Chapter 14

Supplementary Brocading In The Warp And The Weft

Extra warps or wefts, known as supplementary or brocaded threads, can add spots of color to a cloth, or even continuous patterning, but usually in stripes or rows rather than throughout the cloth. Having a bee, a flower, or some other motif appear sporadically in this way keeps the cost of production down, while adding elements of additional color. If the brocaded image is produced in the weft, the motif can be repeated but executed in different colors each time it is woven. Besides having supplementary threads that run selvedge to selvedge, you can also brocade a jacquard or dobby fabric by having the extra threads work in isolated areas of the cloth.

One of the characteristics of a brocaded thread is that it is not essential to the integrity of the woven cloth. Often the extra thread (whether in the warp or weft direction) floats on the face and the back of the cloth, and is not tacked in with the ground cloth. There are also several ways to tack the supplementary threads so that their floats are not too long, including cutting them away between motifs.

Supplementary brocading in the warp or the weft can be done on any type of cloth. Many cultures that make brocaded fabrics do weft brocading on plain weave grounds. You are probably familiar with brightly embellished fabrics from Guatemala, woven on backstrap looms where the sett of the cloth is warp-faced, the structure is plain weave, and the discontinuous brocading is in the weft direction. Their brocaded motifs are distinct to specific towns, and serve to identify the home of the owner of the cloth.

There is also a well-documented group of brocaded towels from Perugia, Italy, made of a linen plain weave ground with blue patterning in the weft. This type of cloth, where the extra threads run selvedge to selvedge, was woven from medieval times almost to the present.

14-1 Discontinuous Weft Brocade from Nebaj, Guatemala

14-2 Motif from Towel from Perugia, Italy

The brocaded ship cloths from Indonesia also have a plain weave ground with supplementary wefts that run selvedge to selvedge.

There is a beautiful collection of drawloom woven brocaded silks from 18th century Europe in the Victoria and Albert Museum in London. This collection is well documented by Natalie Rothstein (see Bibliography), and worth studying. The ground of many of these fabrics is a damask or satin lampas. Some fabrics have supplementary wefts that run edge to edge, as well as some that work in discrete areas of the cloth. The complexity of the weaving combined with the beauty of the design creates sublime fabrics.

In this chapter, we will discuss several variations of brocading, starting with supplementary warps.

Supplementary Brocading in the Warp

Note: These illustrations may be found in color on the CD in the Chapter 14 folder

There exists a method of weaving where extra patterning ends are put into the cloth and removed from the cloth at various points in the weaving, but we will discuss supplementary brocading in the warp assuming that the extra ends run throughout the length of the warp.

If you have a set number of ends on your loom, as is usual with a jacquard loom, you have to designate some of them for the supplementary warp threads. You can have the relationship of ground threads to supplementary warp continuous throughout the cloth, 1 to 1, or 2 to 1, or some other constant relationship. This process allows the pattern to exist in all parts of the cloth, and is the simplest in terms of making weave structures–create them accounting for the two systems of warp (ground and supplementary).

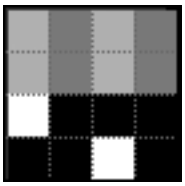
Warp Brocading With No Tacking of the Supplemental Ends

Here is an example where the ground is woven as a plain weave and the supplementary warp floats either above or below the ground. The white represents the ground with the brocading warp on the back, and the red represents the ground with the brocading warp above it (hiding the ground). We have designed for the face of the cloth—440 ends (half of the 880 on our loom), and made the pattern in repeat, so we can weave yardage of the design. The height is 342 picks, a number evenly divisible by two.

14-3

We made two weave structures for our file and saved them as Pattern Presets (which you can find in the master Weave Presets folder as well as in the Chapter 14 folder of the CD). Figure 14-4a, wS001, is a plain weave working on the ground ends (light gray) and the supplementary warp (the dark gray ends) always lifted (floating on top of the plain weave). This weave structure will be used for the red areas of the design.

Figure 14-4b, wS002, is also a plain weave on the ground ends (the light gray ends), but now the supplementary ends (the dark gray ones) remain on the back. They are never lifted to the top of the cloth, nor are they tacked in anyway, they just float at the back of the cloth. This structure will be placed in the white areas of the design.



14-4a wS001

Before placing the structure as Pattern Overlays, we first have to resize the image. The weft system remains the same; only the warp has to be doubled to account for all the ends on the loom. Go to **Image>Image Size**, make sure Constrain Proportions is not checked, have Resample Image set to Nearest Neighbor, and double the width by changing the width dimension to percent and 100 to 200 (or you can just leave the width at pixels and type in the expanded width, which is 880 for our loom). Click OK. The image is now elongated in the width, which is correct. It is shown in Figure 14-5.

