

Chapter 5

A Two-Color Damask Design

Project 1: A Two-Color Design

In this chapter we will go through the steps in designing three projects for one warp and one weft, with two weaves: one a 4/1 satin (warp effect) and one a 1/4 satin (weft effect, or sateen). This construction is also known as damask and has been used for centuries. Damasks are often monochromatic. Our examples are woven with a white warp and black weft for clarity, but a single color could have been used as well, the contrast of the two satin textures providing the sole visual effect.

We will work with a black and white image. We could have chosen any two colors for this step, because at this point in the process the colors represent placeholders for later input of weaves, and not actual weaves.

We are designing for the face of the cloth, with a simple cloth structure, in which all ends and picks lie in the same plane. Consequently, the face design and the final structural image will have the same pixel dimensions. One pixel in the design will represent the intersection of one warp and one weft. We envision that the cloth will weave square, that is, the ppi will be the same as the epi, giving us an aspect ratio of 1. If after weaving a small sample we find that the ppi is not exactly the same as the epi, we will calculate a new Pixel Aspect Ratio and resize the file before weaving the final cloth. Our loom is a TC-1 set up with 880 ends at 30 epi.

Photoshop presents us with a wealth of tools for producing an image in two colors. Start with any digital image file (photograph, scan, computer drawing). In this example we have used a photo from a digital camera, and will detail the steps in reworking the image to produce a black and white file which will be suitable for the addition of weaves.

Note: The working files referred to in this chapter may be found on the accompanying CD. You will find it helpful to view these files and their associated palettes as you read the process descriptions. There are also photos of the three woven fabrics described in this chapter; all can be found in the Chapter 5 folder.

First Image: A Photo with Minimal Styling

Preparing the Image

The starting image is *Frangipani2472.psd*, an RGB image that has the pixel dimension of 1440 wide and 1200 high, resolution 72 pixels/inch. Resize it by **Image>Image Size**, and in the Image Size dialog box check Constrain



Proportions and Resample Image: Bicubic, enter resolution 30 pixels/inch (we already know that our loom is set up this way), and for Pixel Dimensions, enter width 880. The height will automatically become 733 pixels. (We could also change the height to a number evenly divisible by 5, the height of our structures, but it is not necessary in this example, as the file is non-repeating.) Click OK and then **File>Save As**, and give it a new name (*Frangi1.psd* in this case). We will improve the contrast by **Image>Adjustments>Shadow/Highlight**. We like the effect with the default settings, but you may adjust the sliders in the dialog box to your liking, then click OK. Save your work. The image looks like Figure 5-1.

5-1

Styling the Image

We will perform the following adjustments as Adjustment layers so that we may change them later if desired.

- Select>All**

- Layer>New>Layer via Copy**

- With the new layer highlighted in the Layers palette, and the colors set to the default black and white in the Tools palette (Keyboard Shortcut: **D**), **Filter>Sketch>Photocopy**. In the dialog box, adjust the sliders to your liking. We used the settings *Detail: 22, Darkness: 21*. Click OK.

- Layer>New Adjustment Layer>Threshold**. Adjust the sliders. We chose Threshold level 222. Click OK. Save. This converts the appearance of the image to only two types of pixels: black and white. It is still an RGB image underneath.

Experiment. Turn layers on and off by clicking on the eye icon to the left of any layer. Tweak the adjustments by double-clicking on a layer thumbnail (the small images in the Layers palette), and redoing the slider settings. Layers may be adjusted regardless of their order in the palette, and the changes will appear in the image. If it is necessary to resize an image after weaving a sample, the Layer Styles will still be valid. At the very bottom of the stack, the base image is still there, ready and waiting for later variations! Save the file as *Frangi1styled.psd*. It now looks like 5-2. Its associated Layer palette can be seen in Figure 5-2a.

Duplicate the file. Put the original away. Flatten the duplicate (**Layer>Flatten Image**, or choose Flatten Image by clicking on the flyout triangle in the upper right corner of the Layers palette).

Test the file to be sure it contains only two colors. Convert it to Indexed Mode (**Image>Mode>Indexed**, Palette Exact, Forced None, Transparency unchecked, Preview checked). The number of colors should be 2, which is what we want! Click OK. Save as *Frangi1.indexed.psd*. Duplicate the file, and put the original away. This might seem like overkill, but we like to keep each new version of a file in case we need to revisit it. If you find it is redundant for you, ignore this step.



