Changing DPI in an image
by Patty Waits Beasley

DPI is simply the “Dots Per Inch” in your image. That simply means it’s the measure of the resolution of your image based on the number of pixels or printer dots per inch. When you scan an image in on a scanner and digitize it, often you can manually set the dpi you want for each scan. Digital camera photos, however, generally default to 72dpi, and it’s not usually a setting that can be changed on most cameras; only the much higher-end cameras might give you that option.

But with editing software, this can be easily adjusted. Why would you even want to mess with changing the DPI? That depends on what you plan to use your image for. If you’re going to simply crop it and send it via email to share with friends, 72dpi is fine. If you’re going to use it on a web site, again, 72dpi is optimal. Most browsers and screens can’t make use of any finer resolution than 72dpi, so boosting the resolution above 72dpi would generally just be wasted on a web site. But if you need to print off your image, either for a photo album or even for professional offset or magazine work or even a book, you’ll need to adjust the final dpi. Your editor will tell you what the publication requirements are. Frequently, you don’t need as much dpi as you might think, and many digitally-inexperienced editors are still requiring 600dpi output for formats where 300dpi is more than enough. Be that as it may, when the editor speaks, we produce. I’m going to use a wildflower photo for a sample of how to change the dpi and make that editor warm and fuzzy with your product.

Okay, first, bring up your photo in the editing program of your choice and do any editing to it you need to do. Cropping, cleaning, adjusting, whatever. My preferred software is Adobe Photoshop (PS), but for the purposes of this lesson, we’ll use JASC’s PaintShop Pro (PSP), as it’s the preferred software of our CAUG Graphics SIG. I have PSP8 on my pc but PSP7 should work with the same menu commands. For my fellow Adobe Photoshopers, it’s also the same series of commands for PhotoShop (I use PS7).
Once you have the photo where you want it, you’re ready to resize it. On the menu, select IMAGE, then select RESIZE:

The resize box will come up, and you’ll see the default option settings for the image:
You’ll note that the default dpi is indeed 72dpi. This particular image was taken with a hi-res 5-megapixel Sony DSC-F707 digital camera. The maximum print size at 100% is 35.556 inches by 26.667 inches. That’s huge! Needless to say, I won’t want to print quite that large on a regular basis. But it’s there, if I want to, but at 72dpi. However, say I’m selling a copy of this to a wildflower magazine, and the editor tells me I need to provide the image at 600dpi. They’ll be printing it in a magazine with nice shiny, slick paper, and need higher resolution in order to capture the detail for the size of the image that will be printed. No problem. Simply type in the appropriate dpi in the RESOLUTION box (600 for our example), and ... very important ... uncheck the RESAMPLE box.

The first thing you’ll notice is that the Print Size of the image has now changed. Now it’s only 4.267 inches by 3.2 inches. Why? You’ve just crammed a lot more pixels from the original image information into a lot smaller space. Instead of printing at 72dpi on a canvas of over 35 inches, it’s now cramming 600 dots per inch. So, consequently, the actual size of the image will shrink. This is not to say you can’t print to whatever dimensions and resolution you need. That’s the beauty of this little tool; the sky and your selections are the limit up to the boundaries of the resolution. Just be aware that size does matter when it comes to resolution. If you try to print a higher size than the resolution allows, you’ll find your image becoming very lossy, blurry and even pixelated. However, you can print to a lower size with relatively little loss of resolution.
Another thing you’ll notice is that I asked you to deselect the RESAMPLE box. Why would we do that, when resampling would simply reorganize the pixels that I’ve requested into the final image? We don’t want any loss of quality or electronic manipulation of our image. We want the exact same image with the exact same information to be produced, just at a higher dpi rate. If we’d left the RESAMPLE selection checked, the software would have analyzed the input image, adjusted the pixels per our instructions and added or subtracted pixels to accommodate our needs. Generally, resampling, especially for lower-resolution images, leaves an image less clear and more soft (blurry) and pixelated. As your height and width go down with RESAMPLE turned off, your resolution goes up. When you uncheck the RESAMPLE box, the software will automatically adjust the height and width of the image down to the exact same proportion, with no loss in quality.

