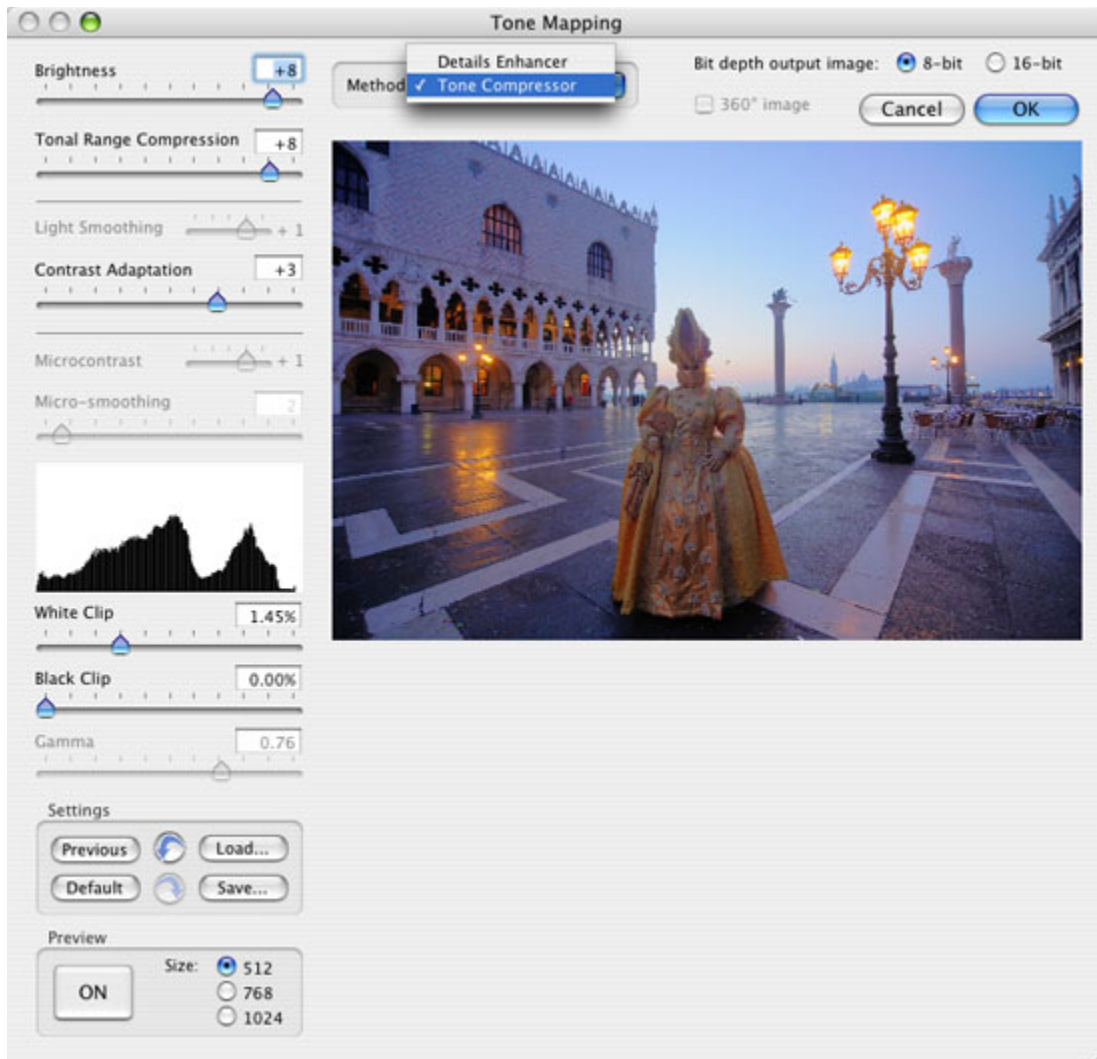
Step 3: Use the five slider controls to adjust the image. The preview window provides a view of what the image will look like once it is converted to an 8-bit or 16-bit image that incorporates the entire expanded tonal range of the HDR source image.

Tone Compressor incorporates the following image adjustment sliders:

- **Brightness:** Influences the tone mapping process done on the HDR image in regards to overall image 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. The Tone Compressor tone mapping method ignores local context.

- **Contrast Adaptation:** Sets how much the contrast is adapted to the intensity of the pixel values processed.

- **White Clip - Black Clip:** Both sliders control how the minimum and maximum values of the output image are set. Moving the sliders to the right increases global contrast. Moving them to the left reduces the 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).

Step 4: Once you are satisfied with the results of the Tone Compressor adjustments, select a bit depth and click *OK* to create the tone mapped output image.

Step 5: Save the resultant file: *File>Save*. Rename, select save location and file type, if desired. *HDR>Save settings* will save the applied tone mapping settings as an .xmp file.

☆ *Edit>Undo* will undo the tone mapping settings applied to the HDR output image. The output image will revert to a 32-bit HDR image which can be tone mapped again.

Additional Tone Mapping Settings

In addition to the image adjustment slider controls, the Tone Mapping Preview window includes several other options and settings, which apply to both Details Enhancer and Tone Compressor.

- **Preview:** The program default is ON. Click the *ON* button to turn the preview window off. Photomatix Pro offers three preview sizes: 512, 768, 1024. Select the radio button for desired size.

  - Hovering the cursor over a section of the preview will bring up a 100% magnification view of the selected area of the preview. Click the mouse to zoom in to 100%. Click the mouse again to return to full image preview.

- **Previous, Load, Default, Save, Undo Last Setting, Redo Last Setting:** These six options allow the user to use pre-set values in both the Details Enhancer and Tone Compressor preview windows. Previous reverts to the last user settings. Default resets the controls to program default, Save allows the user to save settings in XMP format (Extensible Metadata Platform), and Load allows the user to load previously saved settings in XMP format. Undo and Redo last settings allow for quick switching between the current and previous tone mapping settings.