5-2

Assigning Weaves

Save the duplicate as *Frangi1WeavesLayered.psd*. Convert it to RGB mode (**Image>Mode>RGB Color**).

We want to put the black and white pixels on their own layers. Be sure the Layers palette is open. With the Magic Wand tool, Tolerance 0, and Anti-alias, Contiguous, and Use All Layers all unchecked, click on a black area of the image. With all the black pixels selected, **Layer>New>Layer via Copy**, or keyboard shortcut **Command(Control)-J**, and a new layer appears in the Layers palette with the default name of Layer 1. You may rename this layer by double-clicking on its name—do this now, and call it *Black Pixels*.

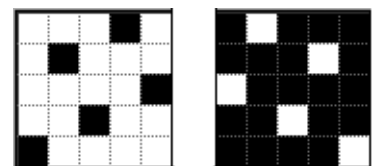


5-2a

In the Layers palette, click on the Background layer to make it active. With the Magic Wand, click on a white area of the image, and with all the white pixels selected, **Layer>New>Layer via Copy**, or use the keyboard shortcut, and a new layer appears in the Layers Palette with the default name of Layer 2. Rename it *White Pixels*. Save.

We will apply weaves to this file in the next step. You may test this layering operation by turning off the Background layer (click on the eye icon on the left). The image should appear the same. Now clicking the black layer and the white layer off and on, the transparent background (gray checkerboard) will show through. Turn all layers back on and save the file.

Here is where we add weaves to the file. Remember that we chose 1/4 and 4/1 satin as our structures in this project? Any two weaves that work together would have served as well, given appropriate yarn and sett. Have you saved these weaves to the Pattern Preset folder yet? If not, do so now. You can find these Presets on the CD accompanying this book, in the subfolder Satins in the Weave Presets folder. They are named 1/4 satin and 4/1 satin and look like Figure 5-3a (They are also in the Chapter 5 folder).



5-3a

Note: we have set up our weaves in the pattern presets as black=warp up. But since our warp in this case is white and our weft black, the weaves will appear inverted. We will address this in a minute.

First, the weaves. Go to **Edit>Preset Manager**, Choose Patterns from the drop down menu, and with the Preset Manager dialog box still open, click and hold the flyout triangle, and select *5-end satins* from the list which appears. (If

5-end satins does not appear, reread the section on Saving Weaves as Pattern Presets in Chapter 4.) Click Done.

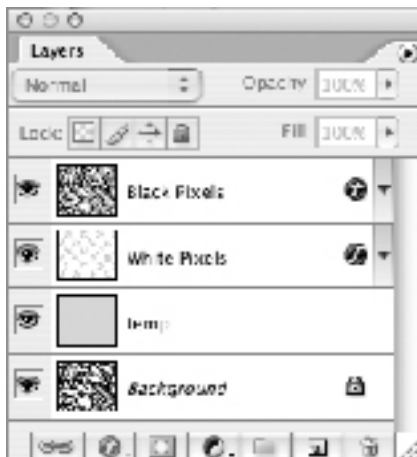
In the Layers Palette highlight the layer *Black Pixels* and click on the “f” icon at the bottom to add a Layer Style. In the Layer Styles drop down menu choose Pattern Overlay... The Layer Styles dialog will open. Click on the triangle at the right of the Pattern thumbnail, choose Satin 1/4 from the pattern list, Blend Mode: Normal, Opacity 100%, Scale 100%, Link with Layer unchecked, and Snap to Origin not clicked, Preview button checked, and click OK.



5-3

In the Layers Palette highlight the layer *White Pixels* and click on the “f.” In the Layer Styles drop down menu choose Pattern Overlay... Click on the triangle at the right of the Pattern thumbnail, choose Satin 4/1 from the pattern list, settings as above, and click OK. Save.

We like to check for “pixel leaks” at this point. Highlight the Background layer in the Layers palette, **Layer>New>Layer**, name it *Temp*, and fill it with a distinctive color (double-click on turquoise in the Swatches Palette, then **Edit>Fill>Use: Foreground Color**, OK). If you turn off the *Black Pixels* or *White Pixels* layer by clicking the eye icon for that layer, you will see the temporary turquoise layer underneath, but when all layers are turned back on, no turquoise should be visible. This tells us that all the image pixels are filled with Pattern. You may delete the temporary layer at this point, but it does no harm to leave it in place. Save. Figure 5-3 shows a section of the file with the weaves assigned, and Figure 5-4 shows the associated Layers palette.