Below are some conversions from the original image at 72dpi to 300dpi (for publication-quality output) and 2400dpi (for high-resolution 35mm slide quality output):
When would you want to use the resample option? You might want to use it depending on which algorithm is used in your program to get a certain effect. Some programs don’t let you choose; others let you select between several different algorithms. You would also want to use it if you want to blow up your image, to produce, say, a poster-sized print. Remember, we only have a certain number of pixels per inch set in the original image. When we tell the software we want to print a larger size than the pixels will measure out to, the software will need to resample the image and start inserting pixels electronically to cover the extra space you’re demanding from it for the oversized image. Resampling algorithms fade and feather new and existing pixels to blend the image and create more bulk for the increased size request. When that happens, you begin to get a visibly blurrier image. It looks softer, it might even look pixelated.

I used that term before, didn’t I? Pixelated basically means the pixels are starting to look blocky and jaggy and stretched out as they’re changed to accommodate the new size requirements. It can be pretty artificial-looking. The resampling will help cover some of that up, but not all. The good news is, Adobe Photoshop guru Scott Kelby (editor, Photoshop User Magazine) has a Photoshop trick that will help compensate for some of that loss. When you increase your image size, only increase it in 10% increments. For some reason, the 10% increment does not cause softening or blurring of the image. Any other increment apparently will. Try it! It’s a neat little trick; just one of hundreds I learned from Scott’s book (a free plug coming here; this is an absolutely awesome book and the best I’ve found on the shelf yet) – The Photoshop Book for Digital Photographers by Scott Kelby, New Riders Press, ISBN 0-7357-1236-0. A bargain, and worth every penny.

So, now you’ve reset your dpi. Just save your image in a new file, label it appropriately, and you’re all set. Remember, NEVER edit your original image files! Always make a copy and edit the copy. And try out the different settings … that’s always the best way to find out just exactly what a setting will do for your particular image in your program of choice before you commit to the action.

Following are some other instances where you might be concerned about DPI. One is when scanning a hard-copy photo into a digital image. Then you should set your DPI higher than the default 72dpi. As rule, though, even for scanning in images, you won’t usually need to go higher than 300dpi for most uses, and consumer level scanners handle that level of resolution and quality quite well for little cost. Remember, your scanned resolution image is only going to be as good a quality as that of your original print, and even prints that are sharp and clear are always at a much lower resolution than the negatives they’re printed from. If you need to scan something in, it’s better to scan in from your negative than from a print. Many imaging programs will differentiate between negative images (negative film) and positive images (slides, prints). If a print is all you have to work with (like family archival photos that only exist on paper and the negatives are no longer available), then you have to scan from the photo paper, but when you do, set the resolution to the higher 300dpi level to maximize the scan quality.
If you’re scanning slides (35mm slides) into your computer, you’ll also want to set the dpi to a higher level, equal to the original quality of the transparency positive (the slide). Most consumer scanners won’t give professional quality output (no surprise there). But for consumer needs, you can usually at least get 300-600dpi from a consumer level scanner. Some scanners claim up to 3600-4800dpi but so far, I’ve not found any consumer model scanner that will handle that level with quality, no matter what they say their maximum output dpi is. For that level, you need to bite the bullet and go with a professional digitizer or digitizing service. Even so, I’ve experimented with a professional digitizer that scanned up to 4800dpi, and found that even with that high a rate of resolution, often 2400-2800dpi is enough to reproduce the image with high quality. File sizes become quite large at that resolution as well (a 50MB file output file at 2400dpi could well end up being over 120MB at 4800dpi), so if space/storage of the output scanned images is a problem, the lower resolutions might work just as well. It’s up to each person to determine what their needs are and how best to meet them with the equipment at hand.

Patty Waits Beasley (patty@ccbirding.com)
CAUG - Graphics & DigiCam SIGs
Corpus Christi, TX
© 2004 Patty Waits Beasley/TailFeather Productions