14-4b wS002

Now make layers out of the two colors, add the structures as Pattern Overlays and save the file. We saved ours as ***14-6.psd***. The Layers palette, which you can see if you open that file, looks like Figure 14-6.

14-5

Duplicate the file and put the original away. Flatten the duplicate, index it to be sure you have only two colors (**Image>Mode>Index**), then save as a .bmp or .tif file. You are ready to weave. A section of the loom-ready file is shown in Figure 14-7.

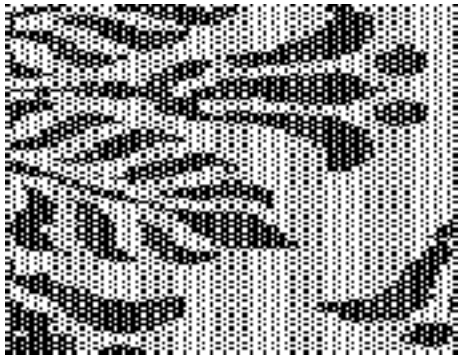
If you find that the ppi you planned on using is wrong (we designed with square pixels in the face, and did not expand the design in the height, so the ppi remained the same as the epi of the ground cloth, 15 in our example) you will need to resize your file to the correct Pixel Aspect Ratio (ppi/epi). You can resize the layered weave file without modifying anything except the height of the image. If you need to review how to do this, see Chapter 4.

14-6

Also, if you find that there are floats of the supplementary ends in the cloth that are longer than you like, you should modify the image as we do in the next example, or modify the structures as we describe further on in this chapter.

Some Comments on Sett

If you are working with a loom that allows variable sett (like the AVL Jacquard Loom), you can figure out the correct epi for the ground cloth, then double it for the total sett (ground ends plus supplementary warp if your ratio is 1:1). The total sett, as with double weave, is crammed, but when split by the weave structures, it weaves at the correct epi for the ground cloth. The brocade warp, weaving on top of the ground, should completely hide the ground. However, if you are working on a loom with a fixed sett, like the TC-1 loom we are using, the supplementary warp might not cover the ground, but look more like a gauze



14-7

over it. If you can tie on thicker ends for the supplementary warp, this will help with the coverage, and if you can tie on thicker yarn for all the ends, then perhaps the sett will work fine. In terms of the plain weave, the denser the sett, the more the ground structure will become warp-faced, like a taffeta. If you use a yarn that is not tightly twisted for the supplementary ends, something that has some loft, it will help with the coverage. The best advice we can give you is to go to the loom and weave samples using different yarns. Assuming the sett cannot be increased, you might have to modify your expectations with this type of cloth.

A Second Method of Making Supplementary Warp Fabric

In this next example of supplementary warp fabric, we are starting with an image of a tree. You can see the full image on the CD, and a section of the image is shown in Figure 14-8. The plan is to weave the tree as supplementary warp ends on top and the white as the ground structure with the extra warps on the back. We are going to use the same two weave structures we used above. What will be different than the previous example is that we will add regular marks to the image that will become tacking points for the supplemental warp.

14-8

First we reduced the size of the image to represent the face of the cloth. In this case, we reduced the image keeping Constrain Proportions checked so we would retain the proportion of the square pixels. Our face width is 440 and the height is 588. We made sure that the number of picks was evenly divisible by 2 (the height of our structures). We are designing with square pixels knowing we might have to resize the image after weaving a test strip.

Using Image>Adjustment>Threshold we reduced the image to two colors, so it looks like ***14-9.psd,*** shown in Figure 14-9.

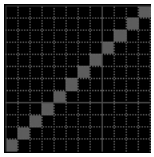
14-9

We can weave the image as it is, with the two Pattern Presets, but if we did, we would have warp floats in the trunk of the tree that run the full length of the cloth. Obviously, we do not want this. One way to solve the issue is to overlay a weave with floats of a length we can tolerate onto the black areas of the image. By overlaying a twill structure, we create distinct diagonal lines on the tree. A satin structure will give a uniform spread of tacking points without the clear diagonal of the twill. We decided to try both structures and see which we preferred.