5-4

Duplicate the file and close the original. Work on the duplicate. Notice that the structural weave image appears to be a reverse of the dark/light values in the original black and white design. This is because the weaves are recorded in the Presets as black = warp up, a common drafting convention. But our loom is set up with a white warp and black weft, giving us the reverse effect. To visualize the woven design temporarily with the correct values, we may add another layer: with the top layer highlighted, **Layer>New Adjustment Layer>Invert**. Now it looks the way we expect! Turn this layer off or delete it. Flatten the file (**Layer>Flatten Image**), discarding the hidden layers if any.

Preparing a Loom-Ready File

Almost done! Reduce the file to a two color weave plan by **Image>Mode>Indexed Color**, and in the dialog box select Palette: Exact, Forced: None, Transparency unchecked. The number of colors should be displayed as 2, which is what we want. Click OK. If we go to **Image>Mode>Color Table**, we

will see the two colors in our table, which are black and white. Click OK. Save as *Frangi1.bmp*, and select 4-bit or 8-bit in the BMP Options window. The TC-1 and the AVL Jacquard will read files in .bmp or .tif format. Whenever we see a file with the .bmp or .tif suffix, we know this file is ready to weave.

Second Image: Drawing and Weaving Face Down

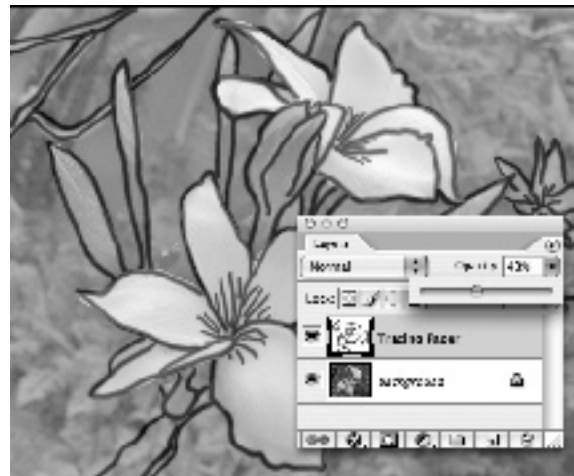
Preparing the Image

We will use the same source image as in the previous example, and give it a new name (*Frangi2.psd* in this case).

Styling the Image

We'd like to do a drawing this time, based on the photograph. We add a "tracing paper" layer by **Layer>New>Layer**, then **Edit>Fill**, and in the dialog box, choose Contents Use: White, Mode:Normal, Opacity 50%. The opacity of the layer may be fine tuned with the Opacity slider in the Layers palette. Choose the Brush tool, with a size of approximately nine pixels (choose brush size in the Options Bar), and for the foreground color choose black (keyboard shortcut D for default color). With your mouse or the pen of your graphics tablet, draw on the tracing paper, using the underlying image as a guide. Be as free as you wish—this is your drawing. From time to time dial the opacity slider all the way up to 100% to envision the drawing in black and white without the base image. When the result is to your liking, be sure the opacity is set to 100%, and save as *Frangi2styled.psd*. The "tracing paper" layer and the opacity slider can be seen in Figure 5-4a.

At this point the drawing is in black and white, with many shades of gray softening the edges of the drawing lines. We have to simplify this drawing to contain only black and white pixels. Do this by adding an Adjustment Layer. With the tracing paper layer highlighted, go to **Layer>New Adjustment Layer>Threshold**, click OK. In the Threshold dialog box, move the little triangular slider back and forth to see the effects of the various threshold settings (be sure Preview is checked). Move it to the left to see thinner lines in your drawing, and to the right for thicker lines. When the effect is to your liking (we chose a level of 101), click OK. Save (Figure 5-4b on the next page).



