

Directions for converting pictures (.jpg files) to  
a PDF document.

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## **Introduction**

This document will assist you in understanding different photo types and how to convert those files into the portable document format (PDF).

### **What is .jpg?**

JPEG (pronounced "jay-peg") is a standardized image compression mechanism. JPEG stands for Joint Photographic Experts Group, the original name of the committee that wrote the standard.

JPEG is designed for compressing either full-color or gray-scale images of natural, real-world scenes. It works well on photographs, naturalistic artwork, and similar material; not so well on lettering, simple cartoons, or line drawings. JPEG handles only still images, but there is a related standard called MPEG for motion pictures.

JPEG is "lossy," meaning that the decompressed image isn't quite the same as the one you started with. (There are lossless image compression algorithms, but JPEG achieves much greater compression than is possible with lossless methods.) JPEG is designed to exploit known limitations of the human eye, notably the fact that small color changes are perceived less accurately than small changes in brightness. Thus, JPEG is intended for compressing images that will be looked at by humans. If you plan to machine-analyze your images, the small errors introduced by JPEG may be a problem for you, even if they are invisible to the eye.

A useful property of JPEG is that the degree of lossiness can be varied by adjusting compression parameters. This means that the image maker can trade off file size against output image quality. You can make *\*extremely\** small files if you don't mind poor quality; this is useful for applications such as indexing image archives. Conversely, if you aren't happy with the output quality at the default compression setting, you can jack up the quality until you are satisfied, and accept lesser compression.

Another important aspect of JPEG is that decoders can trade off decoding speed against image quality, by using fast but inaccurate approximations to the required calculations. Some viewers obtain remarkable speedups in this way. (Encoders can also trade accuracy for speed, but there's usually less reason to make such a sacrifice when writing a file.)

## How well does JPEG compress images?

Very well indeed, when working with its intended type of image (photographs and suchlike). For full-color images, the uncompressed data is normally 24 bits/pixel. The best known lossless compression methods can compress such data about 2:1 on average. JPEG can typically achieve 10:1 to 20:1 compression without visible loss, bringing the effective storage requirement down to 1 to 2 bits/pixel. 30:1 to 50:1 compression is possible with small to moderate defects, while for very-low-quality purposes such as previews or archive indexes, 100:1 compression is quite feasible. An image compressed 100:1 with JPEG takes up the same space as a full-color one-tenth-scale thumbnail image, yet it retains much more detail than such a thumbnail.

For comparison, a GIF version of the same image would start out by sacrificing most of the color information to reduce the image to 256 colors (8 bits/pixel). This provides 3:1 compression. GIF has additional "LZW" compression built in, but LZW doesn't work very well on typical photographic data; at most you may get 5:1 compression overall, and it's not at all uncommon for LZW to be a net loss (i.e., less than 3:1 overall compression). LZW *does* work well on simpler images such as line drawings, which is why GIF handles that sort of image so well. When a JPEG file is made from full-color photographic data, using a quality setting just high enough to prevent visible loss, the JPEG will typically be a factor of four or five smaller than a GIF file made from the same data.

Gray-scale images do not compress by such large factors. Because the human eye is much more sensitive to brightness variations than to hue variations, JPEG can compress hue data more heavily than brightness (gray-scale) data. A gray-scale JPEG file is generally only about 10%-25% smaller than a full-color JPEG file of similar visual quality. But the uncompressed gray-scale data is only 8 bits/pixel, or one-third the size of the color data, so the calculated compression ratio is much lower. The threshold of visible loss is often around 5:1 compression for gray-scale images.

The exact threshold at which errors become visible depends on your viewing conditions. The smaller an individual pixel, the harder it is to see an error; so errors are more visible on a computer screen (at 70 or so dots/inch) than on a high-quality color printout (300 or more dots/inch). Thus a higher-resolution image can tolerate more compression ... which is fortunate considering it's much bigger to start with. The compression ratios quoted above are typical for screen viewing. Also note that the threshold of visible error varies considerably across images.

## What we will be converting

In our example we will be using Adobe Acrobat 6.0 to convert two .jpg files to the PDF format for docketing. Our pretend case involves Jane Doe, her beautiful 1972 VW Beetle was stolen out of her garage and later found stripped down. The photos we wish to docket as evidence are two high resolution, high color photos. Each file was taken with a digital camera with a resolution setting of 2048 x 1536 at 24 bit of color. The files are named pic\_001.jpg & pic\_002.jpg, combined they total 1.36 MB in size.