- If you save the tone mapped image as TIFF, the tone mapping settings will be embedded as XMP metadata in the TIFF file. If you open the file in Photoshop, you can then view the tone mapping settings under File->Info->Advanced.
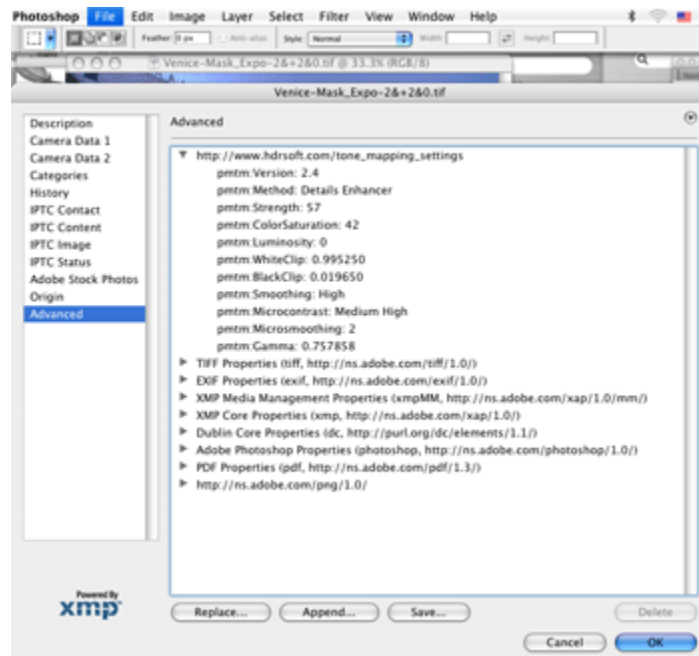
- **Bit Depth output image:** 8-bit is the program's default. Select 16-bit for 16-bit output. This can be changed under *Photomatix Pro>Preferences>>Tone Mapping*

- **360º image:** This option is only applicable to the Details Enhancer tone mapping method and needs to be checked when the image processed is an equirectangular image intended to be viewed as a 360º panorama. This is because Details Enhancer takes into account local contrast and will assign different tonal values to the 360º seams of the panorama. This will produce a visible seam once the resulting image is rendered in a panorama viewer. Checking this option will correct for this.
  - The 360º image option should only be checked for equirectangular 360º images. Checking it in other cases may produce less optimal results.
  - Checking the 360º image option increases the amount of memory necessary to process the image by more than 50%. Processing times will also be increased.

Section 3: Exposure Blending

In addition to the two-step HDR processing described in the previous pages, Photomatix Pro also offers several single-step exposure blending methods that combine differently exposed images to show detail in both shadows and highlights.

> ☆   Each Exposure blending method works with the Batch Processor (page 21) or via the Combine menu with open images. It is recommended to use the Batch Processor, particularly with large files.

Each method is explained in this section:
- Average Method
- Highlights & Shadows – 2 images
- Highlights and Shadows – Auto
- Highlights & Shadows – Adjust
- Highlights & Shadows – Intensive

These blending methods combine 8- and 16-bit source photographs into a single image using the existing shadow and highlight detail from the multiple source images to make a single final 'blended' image with an expanded tonal range.
- The blending methods do not process RAW files.
- Highlights & Shadows – Intensive method only supports 8-bit images.
- There is no limit to the number of source images you can blend, except when using Highlights & Shadows – 2 images, which can only blend two photographs.

> ☆   The Exposure Blending methods are mostly automatic. It is recommended to execute them via the Batch Processing function, especially when blending 16-bit source images. Batch Processing has the additional advantage that you can blend the images with several methods in just one run.

The remaining of this section details Exposure Blending via the Combine menu. For Exposure Blending via Batch Processing, please refer to section 4.

Average Method

<u>Step 1</u>: Open your source images into Photomatix Pro via *File>Open* command path. (Use *Shift* or *Command* to select and open multiple files at once.)
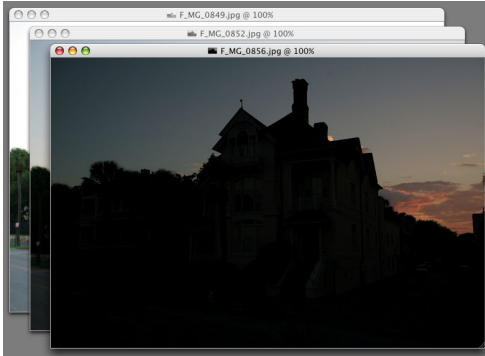
<u>Step 2</u>: Select *Combine>Average*. There are no user-inputs for this command. Photomatix Pro will output a file entitled "Average" which is derived from stacking your source images.
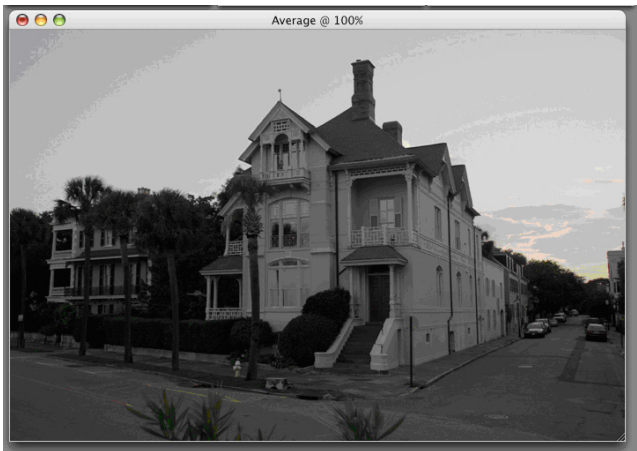
<u>Step 3</u>: *File>Save* will save your image. Rename, select save location, and file type if desired.