5-4a



5-4b

Modify for Heavy Lifts

In thinking of the weaves we will be using, namely 1/4 and 4/1 satin, we want the drawing to appear as black lines on a white background. The major portion of the image is background in this design. Our warp is white, the weft black. If we weave the file this way, almost 80% of the warp ends will be rising on each pick. The loom will work better if fewer ends are rising on any given pick, so we have decided to weave the file upside down. So far so good. However, if we do that and then flip the weaving to the “wrong” side, the image will be reversed from left to right. To avoid this situation, we will flip the image left to right before we invert it. Highlight the top layer in the Layers palette, **Select>All, Edit>Copy Merged** (this will copy content on all layers, not just the active layer), **Edit>Paste**. Now a copy of the previous content is pasted, all together, in a new layer, which is on top. Flip this layer: **Edit>Transform>Flip Horizontal**. Rename this layer *Flipped*. The flipped layer is non-destructive. At any time we may hide it or delete it, and the underlying information remains intact in case we wish to modify it further. Save.



5-5

Note: Edit>Copy Merged will copy content on all layers, not just the active layer.

Assigning Weaves

Save the duplicate as *Frangi2weaves.psd*. Convert it to RGB mode (**Image>Mode>RGB Color**). Put the black and white pixels on their own layers. Be sure the Layers palette is open. With the Magic Wand tool, Tolerance 0, and Anti-alias, Contiguous, and Use All Layers all unchecked, click on a black area of the image. With all the black pixels selected, **Layer>New>Layer via Copy**, or use the keyboard shortcut, and a new layer appears in the Layers palette with the default name of Layer 1. You may rename this layer by double-clicking on its name—do this now, and call it *Black Pixels*.

In the Layers palette, click on the Background layer to make it active. With the Magic Wand, click on a white area of the image, and with all the white pixels selected, **Layer>New Layer via Copy**, and a new layer appears in

the Layers palette with the default name of Layer 2. Rename it *White Pixels*. Save.

We will apply weaves to this file in the next step. You may test this layering operation by turning off the Background layer (click on the eye icon on the left). The image should appear the same. Now clicking the black layer and the white layer off and on, the transparent background (gray checkerboard) will show through. Turn all layers back on and save the file.

Here is where we add weaves to the file. Remember that we chose 1/4 and 4/1 satin as our structures in this project? Any two weaves that work together would have served as well, given appropriate yarn and sett.

Go to **Edit>Preset Manager**, Choose Patterns from the drop down menu, and with the Preset Manager dialog box still open, click and hold the flyout triangle, and select 5-end satins from the list which appears. Click Done.

In the Layers palette highlight the layer *Black Pixels* and click on the “f” icon at the bottom to add a Layer Style. In the Layer Styles drop down menu choose **Pattern Overlay...** The Layer Styles dialog will open. Click on the triangle at the right of the little pattern thumbnail, choose Satin 1/4 from the Pattern list, Blend Mode: Normal, Opacity 100%, Scale 100%, Link with Layer unchecked, and Snap to Origin not clicked, Preview button checked, and click OK.

In the Layers palette highlight the layer *White Pixels* and click on the “f”. In the Layer Styles drop down menu choose **Pattern Overlay...** Click on the triangle at the right of the little pattern thumbnail, choose Satin 4/1 from the Pattern list, settings as above, and click OK. Save.

Check for pixel leaks. When everything is OK, save the file.

Preparing the Loom-Ready File

Duplicate the file and close the original. Work on the duplicate. You will recall that we will be weaving this file upside down. Invert it by **Layer>New Adjustment Layer>Invert**. Flatten the file by **Layer>Flatten Image**, then index it by **Image>Mode>Indexed Color**. This should give you two colors, black and white. Save the file as *Frangi2.bmp*, 4-bit or 8-bit color. It is now loom ready. It will weave as a white drawing on a black ground, but when turned over it will be a black drawing on a white ground, with the correct left-to-right orientation. The left-to-right orientation is especially important in images containing text. We had an intended “front” and “back,” but this cloth is really two-sided, and you can use either side as the visible front side. A small portion of the loom-ready file can be seen at Figure 5-5a.



5-5a

Third Image: Using More Filters

Preparing the Image

Again we use the starting image *Frangipani2472.psd*, an RGB image which has the pixel dimension of 1440 wide and 1200 high, resolution 72 pixels/inch. Resize it by **Image>Image Size**, and in the Image Size dialog box check Constrain Proportions and Resample Image: Bicubic, enter resolution 30 pixels/inch (we already know that our loom is set up this way), and for Pixel Dimensions, enter width 880. The height will automatically become 733 pixels. Click OK and then **File>Save As**, and give it a new name (*Frangi3.psd* in this case). We will improve the contrast by **Image>Adjustments>Shadow/Highlight**. We like the effect with the default settings, but you may adjust the sliders in the dialog box to your liking, then click OK. Save your work.