Below are scaled down examples of the photo:



BEFORE (pic\_0001.jpg)



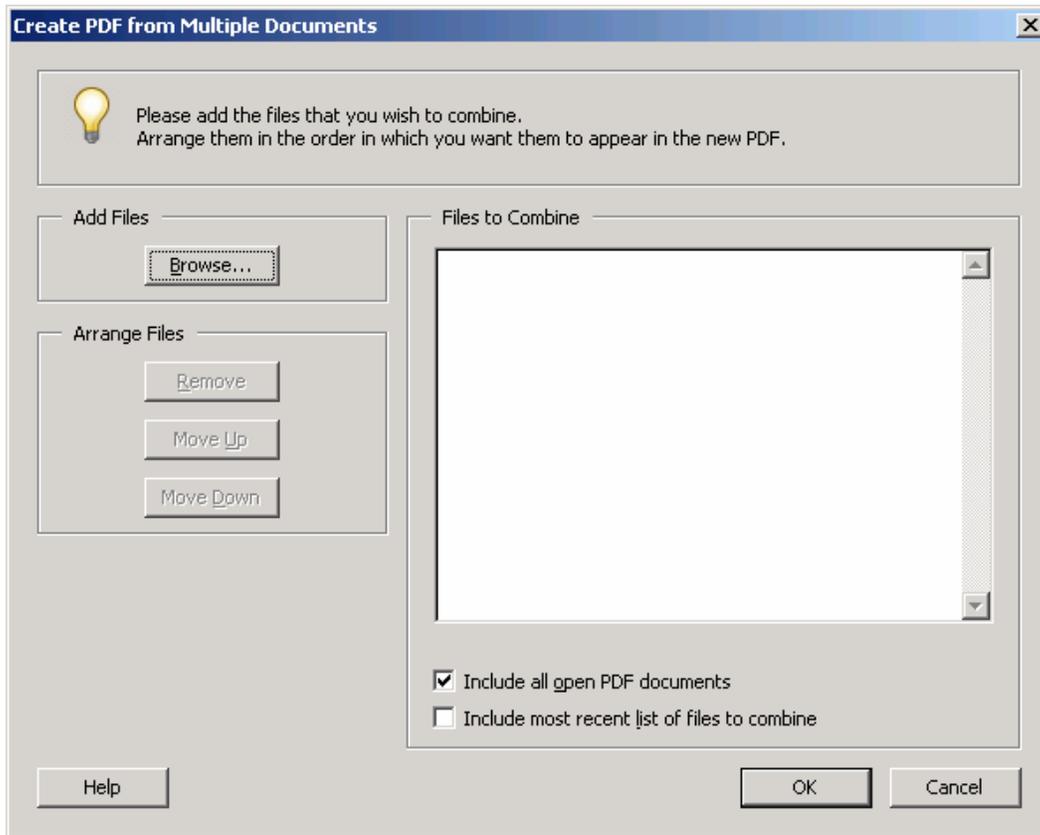
AFTER (pic\_002.jpg)

