

# How to Prepare Images for Electronic Presentation<sup>\*</sup>

by Thomas Field (rev. 2011-09-16)

**Purpose: optimize your images for display on computer monitors or digital projectors.**

## Introduction

Electronic presentation of images requires somewhat different preparation than for printing. This article recommends a process that has proven satisfactory to the author. Other methods may be equally valid, and the “best method” will continue to evolve as technology changes. This article assumes Photoshop CS on Windows, but other image processing software can be used to implement the same method. Although much of the discussion assumes you are preparing images for digital projection, the same methods generally apply to preparing images for display on computer monitors or even televisions.

## Summary

There are many variables in the world of electronic imaging, but here’s the bottom line: your photos will look their best if you use professional photo editing software to (A) re-size them, (B) convert the color, and (C) sharpen them. Let’s look at two different applications of your images.

1. Projection on the high-resolution Canon Realis digital projector, as used by North Bethesda Camera Club (NBCC) for Electronic Image Competition. Size each image to fit within the projector native resolution of 1400 by 1050 pixels. Convert your colors to the sRGB color space. Display the image full size (100% zoom) on your monitor and sharpen to taste.
2. HDTV Slide Shows for Friends and Family. Size each image to fit within a “full-HD” display resolution of 1920 by 1080 pixels. Convert your colors to the HDTV (Rec. 709) color space. Display the image full size (100% zoom) on your monitor and sharpen to taste.

Of course, this summary omits the details and other options. For more, read on.

## Prerequisites

Calibrate! The first prerequisite – an essential part of the process for serious image processing – is a calibrated display system. Without calibration, your computer monitor could display inaccurate colors, brightness and contrast. Images which look good on that uncalibrated monitor may look surprisingly different (usually worse) on a properly-calibrated system. Use a tool such as the Spyder2 to calibrate your monitor, then (important!) verify that it looks accurate by scrutinizing a test chart. With some products, it’s possible to create a faulty calibration without warning. So check the results by eye every time and repeat the calibration if needed. Calibrations should be performed routinely – say, every month. The color, brightness

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<sup>\*</sup> The photo preparation process discussed herein applies to digital projection and to electronic slide shows you create to share with other computer and HDTV users.

and contrast response of your monitor will change over time due to aging of electronic circuits, wearing of LCD lamps, and fading of phosphors and LCD masks.

Get Your Images. Naturally you need images in digital form on a computer. That means using images from a digital camera, or even scanning slides or negative film. You could even scan rare old prints on a flatbed scanner. Digital projectors today do not require extremely high resolution images, but HDTV offers more than 2 megapixels – quite a lot of detail. In any case I recommend you keep images at full (maximum) resolution and quality for archiving purposes. Complete the processing you want on the image files, such as adjusting exposure parameters, removing dust spots and correcting color. Save your (Photoshop format) file as a master, and archive it for safekeeping. Warning: be sure you don't accidentally save and overwrite the file after starting the process outlined below. We'll be making a lower-resolution version of the image, and you don't want to inadvertently overwrite your master Photoshop file.

Make a Folder. Create a new folder where your output image files will be stored automatically by Photoshop (see Automating below). For example, you could call it C:\Electronic-images. You can use whatever name and place the folder wherever you want.

## **Overview of Image Processing**

Processing your image for projection involves the following steps. They are easily done in Photoshop, and it should be possible to do most of them in another image processing tool such as Picasa (free from Google), Paintshop Pro, Corel Photopaint, Adobe Photoshop Elements, etc. If you can't do them all, do what you can. There is a wealth of related information on the Web, if you need help.

1. **Downsize.** Resample the image to the final image pixel dimensions. Why? Photoshop does a good job of resampling the image to fit the monitor or projector, and you have control over the process. But software used to build your slide show might not do as good a job, and you may have no control over it. Downsizing preserves exactly enough information to get the best image display, conserves storage space, and makes your images display with less processing – more smoothly in some cases. Procedure: in Photoshop, use File : Automate : Fit Image.
  - For XGA size (typical desktop monitor and many digital projectors), limit the width to 1024 pixels and the height to 768 pixels.
  - For most Canon Realis series projectors, limit the width to 1400 pixels and the height to 1050 pixels.
  - For full HDTV, limit the width to 1920 pixels and the height to 1080 pixels.
2. **Set ppi.** Set the final pixels per inch (ppi) to a typical print range, say 96 ppi. Do this without resampling. Technically the ppi number is just stored inside the file and does absolutely nothing to the actual image data. So you might think this step shouldn't be necessary, and you would be correct for most applications. But a few applications such as PowerPoint will try to present the image on the "page" at the specified size (in inches). If the ppi is set to an unusual value (such as 4000 ppi from a film scanner), the image will be very tiny when placed, and can become distorted (perhaps due to math round-off) when scaled up to fill the page.