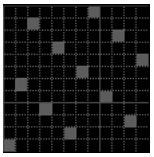
The first decision was to determine what length of warp float we could tolerate. We decided the floats of a 12-end satin would be okay. The end use of the fabric should be considered when making this decision. We made two new files, 12 pixels by 12 pixels, with a black ground. On one we painted the 1/11 twill in red and on the other we painted the 1/11 satin in red. Both these

files were saved as Patterns (**Edit>Define Pattern**) and look like Figures 14-10a and 14-10b.

Then we duplicated the image file, selected the tree with the Magic Wand, and Filled one tree with the 1/11 Twill and the other tree with the 1/11 Satin. Since the trees were already black, the only change was the imposition of the red squares of the structures. This is what sections of each file look like:



14-10a 1/11 Twill



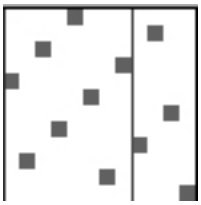
14-10b 1/11 Satin

14-11

14-12

We decided that we preferred the uniform stitching of the satin. However, we saved the image with the twill just in case we wanted to use it in the future. Decisions like this, "twill or satin?," are often arbitrary until you actually see the interlacing of yarn in the real cloth.

We decided to also place an overlay of a structure on the white area to eliminate the long floats at the back of the cloth. We wanted to use the same structure for tacking, but made a new Pattern with blue marks on a white ground. We used blue instead of red so we can distinguish the stitching points in the black areas of the design from the stitching points in the white areas of the design. We also flipped the structure horizontally so the direction of the satin would be different in the ground than in the tree (**Image>Rotate Canvas>Flip Canvas Horizontally**). Again, this was an arbitrary, personal decision–one choice is not inherently better than the other. The new Pattern is shown in Figure 14-13.



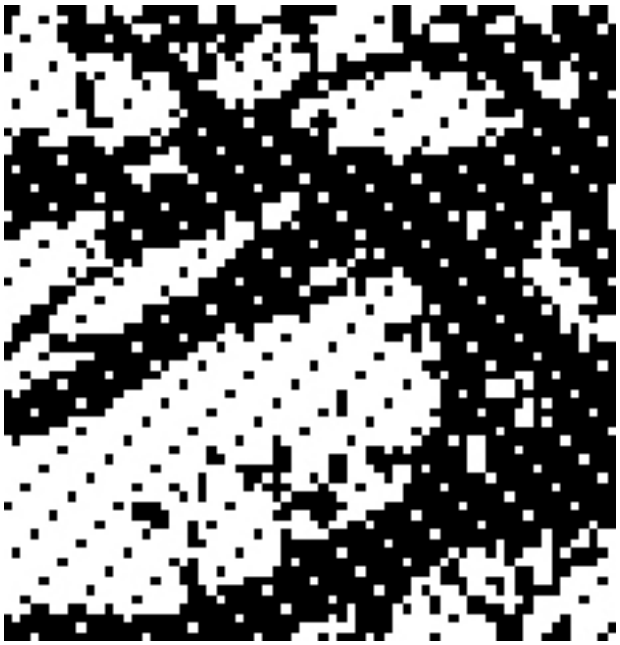
14-13

A section of the image with tacking in both the tree and the ground is shown in Figure 14-14 on the next page. The full image is saved on the CD as ***14-14.psd***. This image is how we want the design to appear in the cloth. The red marks in the tree will be places where the supplementary warps go to the back of the cloth, so no float is longer than 11. The blue marks in the white

14-14

area are tacking points where the supplementary warp comes to the face of the cloth, keeping the back floats to a maximum of 11. In other words, we want the red marks to work like the white area of the cloth (supplementary warp goes to the back), and the blue marks to work like the black area (supplementary warp comes to the front).

Using the Magic Wand, we selected all the red pixels and turned them into white (**Edit>Fill>Use: white**), so the supplementary warp will go to the back of the cloth at those points. Then, using the Magic Wand, we selected all the blue points and turned them black, so the supplementary warp will rise over the ground cloth at those points. We understand that upon seeing the actual fabric we might feel the tacking is occurring too often (or not often enough). In that case, we would go back to the thresholded image (***14-9.psd***), glad that we saved it, and impose different structures as tacking points for the tree and ground. Please don't get confused that the colors of the image file and the colors of the weave structure file are the same (black and white); Threshold turned our image into a black and white file. It probably would have been less confusing if we had then modified the image file into two distinct hues, such as red and blue, distinguishing the two files. A section of the image file, before expanding to accommodate the total number of picks (ground and supplementary weft), turned into black and white looks like Figure 14-15.