Styling the Image

Duplicate *Frangi3.psd* and put the original away. Proceed with the duplicate; save it as *Frangi3styled.psd*. **Layer>New Adjustment Layer>Hue/Saturation**. In the New Layer dialog box, accept default settings, click OK. In the Hue/Saturation dialog box, Edit: Master, Preview box checked, and move the Saturation slider all the way to the left to remove all the color. Click OK. Save.

We are now going to try one of the Photoshop Filters, but we will do this on a separate layer so that the previous steps are preserved. With the top layer highlighted in the Layers Palette, **Select>All, Edit>Copy Merged, Edit>Paste**. Now with this newest layer highlighted, do **Filter>Distort>Wave**. In the Wave dialog box, experiment with the various buttons and sliders (we clicked Sine

and Repeat Edge Pixels, set the number of Generators to 5, Wavelength to Min. 10 and Max 120, Amplitude Min. 5 and Max 35, and scale to 100%/100%). Click OK. Save. Rename this layer *Wavy*.

Now make a new layer for the Threshold operation. With the top layer *Wavy* highlighted, **Layer>New Adjustment Layer>Threshold**, and in the Threshold dialog box, with Preview checked, adjust the slider (we chose a value of 90). Click OK. Save.

We think this file needs something more—perhaps some brush drawing. With the top layer highlighted in the Layers palette, **Layer>New>Layer**. Accept default settings. With the Brush tool, color black (keyboard shortcut D for default color), brush size about 10 pixels, draw on the new blank layer, concentrating in the white areas. Now change the brush color to white

(keyboard shortcut X to reverse foreground and background colors) and draw some more on the image, concentrating on the black areas. When the drawing is finished, there's one more step in the styling process. **Layer>New**



5-6

Adjustment Layer>Threshold, adjust the Threshold slider to a pleasing level (Preview box is checked). Click OK. Save. The completed styled file looks like Figure 5-6 on the preceding page.

Duplicate the file. Put the original away. Flatten the duplicate (**Layer>Flatten Image**, or choose Flatten Image by clicking on the flyout triangle in the upper right corner of the Layers palette).

Test the file to be sure it contains only two colors. Convert it to Indexed Mode (**Image>Mode>Indexed**, Palette Exact, Forced None, Transparency unchecked, Preview checked). The number of colors should be 2, which is what we want! Click OK. Save as *Frangi3.indexed.psd*. Duplicate the file, and put the original away.

Assigning Weaves

Save the duplicate as *Frangi3weaves.psd*. Convert it to RGB mode (**Image>Mode>RGB Color**). Put the black and white pixels on their own layers. Be sure the Layers palette is open. With the Magic Wand tool, Tolerance 0, and Anti-alias, Contiguous, and Use All Layers all unchecked, click on a black area of the image. With all the black pixels selected, use the keyboard shortcut **Command(Control)-J**, and a new layer appears in the Layers palette with the default name of Layer 1. You may rename this layer by double-clicking on its name—do this now, and call it *Black Pixels*.

In the Layers palette, click on the Background layer to make it active. With the Magic Wand, click on a white area of the image, and with all the white pixels selected, **Command(Control)-J**, and a new layer appears in the Layers Palette with the default name of Layer 2. Rename it *White Pixels*. Save.

We will apply weaves to this file in the next step. You may test this layering operation by turning off the Background layer (click on the eye icon on the left). The image should appear the same. Now clicking the black layer and the white layer off and on, the transparent background (gray checkerboard) will show through. Turn all layers back on and save the file.

Add weaves to the file. Go to **Edit>Preset Manager**, Choose Patterns from the drop down menu, and with the Preset Manager dialog box still open, click and hold the flyout triangle, and select 5-end satins from the list which appears. Click Done.

In the Layers palette highlight the layer *Black Pixels* and click on the “f” icon at the bottom to add a Layer Style. In the Layer Styles drop down menu choose **Pattern Overlay...** The Layer Styles dialog will open. Click on the triangle at the right of the little pattern thumbnail, choose Satin 1/4 from the Pattern list, Blend Mode: Normal, Opacity 100%, Scale 100%, Link with Layer unchecked, and Snap to Origin not clicked, Preview button checked, and click OK.