Highlights and Shadows – 2 images

Photomatix Pro will combine two (and only two) images when this command is selected. If more than two source images are available, Photomatix Pro will select two which will yield the best results.
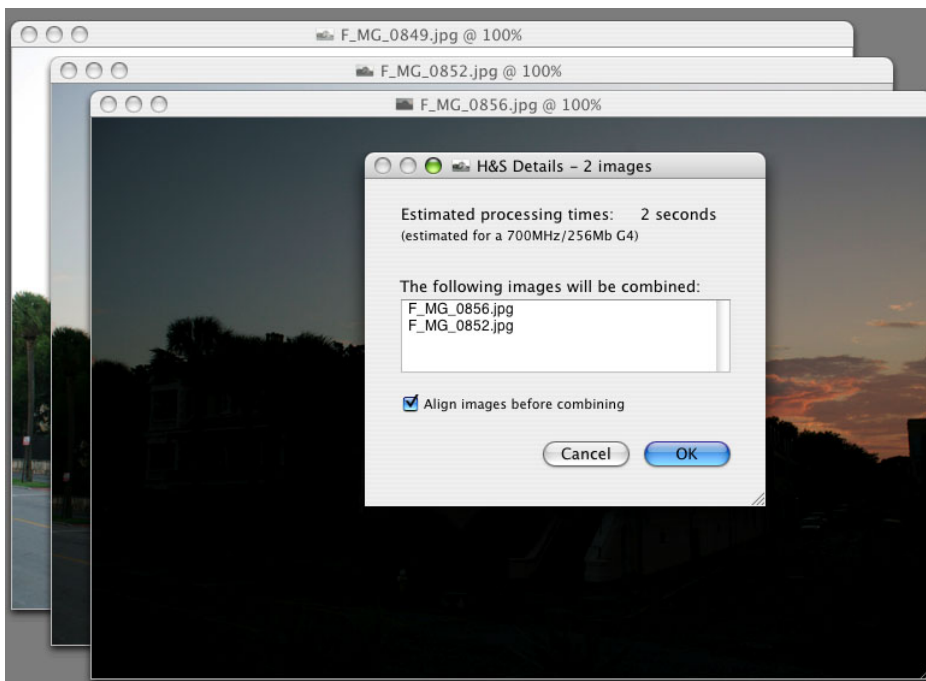
Step 1: Open your source images into Photomatix Pro via File>Open command path.

Step 2: Combine>Highlights & Shadows – 2 images

    ↳ If more than two images are open, the following warning will appear:
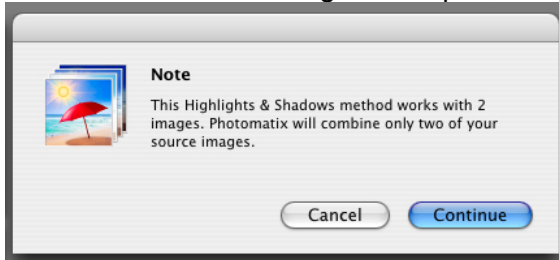
    Step 2-A: Click *Continue*. A dialog box will display, informing the user which two source photographs will be combined.

Step 3: Select *Align Images* (if necessary) and click *OK*. Photomatix Pro outputs a blended photograph entitled "H&S 2 Images".

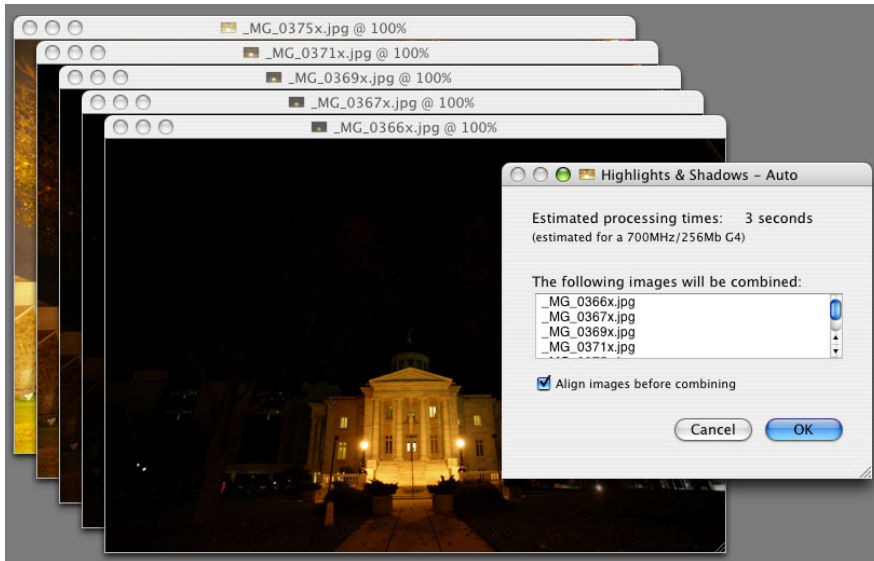Step 4: *File>Save* will save your image. Rename, select save location, and file type if desired.

    ↳ You can try different combinations of two source images to make the most pleasing output image.

Highlights and Shadows – Auto

This method combines all open images into one output image, without offering the user any adjustment options.

Step 1: Open your source images into Photomatix Pro via *File>Open* command path. (Use *Shift* or *Command* to select and open multiple files at once.)

Step 2: Select *Combine>Highlights & Shadows – Auto*. A window will appear stating which source images will be used.

Step 3: Click *OK*. Photomatix Pro will output an image titled "H&S Auto".
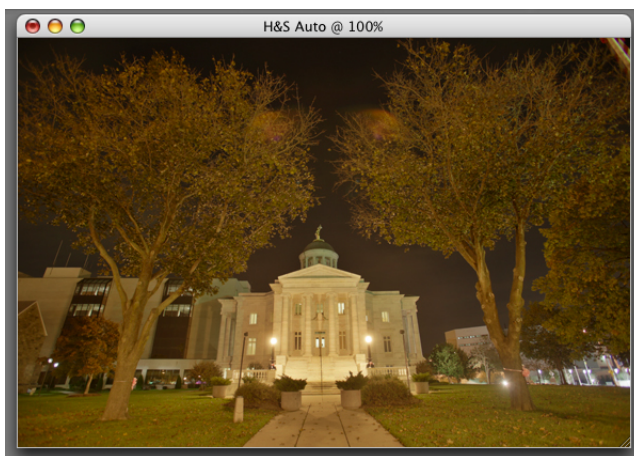
Step 4: *File>Save* will save your image. Rename, select save location, and file type if desired.