14-15

We expanded the width of the image to reflect the true number of ends (**Image>Image Size,** uncheck Constrain Proportions, have Resample Image checked and set to Nearest Neighbor, double the width, click OK). The tree now looks out of proportion, but the structures will make the two warp systems be layered rather than side-by-side (and this will work better if you have been able to modify the density of your sett). You can make the image visually correct by modifying the Custom Pixel Aspect Ratio (ppi/epi means the square pixel ratio has become .5, since we doubled the epi).

We put in the two Pattern Presets as Layer Styles, placing sW001 in the white area and wS002 in the black area. The layered weave file was saved, then duplicated, and put away. If we need to resize the image to change the Pixel Aspect Ratio after we weave a sample at the loom we will return to this file. If you look at a detail of file ***14-16.psd*** you will see that the underlying plain weave of the ground

is maintained throughout. In the light areas of the image, white vertical lines indicating warp floats on the back of the cloth punctuate the plain weave, and in the dark areas of the file, black verticals indicating rising warps punctuate the plain weave.

The stitching points of the supplementary warp in the ground areas will probably show and modify the look of the ground (your sett will determine how much they show). You can see in the detail that where the satin stitching comes next to the plain weave in the ground areas, there are two risers side by side that form diagonal lines (though not as distinct as twill lines).A detail of the weave file ***14-16.psd*** is shown in Figure 14-16.

14-16

The duplicate was flattened, indexed to make sure there were only two colors in it, then saved as a .tif file, ready to be woven. It is on the CD as ***14-16.tif***.

Another Method to Stitch Supplementary Warps

It was a common practice for jacquard designers who used to draw their designs on point paper, to simply paint in stitching points in those areas where floats were too long. We can also do that with Photoshop. Let's create another design using a supplementary warp, having the ratio of ground to extra warp 2:1. We'll use a 2/2 twill for the ground weave, and have the supplementary warp float on the front or back of the cloth. For this design, we will leave the floats on the back alone, letting them be whatever length that happens, but on the front in the image, we will draw in some tacking points.

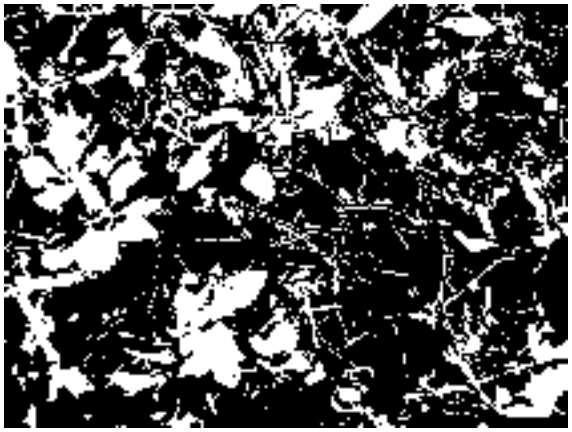
The ratio we are using in this example is probably not going to allow the supplementary ends to cover the ground for a loom with a fixed sett. Still, we thought it might be interesting to see what happens. Like a drawing where stripes are imposed on an object yet you can still tell what the object represents, this will test the limits of how much can be removed before you loose all sense of the image.

14-17

The original digital image that we began with is illustrated in Figure 14-17.

We resized it to the number of ends on our loom (880), keeping constrain proportions on so it would maintain the proportion of width to height of

the original. We could have worked with a face image of one-third the width to represent only the supplementary warp, or we could have worked with a file two-thirds the width representing the ground ends, but it just seemed easier to work full width. Our file became 880 wide x 660 high. (If you want to see the difference in the final image when working from files of different face sizes, make Photoshop files for all three possibilities and compare them. This will be the best way for you to determine how you want to work on your own images. Start with a file that is resized, in proportion, for the total number of ends–880x660 for us–then leave the height unchanged but modify the width.) Our height is a number that is evenly divisible by the repeat of the 2/2 structure. Although this image has not been modified to repeat in yardage and the cloth has only one weft system, making this fact inconsequential, we are in the habit of having our height evenly divisible by the structures, so we are happy.



14-18

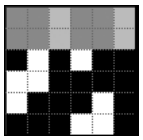
Then we made a Threshold Adjustment Layer (**Layer>New Adjustment Layer>Threshold**), reducing the image to black and white. Using an Adjustment Layer meant we could modify the image later if we didn't like the areas of black and white in the image. It is shown in Figure 14-18.