3. **Saturate.** This is an optional step and can be easily overdone, so be careful. The need for it depends on the display or projection equipment. Older LCD and DLP televisions and projectors have a reputation for de-saturating images, so you could add some saturation to compensate. Bear in mind, by doing so your output image is being made “incorrect” just to compensate for a particular (incorrect) display, so this file can’t be used for general purpose viewing. Newer HDTVs and advanced projectors, such as the Canon Realis series, have good saturation and shouldn’t require this step. If you find your images look a little less vivid than you’d wish, next time try adding a touch of additional saturation (say, 10%) beyond what you consider just right on your calibrated monitor. Don’t overdo it – especially on images with strong colors – or the individual color channels can clip (check the RGB histograms if you’re not sure).
4. **Sharpen.** Apply final sharpening to optimize your image. Sharpening theory is beyond the scope of this article, but suffice it to say that many images can be greatly improved by tasteful application of output sharpening. Tasteful is the key word here, as you will be sharpening based on the appearance of your image at the final size. Start by displaying the image at 100% zoom, or “Actual Pixels” on your monitor. Then adjust the sharpening parameters to bring out the best in your image. Watch out for too much sharpening, which can cause bright halos around dark edges, over-emphasize textures, or bring out too much speculance on tree leaves. Typical settings for Photoshop Unsharp Mask might be 75% at 1.1 pixels radius and a threshold of 3. These parameters will vary, though, depending on the contents of your image. There are many powerful sharpening tools on the market which may do a better job than Unsharp Mask.
5. **Color Space.** Convert your image to the output color space. In Photoshop CS3 click Edit, Convert to Profile. For desktop monitors and most projectors, select “sRGB IEC61966-2.1” as the destination color space. For HDTV, select “HDTV (Rec. 709)”. Why? Many slide show applications are not color managed and will ignore embedded color profiles. If your images are in a different color space, it is likely that the colors in your image will be misinterpreted. The result could vary from imperceptible changes to very poor fidelity (dramatic color shifts and reduced saturation).
6. **8-Bit.** Convert the image to 8-bit colors (if 16-bit color depth was used). Why? We want to create a JPEG output file, but Photoshop will not automatically convert 16-bit images to 8-bit during the file save process. In fact, with 16-bit images Photoshop will not even display JPEG as a possible save-as type.
7. **JPEG.** Save the image as a JPEG file, with high quality (typically 10 on a scale of 1 to 12). This quality level will preserve detail in most images while minimizing file size. In some cases, you may need to minimize file sizes (e.g., posting images on the Web or sending as email attachments). You can compress the file sizes by reducing “JPEG quality” until you notice a difference (toggle Preview checkbox on/off), then increase the quality setting slightly until you see no difference. Remember, during this process do not accidentally save the file overtop of your original full-resolution file, or you’ll destroy your master archive image with this low-resolution version.
8. **Close** the file, and you’re finished.

## Optional: Automating the Process

If you're creating a large number of images, you can avoid the tedium of manually executing the above preparation steps. Automate the entire process in a Photoshop action. Even if you have hundreds of images, just sit back and watch the computer run a batch process on all of them (or go do something else while it works!).

I've created a rather generic Photoshop CS3 action set provided here: [ElectronicImagePrep.atn](#). You can use this as a starting point for your own automation. If you're not familiar with actions in Photoshop, read up on it in the help file or manual. It's worth it!

Click [this link](#) and save the file on your disk somewhere you can find it (such as on your desktop). Open Photoshop. Do one of the following. Do it only one time, or you'll end up with multiple copies of the action set in Photoshop.

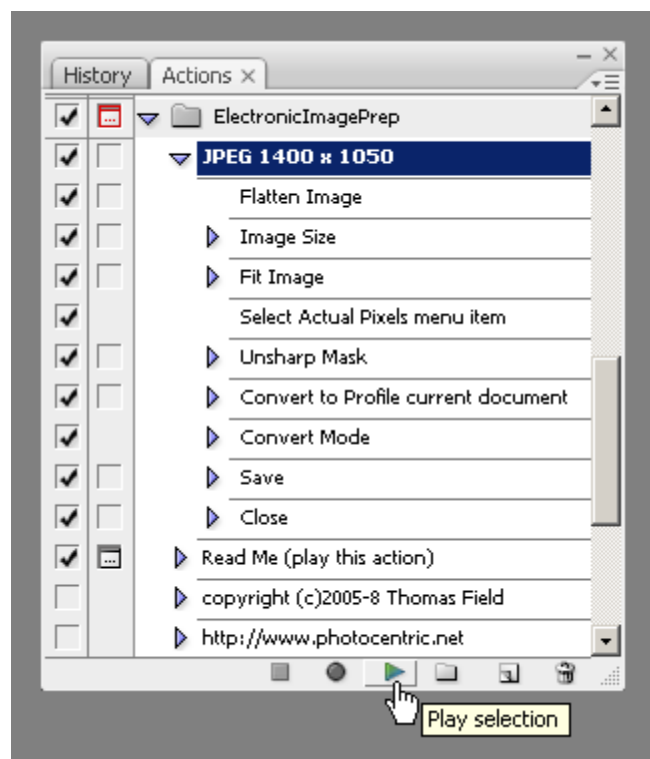
1. Easiest: double-click the file you just saved (ElectronicImagePrep.atn). This will cause Photoshop CS3 to open the file and load it as an action set.
2. Or, on the Actions palette, choose Load Actions from the palette drop-down menu. Navigate to the action set file you just saved (ElectronicImagePrep.atn), and double click it to load.
3. Or, open an explorer folder containing the action set ElectronicImagePrep.atn that you just saved. Click and drag the file onto the Actions palette in Photoshop.

