

j2k



JPEG 2000 plug-ins for Photoshop, After Effects, and Premiere

fnord

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fnord software

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About JPEG 2000

The j2k plug-ins read and write JPEG 2000 files. Because JPEG 2000 is sort of a mouthful, most people refer to them as JP2 files.

JPEG 2000 is meant to succeed JPEG. It has the same basic purpose as JPEG: lossy compression of photographic images. The main difference is that JP2 uses wavelet compression instead of the DCT (Discrete Cosine Transform) compression found in JPEG.

The result is that where a heavily-compressed JPEG file exhibits chunky artifacts, JP2 artifacts are soft and blurry. Ultimately you can get an image with the same visual quality using less data.

JP2 also supports a lossless compression mode (sort of like PNG), alpha channel transparency, and 16-bit color among other things. For some really technical info, go to the [JPEG website](#).

System Requirements

j2k has been tested to work on Photoshop CS3 and After Effects CS3 and later. The Photoshop plug-in will probably work in earlier versions—possibly *much* earlier versions. Try it and find out! For Premiere, you'll need CS5 or later.

Installation

For Photoshop and After Effects, copy the appropriate plug-in to the appropriate host's Plug-Ins folder and launch the application.

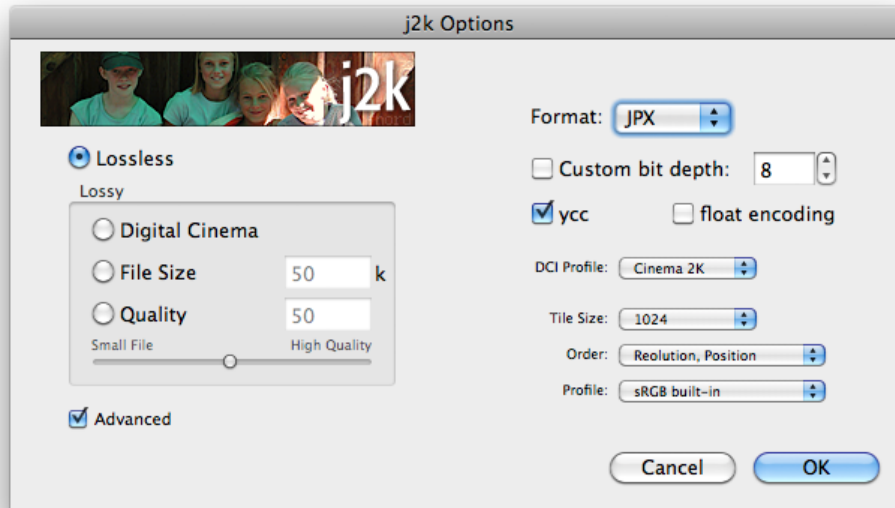
j2k can work alongside Adobe's JPEG 2000 plug-in for Photoshop, although you might not know which plug-in will open a JPEG 2000 file if you have them both installed. You can force the issue by specifying the format in the Open dialog (Open As... on Windows). You could also disable the

Adobe plug-in by adding a ⌘ (option-L) in front of the name on Mac or changing its extension on Windows.

For Premiere, drop the j2k plug-in into a place where both Premiere and Adobe Media Encoder can see it. Here are the folders for each platform (replace “CSX” with your version):

Mac	/Library/Application Support/Adobe/Common/Plug-ins/CSX/MediaCore
Windows	C:\Program Files\Adobe\Common\Plug-ins\CSX\MediaCore

Options



Compression Method

There are four ways j2k can determine how much to compress the JP2 file it creates. *Lossless* means that the pixels will be saved without any changes whatsoever and the file will shrink as much as possible, depending on the image content. *Digital Cinema* is a special case—see the section below. *File Size* let's you specify the size of the resultant file; the bigger the file, the better the image fidelity. *Quality* uses a custom formula to set compression levels based on a 1-100 scale with 100 being practically visually lossless, 1 being pretty ugly, and every level in between; the file size will depend on the dimensions of the image and its contents.

Advanced Checkbox

Reveals more controls for extra compression options, detailed below. When unchecked, those controls are ignored and some sensible defaults are used.

Format

The JPEG 2000 standard actually specifies a few different file formats to wrap around compressed JPEG 2000 data. *JPX* is the most versatile, able to store CMYK and L*a*b data as well as RGB and Greyscale. *JP2* is a more restricted form of JPX, supporting less metadata and only RGB and Greyscale. *j2c* is a raw JPEG 2000 codestream with no metadata (including no ICC profiles). When Advanced is unchecked, JPX is used.

It will be up to you to set the proper file extension depending on the format you use:

JPX	JP2	j2c
.jpx, .jpf	.jp2	.j2c, .j2k

Custom Bit Depth

One unique feature of JPEG 2000 is that it not only supports 8-bit and 16-bit images, but it can actually handle anything from 1-bit to 32-bit integers. Normally j2k will use 8-bit if your Photoshop file is 8-bit (or Millions of Colors in After Effects) and 16-bit if Photoshop is set to 16-bit (Trillions in AE). But if you check this box, you can choose a different bit depth. There is no practical advantage for storing pixels in a higher bit depth than used in Photoshop, but using a lower bit depth can lead to a smaller file.

ycc

As with standard JPEG, JPEG 2000 can convert an RGB image into luminance and chrominance channels, compressing the color channels more to get better performance. This defaults to on.

