

Polaroid Technical Application Note

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Subject: How to "Page Size" Bitmaps for Polaroid Palette Film Recorders

The purpose of this Tech Note is to provide a guide for obtaining the correct aspect ratio image for the format of the film you are exposing on your Polaroid Palette film recorder. Using these methods will help you avoid using interpolation (fabricating data) to correct the size the image. Following this procedure will ensure that you obtain the sharpest output possible by utilizing Polaroid's programmable resolution feature of the Palette color film recorders.

Programmable resolution means the pixel size and aspect ratio of Polaroid film recorders can be programmed or changed to match the exact pixel size and aspect ratio of the image. One does not have to invent or interpolate data to satisfy the arbitrary needs of the hardware. Frequently, interpolation of data causes images to appear anti-aliased and/or fuzzy. Interpolation and imaging of the interpolated images frequently causes dramatic increases in imaging time. For example, if your image is 3300 horizontal pixels and the film recorder only images 2048 or 4096 pixels, the driver software will either sample the image down to 2048 pixels or arbitrarily scale the image up to 4096 pixels. In either case, the image is likely to be adversely effected. Palette film recorders image at the exact resolution of the image file without interpolation or resizing.

ISSUES: How do I resize an image to fill my Palette's aspect ratio? I do not want any borders and I do not want the image to appear distorted on the resulting Palette exposed film. Is there something I can do during scanning to prevent this? What if I already scanned and retouched my image file and I simply need to resize it for the film recorder's aspect ratio?

For 35mm, the aspect ratio is approximately:	3:2
For 4x5, the aspect ratio is approximately:	54:42
For 6x7, the aspect ratio is approximately:	11:9

SOLUTIONS: Below are 3 options to correctly size your bitmaps for film recorder output. These methods may vary depending on the scanner used and the aspect ratio of the existing bitmap images being used with the Palette film recorder.

Option I. The *best* way to size your bitmap files for Palette film recorder output is to scan them *at the maximum optical resolution of the scanner, up to the maximum resolution of the film recorder and in the correct aspect ratio of the film you will be imaging. Remember, because of Polaroid's exclusive programmable resolution feature, the exact number of horizontal pixels is not as important as having the horizontal and vertical pixel values in the correct aspect ratio.*

For example, all of the following combinations are correct for full frame imaging to a 35 mm camera; 4096 x 2732, 3150 x 2100, 3300 x 2200, 5135 x 3423. Scanning for output is always the best method, but not always possible. Refer to the Optimum Input Resolution Guide (see Figure 2) for the correct pixel dimensions for the resolution you want to output. If you have already scanned, this option may not be feasible.

Option II. Very often the image does not have the correct pixel dimensions (or aspect ratio) to fit on the film type you are exposing with the Palette. This brings up an important issue: Many people are concerned with having enough dots-per-inch (DPI). The higher resolution you can scan an image *without using interpolation in the scanner software*, the better the detail will be maintained from the original photograph to the final output. This is true, up to the maximum resolution of the output device. If your film recorder cannot resolve your bitmap image file's resolution, you may be scanning and storing too much data. Again, refer to the Optimum Input Resolution Guide (see Figure 2) for scanning resolutions that match your Palette film recorder's capability.

Do not confuse pixel resolution and DPI. When scanning an image, you scan in with DPI, but it is just to form a relational measurement when dealing with input resolution. When outputting to a film recorder, pixels are what you are actually dealing with. It does not matter how many dots-per-inch (DPI) you designate to your image file. The film recorder is only concerned with how many pixels make up the image, and this should remain constant no

matter how many Dots you designate per Inch (unless you are interpolating the image.) Conversely, you do not need to be concerned with how many inches tall and wide the image is. Again, the Palette film recorder is only concerned with *pixels* and the inches can be changed depending on how many DPI is designated. The pixels remain constant. You are dealing with electronic media and film and DPI is a concern for print media only.