### Running the Action

You can run the action on a single image. Open your image, which can be any Photoshop file. If you have been working on the image, be very sure to save it because the action will close your original file without saving.

Click once on the action "JPEG 1400 x 1050" and then click the "Play selection" button (triangle icon at the bottom of the Actions palette).

Playing the action will cause each step in the action to be executed on your file as if you had performed them manually. This may happen in the blink of an eye, depending on your image and your computer speed.



**Running A Batch.** You can run the action on a group of image files. This is called batch processing. There are many ways to do this, but here's an easy one:

1. Open the Photoshop file browser application Bridge.
2. Navigate to the folder containing your images to be processed.
3. If you want to process all the images in this folder, don't select or click any of them.

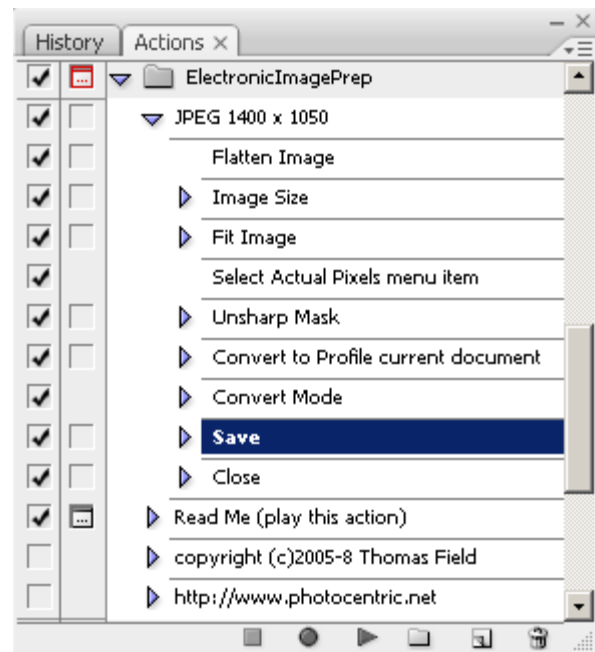
4. If you want to process only certain files, select them by holding the Ctrl key and clicking one at a time.
5. If you want to process a range of files, click the first and then hold the Shift key while clicking the last.
6. On the Bridge menu bar, select Tools, Photoshop, Batch.
7. On the Photoshop Batch dialog box, select Set “ElectronicImagePrep” and action “JPEG 1400 x 1050”, then click OK.

This will process all of the images you selected, and place JPEG copies in your XGA-images folder, ready for projection.

## Customizing the Action

Before using the action, you may want to customize it to suit your computer – specifically, to set the folder where your output files will be stored when you run the action.

In Photoshop, open any JPEG file. On the Actions palette, open the action set: click the arrow to the left of ElectronicImagePrep.atn. Click the arrow to the left of the action, “JPEG 1400 x 1050”. This will expand the action so you can see the individual steps within it. You should see something similar to the display at right.



Update the folder where your files will be saved. Important: this only works if you already opened a JPEG file as mentioned in the previous paragraph. Double-click the action step “Save” (second to last in the list). This will bring up the Save As dialog box. Navigate to the folder you created (see Prerequisites above) and click Save. Under JPEG Options, select quality 10 under Image Options. Click OK.

There, you’re finished. Next time you run the action, files will be saved in the folder you picked during this customization. The remaining customizations below are optional.

**Turning Off Dialogs (stops).** You can turn on or off the dialog for a step by clicking the box just to the left of the action step. With the dialog on, Photoshop will stop the action and present the normal dialog for that action step with default options already filled in. With the dialog off, Photoshop will not stop and ask you for input during that step. For example, if you want to adjust the settings for the Unsharp Mask step on every image, turn on the dialog.

**Changing Defaults.** If you want to change the default on any of these action steps, just double click the step as described above. This will open the dialog box and let you change any of the parameters. Any changes you make will be saved back into the action, overwriting the original settings. Note that some action steps cannot be edited unless you already have an image open.

**Adding Steps.** You could add new steps to your action. For example, you might elect to increase color saturation.

**Stepping Through Actions.** To execute an action one step at a time, hold Ctrl and click the Play button.

**Changing Default Resample Method.** The Fit Image command used in the action does a resample of your image during downsizing. The resample method can be changed on the Preferences “General” screen (Ctrl-K) as shown below. Some people prefer Bicubic Sharper. Click OK to save this preference.