## Using Adobe to combine and convert pictures to one single PDF

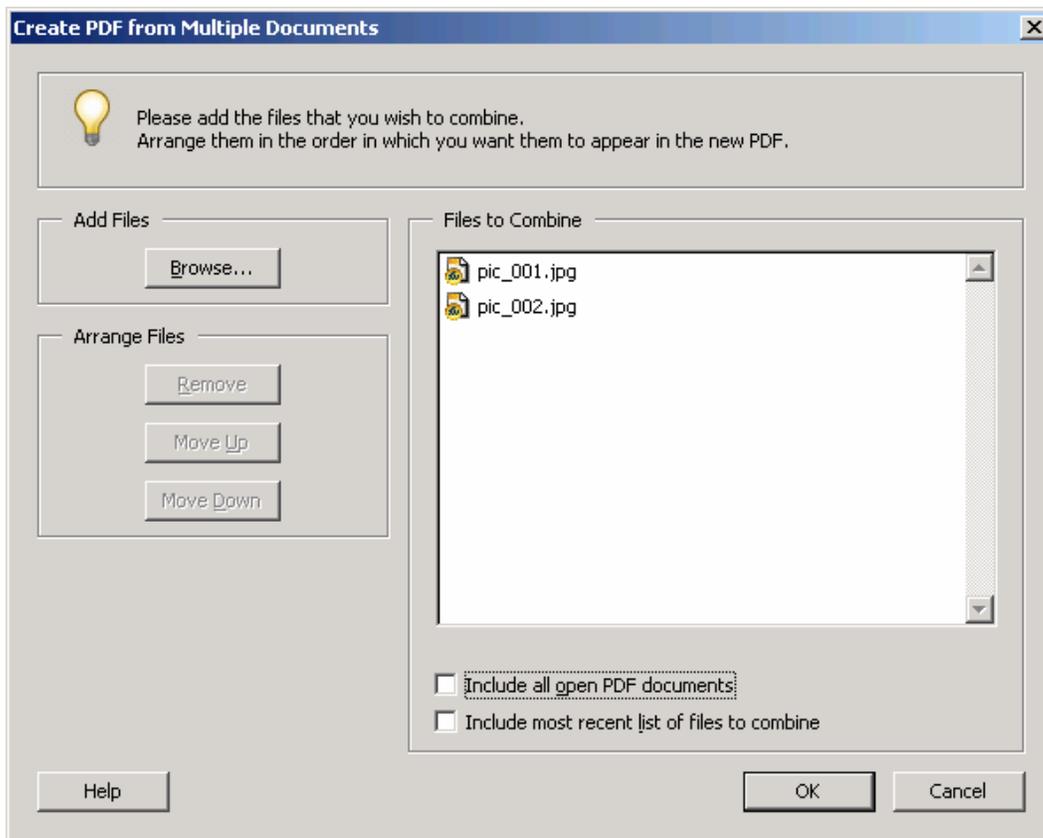
With Adobe open click on:

FILE > CREATE NEW PDF > FROM MULTIPLE FILES

You should see the dialog box below:



At this point you will need to use the browse button to go out to your folder where the pictures are stored. This could be your computers hard drive, a floppy drive or even a CD ROM drive. Once you have found your directory you will need to click on and choose the pictures you wish to use, in this case pic\_001 and pic\_002. You can use your CTRL key to highlight multiple files at once.



Once you have chosen your files make sure to uncheck both options of *Include all open PDF documents* AND *Include most recent list of files to combine*, click on the OK button.

When you press the OK button Adobe will begin to assemble your document, once complete you may be presented with this prompt:



If you do receive this message check the box that says *Don't Show Again* and press the OK button. At this point you should have a document called *Binder1.pdf* that you will need to

save and name the file into your PDF directory . In this example we will call this document Exhibit A Large.pdf. If you were to right click on the file and go to properties you will see the file at this point is 1.33 MB in size. Next we will discuss compressing the PDF.

### **How to compress a PDF file**

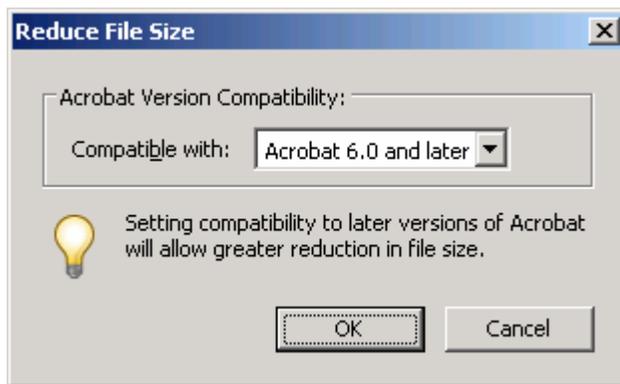
Compressing a PDF file does two things:

1. It makes the document smaller and easier to upload to ECF, and
2. It allows you to fit more images into a single file and stay under the courts 2MB file size limit.

Open your new file with Adobe. When the file is loaded click on:

FILE > REDUCE FILE SIZE ...

You will be prompted with a screen similar to this:



You will want to choose the option Acrobat 6.0 and later for maximum compression and usability. Click on OK. Adobe will begin to compress the file and will prompt you to name the new compressed file. The new file is 1.13 MB in size.