There are two adjustments that can be made to your bitmap image file in an application program like Adobe Photoshop:

1. Crop the image to the correct size using a "cookie cutter" technique. The properly sized image piece is *cut out* of the original image file without any interpolation. The draw back here is that some of your original image must be discarded to achieve a certain aspect ratio for the output.
2. Create a border around the image that has the proper aspect ratio for the Palette film recorder. This involves creating a file in Photoshop with the correct aspect ratio for the output, and then pasting your original bitmap on top of this *border* file. This is a way to avoid discarding any part of the original image while maintaining the original aspect ratio. Palette Export automatically performs the equivalent of this function for you.

Cropping the image:

- Make sure the image is in the landscape orientation by rotating (if necessary). The image should be wider than it is tall. Use Photoshop's rotating tool for this.
- Double click on the crop tool to obtain the Crop Tool Options window (see *Figure 1*).
- Click on the fixed target size box and enter the aspect ratio (in inches) that *meets or exceeds* the largest dimension of your image.

Example: If your image measures 5 x 5 inches and you are exposing 5 x 4 film in your Palette film recorder, and you do *not* want a border, you'll need to crop the image to correctly fit the film's aspect ratio of 5:4. In this case, enter 5 for the width and 4 for the height of the Crop Tool Options windows (see *Figure 1*). Remember to leave the Resolution box empty. When drawing the crop tool, notice that the 5:4 aspect ratio is maintained regardless of how you move the crop around. Because the original image is not the correct aspect ratio, you must sacrifice part of the image. When your area-of-interest is inside the crop area, click inside the crop and "cut" the piece of the file out of the original. The resulting image will have exactly the same resolution as the original file, and now has the exact aspect ratio to expose 4 x 5 film without leaving any borders. No interpolation was performed, you simply "cookie cut" the desired piece out of the original file. You can verify the correct aspect ratio in Palette Export's preview window (Mac only). NOTE: The Windows version of Palette Export has no preview feature.

Here are the approximate aspect ratios for the film types exposed on Palette film recorders:

For 35mm, the aspect ratio is: 3:2
For 4x5, the aspect ratio is: 5:4
For 6x7, the aspect ratio is: 11:9

Another, more precise method of cropping requires some calculations:

- Make sure your image is in the landscape position by rotating it, if necessary.
- In Photoshop, select Adjust> Image Size and select pixels for the units.
- Record the pixel width for this particular image.
- Calculate the (height) pixel dimensions you will need to apply. This will depend on the format of the Palette film you will be exposing.

Example: Let's use 35mm format this time. If your pixel width is 3452, then you multiply 3452 by 2 and divide the result by 3. That equals 2301. 2301 pixels is your height for this particular image and will give you the 3 to 2 aspect ratio you need for 35mm format.

- Returning to the Crop Tool Options box. Instead of using inches, you can set the units to pixels. Plug in the numbers. Width = 3452, Height = 2301
- Draw the desired crop and cut out the area-of-interest from your image file. NOTE: Some interpolation/decimation may occur if you do not draw the crop across the entire width of the image file.

Option III. One can create borders around images to force them into the correct aspect ratio while avoiding stretch distortion. This method is particularly useful when using Palette for Macintosh (SiPA) to image your bitmap files to your Palette film recorder. Borders are sometimes undesirable but unavoidable. If the entire image *must* be on film and image distortion is undesirable, but the aspect ratio is incorrect for the selected output film, borders are the only way! Borders can look very nice and the big plus is you will not have to sacrifice any of the image. Also, you can get creative with your choice of border colors and adding annotation in the border area. This is how it is done:

Creating a border:

Using the Canvas tool in Photoshop, place your image onto a 3:2 aspect ratio canvas for 35mm format.

EXAMPLE: If your image measures 5 x 4 inches, go into IMAGE>CANVAS SIZE

- Make sure to select the center box in the Canvas tool.
- Type in 6 for width and 4 for height. (6 x 4 inches has a 3:2 aspect ratio and it is a multiple of 3 and 2). This image will fill the film area top to bottom, and left and right as necessary. No distortion or cropping will happen.