> ↳ If you have many source images, experiment with different numbers and combinations of source images to obtain your desired results.

Highlights & Shadows – Adjust

This method allows the user to control the blending point and radius of the blended image, and provides a preview window.

Step 1: Open your source images into Photomatix Pro via *File>Open* command path. (Use *Shift* or *Command* to select and open multiple files at once.)

Step 2: Select *Combine>Highlights & Shadows – Adjust*. A preview window will display the exposure blending of your open source images.
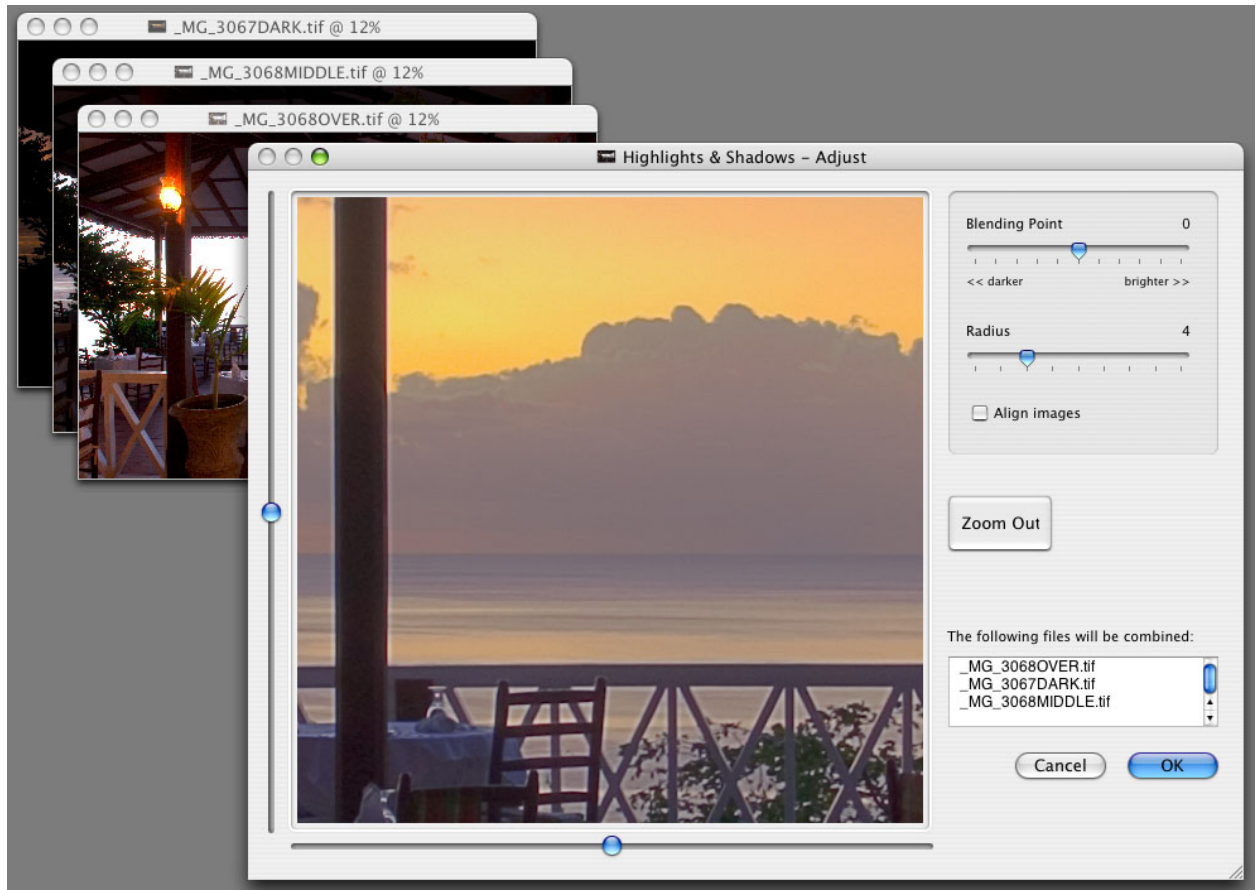
↳ The sliders to the left and below the preview move the image section in the preview window which is defaulted to a detailed partial view. Click *Zoom Out* for a full image preview.

Step 3: Adjust the controls to achieve the desired effect and click *OK*.

- Blending Point: Shift this control to the right to favor overexposure, left for underexposure.
- Radius: A higher radius increases sharpness and blending accuracy, but may produce halo artifacts.

Photomatix Pro will output an Exposure Blended file titled "H&S Adjust".

Highlight & Shadows – Adjust: Resulting blended image.

<u>Step 4</u>: *File>Save* will save your image. Rename, select save location, and file type if desired.

Highlights & Shadows – Intensive

This exposure blending method only works with 8-bit source images.

Step 1: Open your source images into Photomatix Pro via *File>Open* command path. (Use *Shift* or *Command* to select and open multiple files at once.)