In the Layers Palette highlight the layer *White Pixels* and click on the “f”. In the Layer Styles drop down menu choose **Pattern Overlay...** Click on the triangle at the right of the little pattern thumbnail, choose Satin 4/1 from the Pattern list, settings as above, and click OK. Save.

We like to check for “pixel leaks” at this point. Highlight the Background layer in the Layers palette, **Layer>New>Layer**, name it *Temp*, and fill it with a distinctive color (double-click on turquoise in the Swatches palette, then **Edit>Fill**, Use: Foreground Color, OK). If you turn off the black or white pixel layer by clicking the eye icon for that layer, you will see the temporary turquoise layer underneath, but when all layers are turned back on, no turquoise should be visible. This tells us that all the image pixels are filled with pattern. You may delete the temporary layer at this point, but it does no harm to leave it in place. Save. Be sure your zoom level is 100%. Sometimes other zoom levels will introduce colors into the screen image which aren’t really there, confusing you. Duplicate the file and close the original. Work on the duplicate. Notice that the weave image appears to be a reverse of the dark/light values in the original black and white design. This is because the weaves are recorded in the Presets as black signifying warp up, a common drafting convention. But our loom is set up with a white warp and black weft, giving us the reverse effect. To visualize the woven design temporarily with the correct values, we may add another layer: with the top layer highlighted, **Layer>New Adjustment Layer>Invert**. Now it looks the way we expect! Turn this layer off or delete it. Flatten the file (**Layer>Flatten Image**), discarding the hidden layers if any.

Preparing a Loom-Ready File

Almost done! Reduce the file to a two color weave plan by **Image>Mode>Indexed Color**, and in the dialog box select Palette: Exact, Forced: None, Transparency unchecked. The number of colors should be displayed as 2, which is what we want. If we go to **Image>Mode>Color Table**, we will see the two colors in our table, which are black and white. Click OK.

Save as *Frangi3.bmp*. If you select the 4-bit option rather than the 8-bit option, the file will be smaller, but either size will work OK. The TC-1 and the AVL Jacquard will read files in.bmp or .tif format.

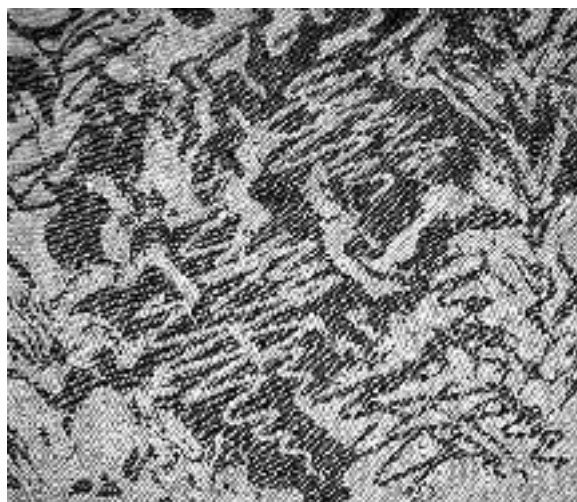
Following are photos of fabrics woven from the three example files in this chapter: Frangi1, Frangi2, and Frangi3 (Figures 5-7, 5-8, and 5-9). The photos may be found in color on the accompanying CD.



5-7 *Frangi1.bmp*



5-8 *Frangi2.bmp*



5-9 *Frangi3.bmp*

File Naming Conventions

To review, these are the steps with suggested naming conventions and file suffixes:

• <i>Filename.psd</i> - the source image
• <i>FilenameStyled.psd</i> - same as previous, with layers, layer styles, filters, layer comps, etc., added
• <i>FilenameIndexed.psd</i> - same as previous, flattened and indexed to desired number of colors
• <i>FilenameWeaves.psd</i> - same as previous, converted to RGB, with each color assigned to its own layer, and weaves applied as layer styles
• <i>Filename.bmp</i> or <i>Filename.tif</i> - same as previous, flattened and indexed to 2 colors (b/w), loom ready.
And to wrap it all up, put the above 5 files in a folder called <i>Filename Workfiles</i> . We also like to include the original file from which the source image was derived, as an optional sixth file.