14-19

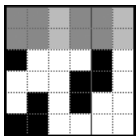
We plan to put a 2/2 twill with the supplementary warp floating on the back in the black areas of the design. The supplementary warp will float over the 2/2 twill in the white areas (covering it or not covering it, depending on the sett of the cloth; in our case we don't expect it to cover the ground). In some of the areas, the floats were longer than we wanted, so we drew in stitching points, using red marks. We made a new layer above the Threshold Adjustment layer and used the Pencil tool set to a size of 1 pixel. Basically we just looked for large areas of white and drew in lines that would break up long floats. We did this rapidly, with confidence, knowing that we can always return to the Photoshop file and modify the image if we don't like the results in the cloth. The file is saved as ***14-19.psd*** on the CD. A section of the design now looks like Figure 14-19.

We created two new structures and saved them as Pattern Presets wS003 and wS004. The structure on the left, wS003, will be used in the white areas of the design, where the supplementary warp floats over the ground, and the structure on the right, wS004, will be used in the black areas of the design, where the extra warp floats on the back of the cloth. It will also be used in the red areas of the cloth. We could have turned the red marks into black, but prefer making a layer for the red and adding the structure as

Pattern Overlay. If there is a problem when we weave the image, we can make adjustments to these stitching points since they have retained their identity as a separate layer. The two structures, saved as Pattern Presets and found on the CD, look like Figures 14-20a and 14-20b with the warp systems indicated by the color bands at the top of the files.



14-20a wS003



14-20b wS004

The layered weave file is saved on the CD as ***14-21.psd*** and the flattened loom-ready file is saved as ***14-21.tif***. In the final file, you can clearly see the ground warps, clumped in twos, and the supplementary warp with its long black marks indicating warp floats. The long white marks show where the supplementary warp floats on the back. Some of the back floats are really long. A section of the file is shown in Figure 14-21.

14-21

Supplementary Warp in Discrete Stripes

Sometimes you find supplementary warp used in discrete stripes in fabric, often as border patterns. An example of this is found on some saris from India. The supplementary stripes can be dispersed throughout the width of the cloth too. Whether on the borders or throughout the cloth, this type of fabric has different warp set-ups—sections of the warp threaded with only ground warp and sections threaded with both ground warp and supplementary warp. Designing for this set-up in Photoshop is a bit tricky. This is one place where dedicated jacquard software has an advantage. However, it is not impossible with Photoshop, and we will go through two examples to show you ways that we have found to make files that weave properly.

Working on a loom with a fixed sett like ours, it is a good idea to use thicker yarn for the supplementary ends, so that they will cover the ground warps weaving under them. Since our sett is fixed at 30 epi all across the loom, in the final cloth the border areas will have the ground at 15 epi and the brocade at 15 epi, totaling 30 epi, while the ground in the rest of the cloth is 30 epi. This means the ground weave, where it shows in the border, will appear looser than in the body of the cloth. Our brocaded pattern is such that the ground does not show in big areas so we don't think this is going to be a critical issue. However, if we had the ability to change the sett of the loom, we would have made the borders with a sett of 60 epi, keeping the ratio of 1:1, and keeping the ground sett at 30 epi and the pattern ends at 30 epi; or 45 epi, with a ratio of 2:1, keeping the ground set at 30 epi and the supplemental ends at 15 epi. We know we can create variable setts across the width of the cloth on a dobby loom, but are not sure if it is possible to do this on jacquard looms that allow changes in sett. The AVL Jacquard Loom is designed to make a uniform change in sett, but it probably can also be modified for variable sett in stripes across the cloth. The Stäubli Unival controller allows each hook (end) to be controlled and moved within a range, so variable sett is

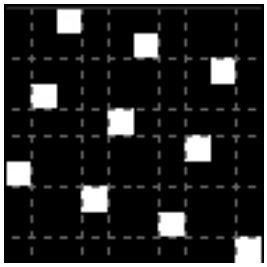
14-22 AVL Jacquard Loom allows Variable Sett

possible there. You will have to design according to the loom available to you.

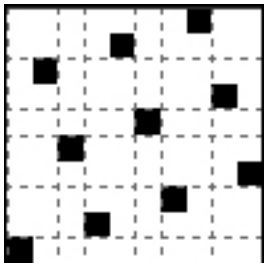
14-23

Supplementary Warp Borders

In the first example, we will have supplementary threads working as borders on either side of the fabric, and nowhere else in the cloth. At the borders, we will have a ratio of 1:1 for the two warp systems. Let's begin with the total number of ends, 880, and a sett of 30 epi. We will use a satin/sateen damask for the ground cloth and have the supplementary warp float on the top or back of the cloth, with no other tacking points than in the design. We want two inches of border on each side of the cloth—that is, 60 ends on each side, 30 as ground and 30 as supplementary warp.