Float Encoding

JPEG 2000 normally encodes data using integers, but this option will switch to floating point internally. Note, that truly lossless compression is not possible with this option. In JPEG 2000 par-

lance, checking this box turns on “irreversible” encoding, as opposed to “reversible” when unchecked.

DCI Profile

See the DCI section below for more information.

Subsampling (not visible above)

When saving out a L*a*b image in Photoshop, j2k will give you the option to subsample the color channels, further reducing file size.

Tile Size

JPEG 2000 images can be saved in a set of tiles. This can allow an image decoder to view select pieces of the image instead of having to decompress the entire thing. Can be especially helpful with very large images. Defaults to tile size of 1024 pixels.

Order

JPEG 2000 can give preference to certain image attributes as it compresses, allowing a decoder to progressively draw an image in a certain way as it downloads the codestream. For example, using the “Resolution, Layer” order first provides the decoder with a lower resolution image (with all the RGB components) and then successive compression layers of increasing quality. I know, this is getting pretty technical—if you don’t know what this means, you probably don’t need to worry about it.

Profile

JP2 and JPX files must have color information. This menu lets you choose between a named color profile provided by the host, or the appropriate generic one used by the JP2/JPX standard (sRGB for color, sLUM for black and white). For a L*a*b image, you will have the option of choosing the sYCC color space, a standard more likely to be read by most JPEG 2000 readers than L*a*b.

Digital Cinema

The biggest new use for JPEG 2000 is in digital projection distribution under the [Digital Cinema Initiatives](#) (DCI) format. This specification calls for 12-bit JPEG 2000 frames encoded in XYZ color space with a 2.6 gamma. The final form of a DCI file is an MXF container, but j2k will let you generate .j2c frames to be passed on to a tool like [OpenDCP](#) to do the rest.

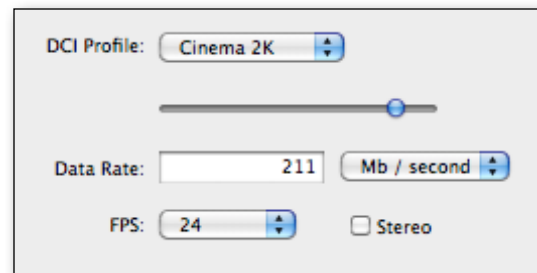
The j2k plug-ins for After Effects and Photoshop do not handle the conversion to XYZ color space. To do this, convert your image to Adobe's "DCDM X'Y'Z' (Gamma 2.6) 5900K (by Adobe)" profile. Then output to JPEG 2000 using the ".j2c" file extension and select the Digital Cinema compression method. Note that if you are converting from Rec. 709 you may want to turn off Scene-referred Profile Compensation, either in the Color Profile converter or in the After Effects project settings.

The Premiere plug-in lets you choose between converting to XYZ from sRGB or Rec 709. Rec 709 (i.e. HDTV color space) is the default, but sRGB may be preferred when the image has been color corrected and you want to match the appearance of your sRGB monitor. You also set the color temperature of your destination projector, which defaults to 5900K, same as After Effects. You can read more about XYZ conversions [here](#).

DCI has some of its own controls, visible when the "Advanced" checkbox is checked:

DCI Profile

Basic DCI descriptors required by the DCI spec with resolution and data rate caps as listed below. The per-frame data rate assumes a frame rate of 24 fps. Stereo productions require twice as many frames (one for each eye), so the per-frame data rate should be cut in half.



DCI Profile	Max Resolution	Max Bytes Per Frame
2K	2048 x 1080	1,302,083
4K	4096 x 2160	1,302,083

Data Rate

Enter the data rate you wish to use. The slider provided tops out at the DCI spec’s maximum rate, but higher amounts may be entered manually. Premiere’s output module knows the size and frame rate of the source, so you simply supply the data rate in Megabits per second (Mb/s).

When entering the data rate in After Effects, you can choose to measure it either by frame (“KB / frame”) or by rate per second (“Mb / second”). When using the latter option, the frame rate and stereo knobs are used to calculate the per-frame size for you using this formula:

$$\text{frame size} = (1024 / 8) * \text{data rate} / (\text{frame rate} * \text{stereo multiplier})$$

The reason for the (1024 / 8) term is that the second option uses megabits while the first option used kilobytes. There’s 1024 kilobytes in a megabyte and 8 bits in a byte.

Note that the data rate you specify is a maximum. For a frame that compresses easily, like white text on a black background, JPEG 2000 may be able to compress the frame perfectly without any loss using less data than you’ve allocated. The file size will be smaller than you expect, but this is normal.

Miscellaneous

After Effects and Premiere will use JPEG 2000's sophisticated encoding to "auto-proxy" the files it reads. This means that if you are working at half resolution, j2k will only need to read enough data from each file to construct a half-rez image, giving you a big speed boost. You're welcome.

In Photoshop, any JPEG 2000 alpha channel is treated as transparency.

The girls in the j2k banner were campers at [Walton's Grizzly Lodge Summer Camp](#) during the Summer of 2001. They were in the middle of a BB gun shooting competition with 4 boys, which they won decisively even though none of them had shot guns before (the boys did it every day for the week they were there).

Acknowledgements

Uses the [Kakadu](#) software framework by David Taubman. Also uses [Little CMS](#) by Marti Maria.

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History

2.7	31 May 2012	Premiere plug-in
2.6	14 November 2011	Improved DCI controls.
2.5	4 October 2011	DCI support.
2.0	11 May 2007	Expanded dialog.
1.1	2 September 2002	Better standards compliance, including ICC profile support.
1.0	25 June 2002	Hello, World!

Fin

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