Step 2: Select *Combine>Highlights & Shadows – Intensive*. A preview window will display.
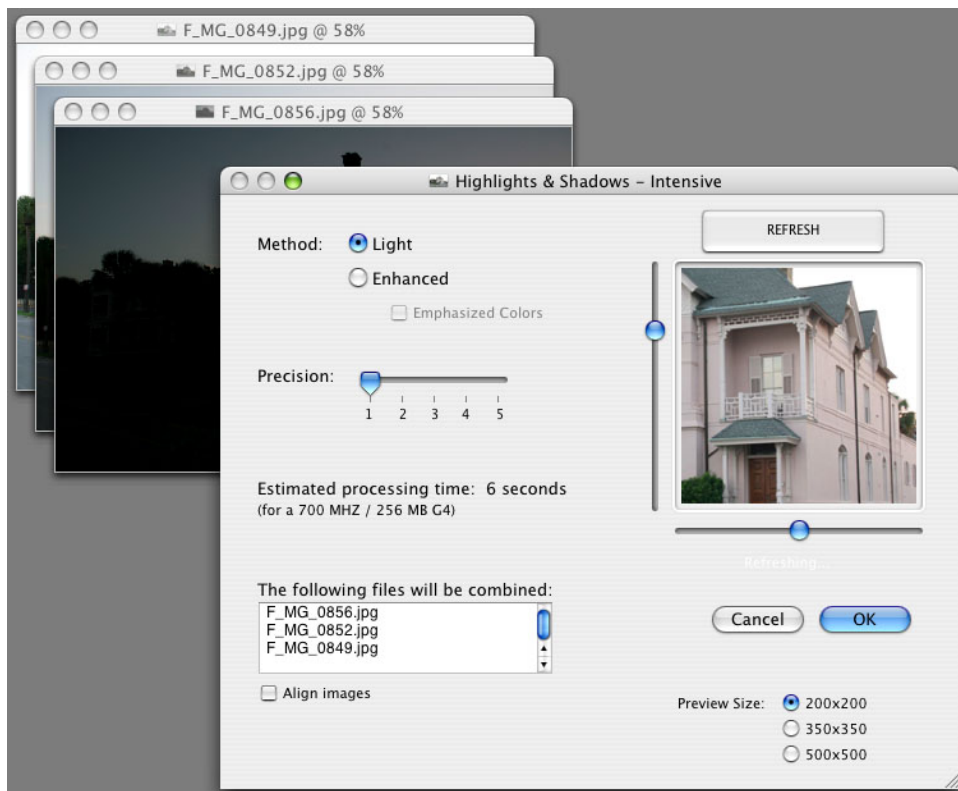
Step 3: Select either *Light* or *Enhance*. If *Enhance* is chosen, *Enhance Colors* is an option. The *Enhance* method tends to produce a higher dynamic range, but appears to be more artificial and produce more halos and artifacts than the *Light* method.

> ↳ Experiment with both options to obtain your desired results.

Step 4: Select a setting on the *Precision slider*. The setting defaults to 1.
A higher precision setting increases sharpness and blending accuracy, but may produce halo artifacts. The higher the precision setting, the longer it will take to process.

Step 5: Check *Align Images* if necessary.

> ↳ You must click the *Refresh* button to update the preview after any adjustments are made, or when the preview sliders are moved.

Step 6: Click *OK* to output the combined image. *Cancel* will close the window without outputting the previewed image.

Step 7: *File>Save* will save your image. Rename, select save location, and file type if desired.
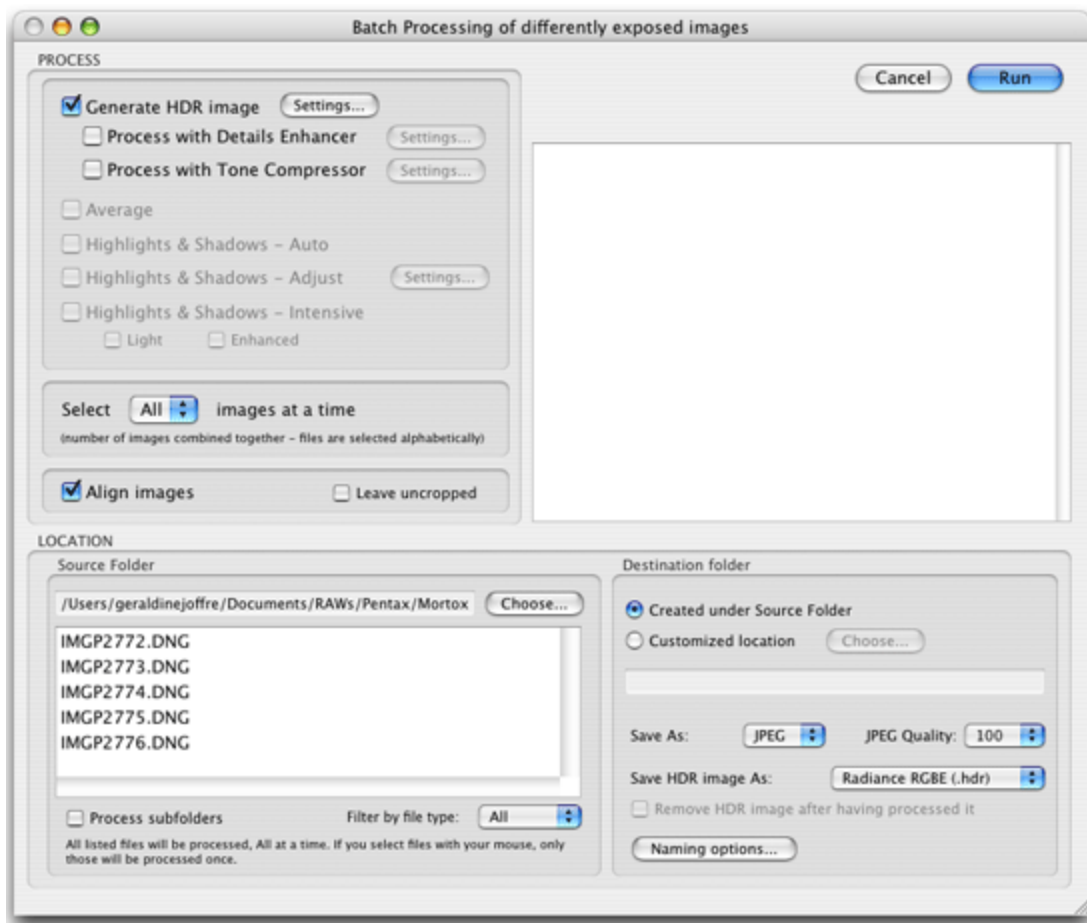
Section 4: Batch Processing

The Batch Processing function of Photomatix Pro allows you to automate the processing of your images. Batch Processing may be used to:

- Process many exposure series to create HDR image files ready to be tone mapped individually. If you open another session of Photomatix Pro, you can start working on the first images while Batch Processing has not finished processing the remaining exposure series.
- Apply several different tone mapping or exposure blending methods to one set of source images
- Apply the same tone mapping or exposure blending settings to several different sets of source images
- Apply both of the above processes at once: applying many different tone mapping or exposure blending methods to several sets of source images

   ↳ It is important to note that when processing different sets of source images in a single folder, each set must contain the same number of source images.