14-24a 9/1 Satin

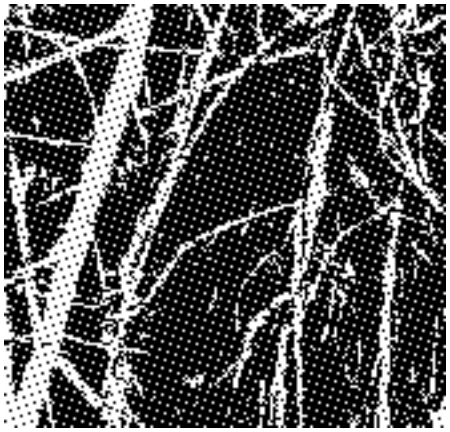


14-24b 1/9 Sateen

First, we will design the damask ground. We subtracted the borders from the design (880 – 120 = 760) and placed the damask image in a file 760x200. We decided to use a 10-end satin and sateen, and made the height of the design a number divisible by 10 (200 picks). The image for the damask looks like Figure 14-23.

Then we put in the weave structures and flattened the image, just as we would do for any design. We used these structures for the image (black became the 9/1 satin and white became the 1/9 sateen), which are found in the Weave Presets folder under Satin, as well as in the Chapter 14 folder.

We made the image file a size that would be divide evenly by the 10-end repeat of our weave structures. They repeat evenly in both the width and height of the file. By doing this, we are assured that warps and wefts will line up correctly (though in this case, the structures have only one warp and one weft system, so it is not an issue). A section of our structural file is shown in Figure 14-25.



14-25

Before making the border images, we took our damask and went to **Image>Canvas Size** and increased it to 880, the full width of the final weaving. We left the image anchored in the center, but changed the canvas extension color to red, a hue that would not be mistaken for either black or white. Then we saved this file (it is ***14-25a.psd*** on the CD) and focused on the borders.

The borders are going to each be 60 pixels wide by 200 pixels high. If they are going to be identical, as in our example, then we only need to make one file. We decided to make a pattern that would be repeated twice at each edge. We made a file 15 pixels wide by 200 pixels high, to represent one repeat of the image and

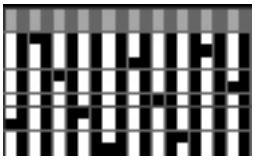
only the supplementary warp. We drew in a motif and copied and pasted it until it filled the height of the design. If we wanted it to be a continually changing image, we could have drawn that too. The image is shown in Figure 14-26.

Then we doubled the width of the image, to account for the ground warp. This made our file 30 pixels wide. Since we left 60 pixels on each side for the border, we also doubled the width of the file (**Image>Canvas Size**) and pasted a second version of the border design into the expanded file. The final border image looks like Figure 14-27.

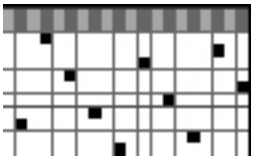
14-26

14-27

The ground structure will show in the white sections of the design. It is possible to choose a structure to sit under the supplementary warp that is different than the structures used in the body of the cloth. If you do this, and you increased the density of the borders to maintain the sett of the ground, be careful not to use a tighter structure (one with more binding points), which would cause tension problems at the edge of the fabric. Since our sett was fixed, the ground structure is actually going to be looser than in the area with only ground warp. What we need to watch as we weave is that the picks do not pack down more on the edges than in the body of the cloth. For us, choosing a tighter structure might actually be a good idea. However, we decided to continue with the 1/9 sateen under the supplementary warp image and see how it works. We had to create new Presets for the border: wS005 has the supplementary warp floating over the 1/9 sateen and wS006 has the supplementary warp floating under the 1/9 sateen.