NOTE 1: You can select any (border) color for the canvas. Even text can be added to the canvas. Setting the canvas to black makes it disappear on chrome (positive) film. The canvas color must be chosen *before* you go into the canvas tool. The bottom square on the Photoshop toolbar represents the color of the canvas. You can change the canvas color by simply clicking on this square.

NOTE 2: Palette for Macintosh (SiPA) has the ability to automatically resize your image horizontally *and* vertically to fit your film recorder's aspect ratio. No adjustment to the image is necessary, however some distortion (stretch) can be seen in the resulting exposure. Palette Export has the same capability to automatically resize your image, but does so only in the horizontal (width) dimension while maintained the original aspect ratio in the vertical (height). Palette Export will leave a black border.

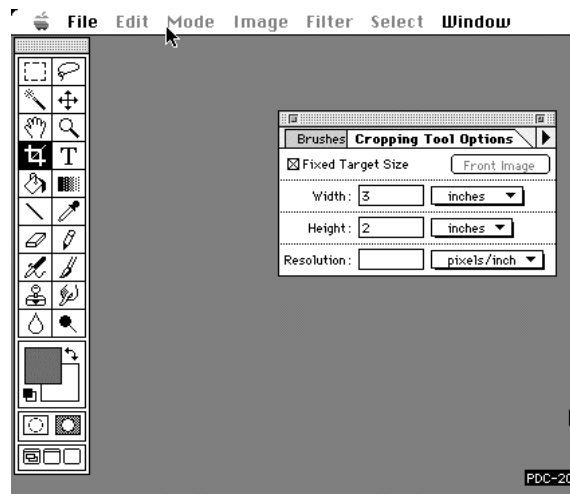


Figure 1

Optimum Input Resolution Guide

HR-6000 Digital Palette Color Film Recorder					
Output Format	Output Resolution	Input Resolution Pixels	Input Resolution PPI/DPI	File Size Mbytes	Aspect Ratio
35mm	4K	4096 x 2730	2731	33.5	3:2
35mm	2K	2048 x 1364	1365	8.4	3:2
35mm	1K (Draft)	1024 x 682	683	2.1	3:2
Autofilm	4K	4096 x 3072	1024	37.7	4:3
Autofilm	2K	2048 x1536	512	9.4	4:3
Autofilm	1K (Draft)	1024 x 768	256	2.4	4:3
Pack film	4K	4096 x 3150	1092	38.7	39:30
Pack film	2K	2048 x1574	546	9.7	39:30
Pack film	1K (Draft)	1024 x 786	273	2.4	39:30
4 x 5	4K	4096 x 3184	886	39.1	54:42
4 x 5	2K	2048 x 1592	443	9.8	54:42
4 x 5	1K (Draft)	1024 x 796	221	2.4	54:42

ProPalette 7000 Digital Film Printer					
Output Format	Output Resolution	Input Resolution Pixels	Input Resolution PPI/DPI	File Size Mbytes	Aspect Ratio
35mm	4K	4096 x 2730	2731	33.5	3:2
35mm	2K	2048 x 1364	1365	8.4	3:2
35mm	1K (Draft)	1024 x 682	683	2.1	3:2

ProPalette 8000 Digital Film Printer					
Output Format	Output Resolution	Input Resolution Pixels	Input Resolution PPI/DPI	File Size Mbytes	Aspect Ratio
35mm	8K	8192 x 5460	5461	134.2	3:2
35mm	4K	4096 x 2730	2731	33.5	3:2
35mm	2K	2048 x 1364	1365	8.4	3:2
4 x 5	8K	8192 x 6370	1638	156.5	54:42
4 x 5	4K	4096 x 3184	819	39.1	54:42
4 x 5	2K	2048 x 1592	410	9.8	54:42
6x7cm	8K	8192 x 6702	2926	164.7	11:9
6x7cm	4K	4096 x 3350	1463	41.2	11:9
6x7cm	2K	2048 x 1674	731	10.3	11:9
6x8cm	8K	8192 x 6144	2560	151.0	8:6
6x8cm	4K	4096 x 3072	1280	37.7	8:6
6x8cm	2K	2048 x 1536	640	9.4	8:6