Step 1: Open the Batch Processor via the *Automate>Batch Processing* command path.

🕯 Batch Processing files are selected alphabetically. Ensure that files to be processed are named in a logical alphabetical manner.

☆ Photomatix Pro can process subfolders with different numbers of source images in each folder, and can filter by file type.

Step 2: Select the processes to be automated. At least one option described below (Options A-G) must be selected to run the Batch Processor.

Option A: Generate HDR image

Check this option if you want to create a 32-bit *HDR image. C*lick the *Settings* button to open an option window.
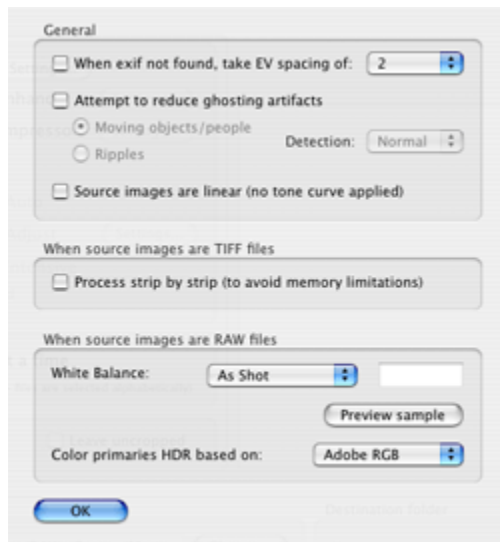
The first checkbox will allow input of EV spacing and will be used if no EXIF information is found in the source files.

If there are moving objects in the source images and you find the resulting 'ghosts' are not desirable, check "*Attempt to reduce ghosting artifacts"* with the option *"Moving objects/people"* selected. If there are elements in the scene that follow a rhythmic pattern (flowing water for instance) oscillating between shadows and highlights,then select instead the option *"Ripples".*

Only check the *"Attempt to reduce ghosting artifacts"* option if it is needed.

If the source images are large TIFF files, check the option "*Process strip by strip"*. With this option, the HDR image file will be created in several passes, processing and loading into memory only one strip at a time. One strip is composed of a limited number of rows set to not exceed around 512 Mb RAM once loaded. This option is particularly useful when processing large panoramas.

If the source images are RAW files, *White Balance and Color Primaries* may be selected. Please refer to step 5 under the HDR Generation chapter of section 2 for details on those settings.

Option B: Process with Details Enhancer

Check this option is you want to further process the HDR image with *Details Enhancer. C*lick the *Settings* button to open a window which lets you adjust the Details Enhancer settings (described in Section 2) without a preview window. You may load settings in .XMP format in this command window.

When the option "Save" is checked, the settings will be saved in an XMP file alongside the tone mapped images. This option is checked by default.
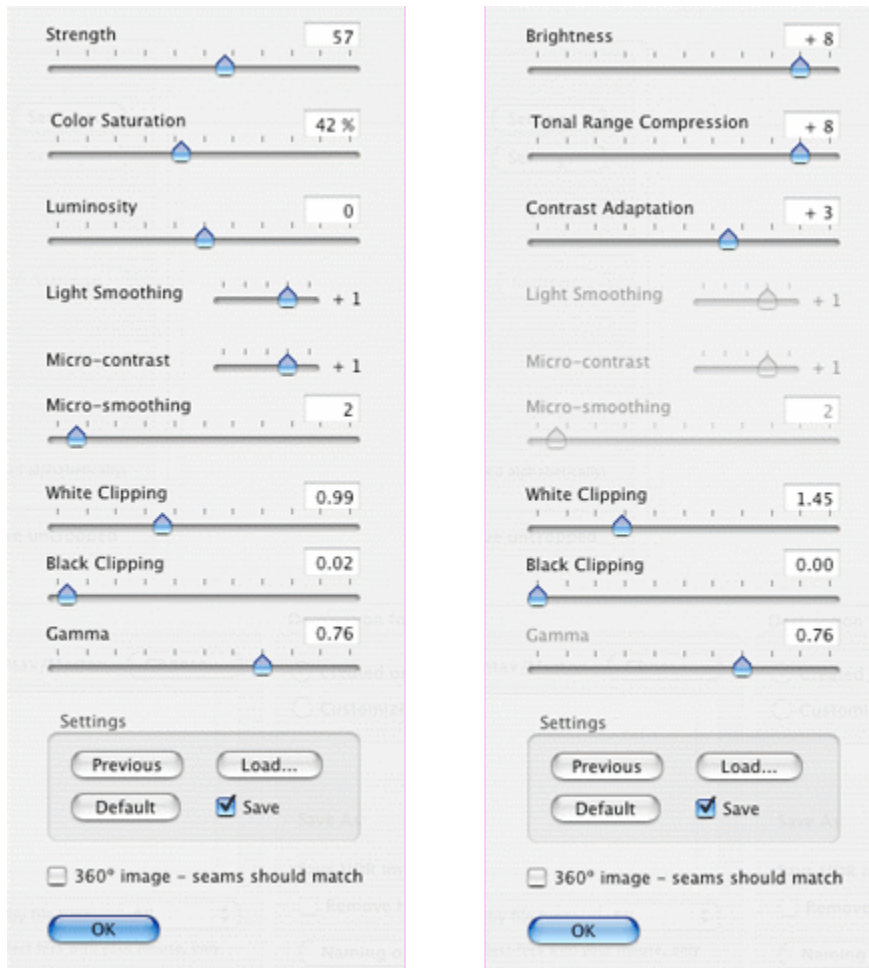
The left window displays when clicking on the Settings button for Details Enhancer.
The right window when clicking on the *Settings* button for Tone Compressor.