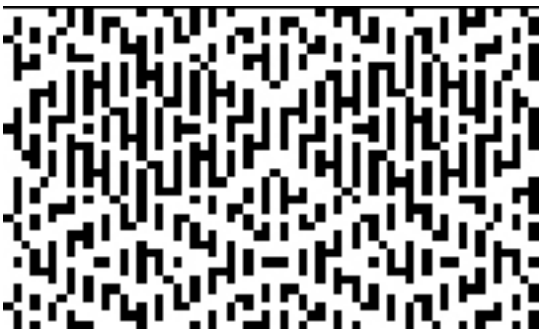
14-28a wS005



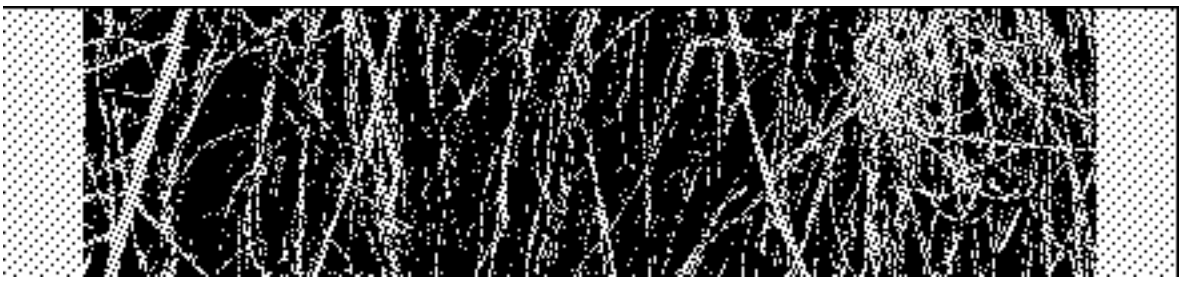
14-28b wS006

Figure 14-29 shows what the bottom portion of the border looks like, expanded to 60 pixels wide, with the two structures replacing the black and white colors.

Now we have two files, the central damask with two extensions (red in our file) and the border file. We want to drag the border design into the damask file, twice, and place it in the red sections on the edges. We saved the layered weave file as ***14-29.psd*** on the CD. This is how our final image looks:



14-29



14-30

Stripes of Supplementary Warp Across the Cloth

If we wanted to make a file where the border pattern we created above was woven in several areas across the cloth, we would follow a similar procedure, making a file for the supplementary area and making a file for the ground cloth. Then we would combine them. Having the number of warps in a section match the size of the weave structures will ensure that your warp systems and weave structures match correctly. Let's try an example of this.

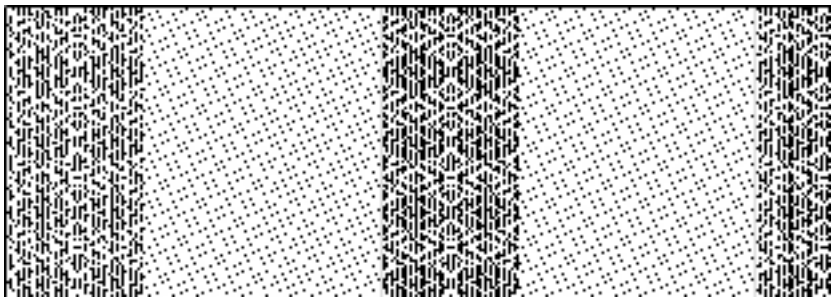
We have already done some of the work. We have a file 60 pixels wide by 200 pixels high that represents a stripe of supplementary warp patterning, ***14-26.psd***. Let's make a new file, 880 pixels wide x 200 pixels high, and fill it with the 1/9 sateen. This will be the ground of our new fabric.

If we want symmetrical cloth, we can do the math to figure out the placement of the supplementary warp stripes. It is necessary to do this eventually, to tie-in the supplementary threads on the loom (unless we use the current warp as those threads). We can also decide the placement first in Photoshop, then return to the loom and tie-in the supplementary threads in the right positions. Let's do that.

First, place copies of the border on each side of the image. By using copy and paste, Photoshop will put each copy in its own layer, and keep the 1/9 sateen on the ground layer. We can make a fixed rectangular selection of 60 wide x 200 high, the size of the border pattern, and place it where we want the copy to go.

We know from our previous example that the width of the ground between the two side borders is 760 pixels wide. Let's leave 100 pixels of ground and place another pair of stripes, moving in from each edge. Make a fixed selection 160 pixels wide x 200 pixels high, and place it over the left portion of the design. Drag out a Guide Line (drag from the ruler) and mark the right edge of this selection. Do the same on the right side of the design, placing a Guide Line on the left edge of the selection. Then, using Fixed Selections of 60 wide x 200 high, placed so their edges touch the Guide Lines, paste another pair of supplementary warp sections into them.

Repeat this process, this time having the selection 320 pixels wide for marking the Guide Lines. Then paste two more repeats of the border. You will have six stripes, evenly spaced, except the central portion of the cloth, which shows ground, is a bit wider. You can see the file on the CD, saved as ***14-31.psd***. A portion of the image looks like Figure 14-31.



14-31

Another option is to start in the center of the image, placing the supplementary warp sections, and move outwards. The important thing is that when you go to weave, the threads on the loom match up with the lifting plan of the draft. In the above example,

we will want threads 1-60, 161-220, 321-380, 501-560, 661-720, and 821-880 threaded one ground, one supplementary warp.