Option C: Process with Tone Compressor

Check this option is you want to further process the HDR image with *Tone Compressor.* Click the Settings button to open a window which lets you adjust the Tone Compressor settings (described in Section 2) without a preview window. You may load settings in .XMP format in this command window.

↳ Batch Processing lets you tone map your HDR images with Details Enhancer and Tone Compressor simultaneously.

Option D: Average

Check this option if you want to combine the source images using the average method.

Option E: Highlights & Shadows – Auto

Check this option if you want to combine the source images with the exposure blending method *Highlights & Shadows – Auto*.

Option F: Highlights and Shadows – Adjust

Check this option if you want to combine the source images with the exposure blending method *Highlights and Shadows – Adjust. C*lick the *Settings* button to open a window to adjust the radius and blending point.

Option G: Highlights & Shadows – Intensive

Check this option if you want to combine the source images with the exposure blending method *Highlights & Shadows – Intensive Light/Enhanced*

⤵ This exposure blending method can only process 8-bit source images.

⤵ Selecting this option will prompt a warning window when you click *Run* indicating that this exposure blending method will take a long time to process.

Step 3: Select a number of source images to process at a time: 2-11 or All.

All should only be selected if you are using the *Process Subfolders* option, or if the folder processed contains only one set of bracketed exposures. When *All* is selected, Photomatix will attempt to process all images in each folder, so it is important that only one set of source images be in each subfolder.

☆ It is possible to Batch Process multiple series of source images with varying numbers of source images, if each series is in its own subfolder, and *All* is selected.

☆ If all source images from multiple series are in a single folder, each series must have the same number of source images. Images are processed alphabetically, so each series should be assigned a logical naming method, as described in Section 2. For example: A_Castle1,jpg, A_Castle2.jpg, A_Castle3.jpg followed by B_Sunrise1.jpg, B_Sunrise2.jpg, B_Sunrise3.jpg.

Step 4: Check *Align Images,* if necessary, to correct for slight camera movement between source photographs.

When *Align images* is checked, the images will be cropped after alignment in order to remove invalid areas on the edge due to the correction for mis-alignment shifts. If you want to skip the cropping, then check the *Leave uncropped* option. This option may be useful if you are processing images intended to be stitched into one panorama.

Step 5: Choose a source folder.

Click *Choose* to route to your source images*.*

If you want to batch process several folders, then check *Process Subfolders* .

> 🔔 Use *Process Subfolders* if you have multiple series of source images which vary in the number of source images they contain. The Batch Processor can process series with varying numbers of source images if each series is in its own subfolder and *All* is selected.

Select a file type from the *Filter by File Type* dropdown, if necessary. Options are: All, TIFF, JPEG, PSD, RAW.

> 🔔 This option is useful if a source folder contains RAW+JPEG from a camera, and you are processing only one file type.

Step 6: Select *Destination Folder* location.

Checking *Created under Source Folder* will put the Batch Processing results in subfolders within the source folder. The resulting folder will be prefixed by 'PhotomatixResult'. Checking *Customized Location* allows you to select a specific (different) location on your computer. Click *Choose* to select the location.
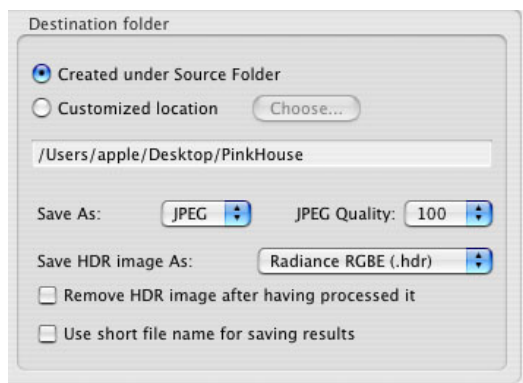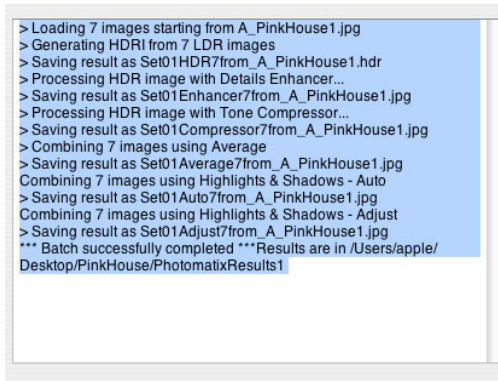

Select a file type for saving, JPEG or TIFF. If JPEG is selected, select a JPEG Quality, from 10-100. If applicable, select an HDR file type for saving the HDR image file: Radiance RGBE or OpenEXR. If you want to save only the Tone Mapping results and not the 32-bit HDR image, check *Remove HDR image after having processed it*.

Click *Naming Options* to choose a naming strategy.

> ☆ Start with Set Number or Start with Filename of first image in the set are the main options. Start with Set number will yield long names such as: Set01Enhancer3from_IMG_3421.jpg. Checking Use shortened version will yield shorter names that do not reference the source files: Set01Enhancer.jpg, for example. Start with Filename of first image in the set yields file names that start with the first image in the set: IMG_3431&2&3Enhancer.jpg, for example. Suffix (optional) will append additional file name information to the end of the assigned file names.

Step 7: Click *Run* to start batch processing.

The window below the RUN command will show the status of each process in real time. When Processing is completed it will state: ****Batch successfully completed***Results are in /Location/PhotomatixResults* of files as selected in Step 6.


```
> Loading 7 images starting from A_PinkHouse1.jpg
> Generating HDRI from 7 LDR images
> Saving result as Set01HDR7from_A_PinkHouse1.hdr
> Processing HDR image with Details Enhancer...
> Saving result as Set01Enhancer7from_A_PinkHouse1.jpg
> Processing HDR image with Tone Compressor...
> Saving result as Set01Compressor7from_A_PinkHouse1.jpg
> Combining 7 images using Average
> Saving result as Set01Average7from_A_PinkHouse1.jpg
Combining 7 images using Highlights & Shadows - Auto
> Saving result as Set01Auto7from_A_PinkHouse1.jpg
Combining 7 images using Highlights & Shadows - Adjust
> Saving result as Set01Adjust7from_A_PinkHouse1.jpg
*** Batch successfully completed ***Results are in /Users/apple/
Desktop/PinkHouse/PhotomatixResults1
```

Single File Processing

In addition to batch processing multiple source files, Photomatix Pro includes the Single File Conversion command under *Automate>Single File Conversion*. This is useful for applying one set of Details Enhancer Tone Mapping settings to several HDR source images at once. This command box can also convert single 16-bit or RAW images into 32-bit HDRs in either .hdr or .exr formats.

> ↳ Only one conversion method is available at a time. You cannot convert from HIGH to LOW and LOW to HIGH in a single session.
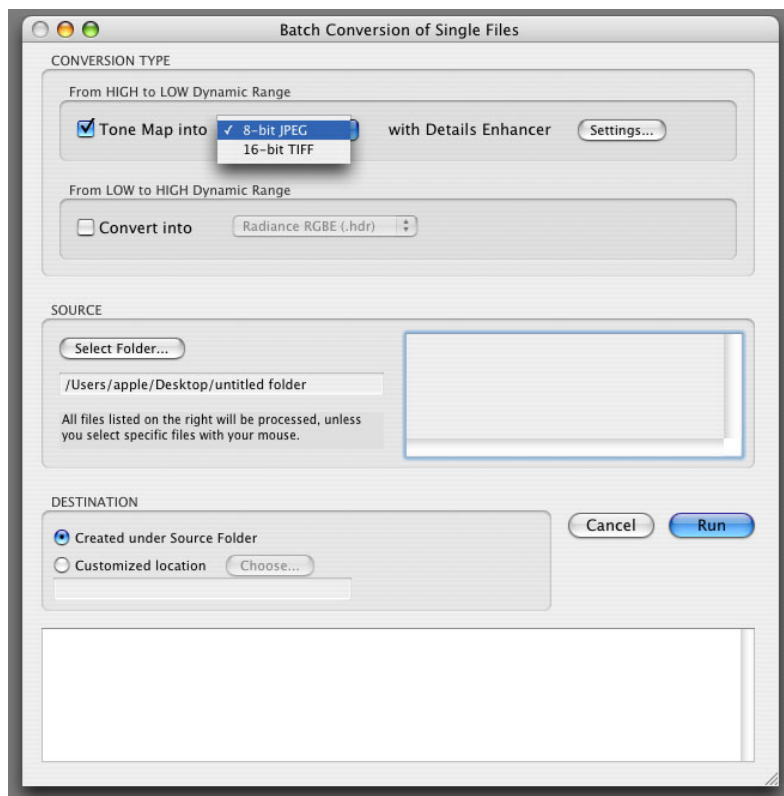
To tone map HDR source images:

Step 1: Check the Tone Map into box.

Step 2: Select either 8-bit JPEG or 16-bit TIFF for output.

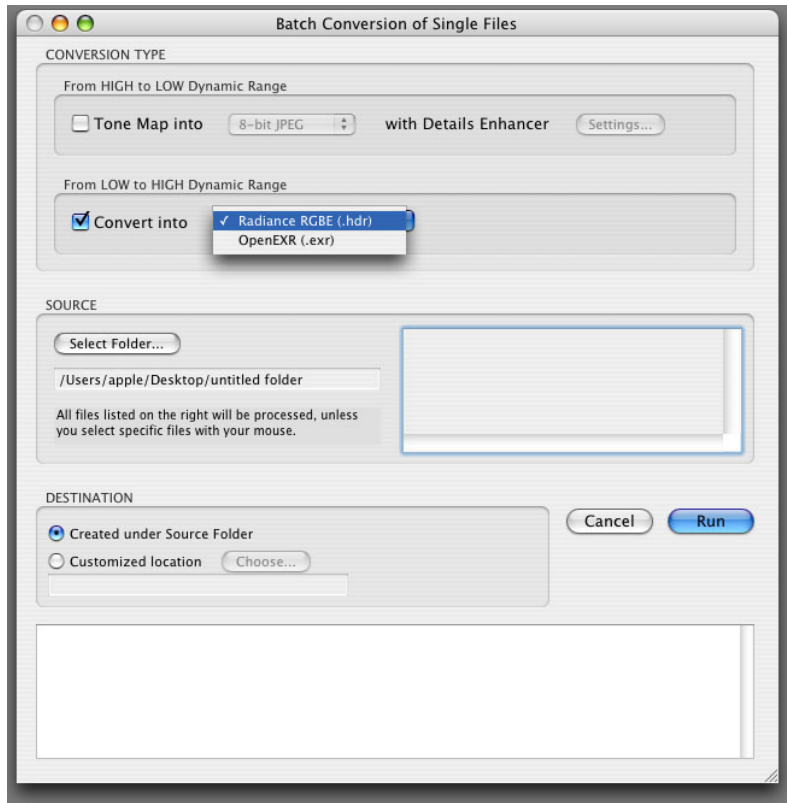Step 3: Click *Settings* to adjust the Details Enhancer settings.

Follow from Step 4 on next page for converting from LOW to HIGH Dynamic Range.

To Convert from LOW to HIGH Dynamic Range:

Step 1: Check the *Convert into* button.

Step 2: Select either Radiance RGBE (.hdr) or OpenEXR (.exr)

Step 3: Click *Select Folder* to locate the folder you wish to process.

Step 4: Choose an output destination. Check *Created Under Source Folder* to have the output files saved to the same location as the source files, or Check *Customized Location* to select another location on your computer. In the case of Source Folder the result will be saved in a sub-folder prefixed by 'PhotomatixConversion'.

Step 5: Click *Run* to process the files. The window at the bottom of the command box will display the progress as the files are processed.