Supplementary Brocading in the Weft

Supplementary brocading in the weft is more flexible than in the warp: it can be done on any kind of warp set-up; we can work with different numbers of supplementary wefts in the same design; and we can change the color and type of yarn at will. There are so many variations of this type of structure that we can deal with only a few in this chapter. Once you understand the principal of designing this cloth, you can make your own Presets and modifications.

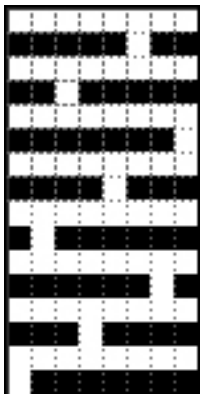
Weft Brocade working from Selvedge to Selvedge

If you use a consistent number of brocaded wefts in a design, and they form motifs all over the cloth, you can create a file easily. First we will detail an example where the ground is an 8-shaft satin and the supplementary weft floats either on the face or the back of the cloth; then we will discuss an example where the supplementary weft works as a twill, front and back. Remember that supplementary implies the patterning weft is extra. There is always a ground yarn that weaves the structure that binds the threads into cloth. The supplementary weft adds color and motifs, but you can cut it out of the fabric and still have whole cloth.

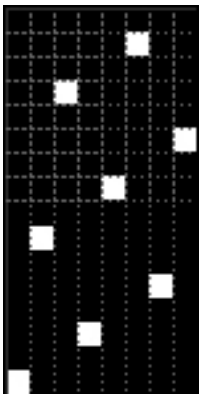
There is variable ppi in this type of cloth. We are discussing files where the weaver throws a shuttle and controls the beat, but if you are designing this type of cloth for an industrial jacquard, you need to put marks into the file on the "regulator" hook indicating stop motion. In other words, the automatic take up on the loom will stop on those picks, allowing the density of the wefts to become tighter. Appendix D has more information on designing for a fully-automated loom.

14-32

We will start with a file 880 ends wide (the full number of ends on our loom) by 160 picks high (a number evenly divisible by 8, the number of picks in our ground structure). We made a file with two colors, one to represent the ground cloth with the brocade floating on the back, and the second color to represent the ground with the brocade weft working on top. We are going to ignore the size of the weft floats on the back, but scatter the motif around the cloth so that the floats are somewhat checked.



14-33a 1SW001



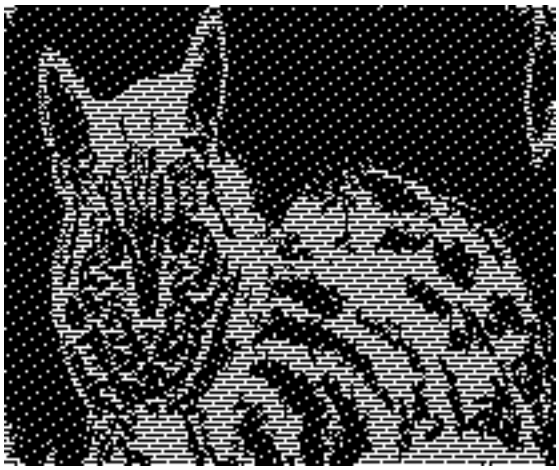
14-33b 1SW002

We made the two weave structures and saved them as Pattern Presets. All of our Presets for weft brocading start with a number (designating how many pattern wefts are used), then have SW for supplementary weft, and then a sequential numbering starting with 001. 1SW001 is an 8-end satin with the patterning weft floating on top, and 1SW002 is the 8-end satin with the patterning weft floating on the back. Using Layer Styles, the black area in the design file will be filled with 1SW001 and the beige ground will be filled with 1SW002. These structures (saved as Pattern Presets on the CD) are 8 pixels wide by 16 high, double the height of the 8-end satin, to account for the two weft systems (ground weft and supplementary weft).

The Layers palette is shown in Figure 14-34 and a section of the design with the pattern added is shown in Figure 14-35.

14-34

Did you notice that the image is now elongated? That is because we designed with square pixels, then doubled the height (the number of picks) without modifying the width. The way these structures will weave is that the ppi should be approximately twice the ppi of single cloth. If we modify the Pixel Aspect Ratio (ppi/epi) to reflect the density of the weft, the image will look right and that is also the way it should appear in the cloth. A custom Pixel Aspect Ratio of 2 will reflect twice as many picks as ends per inch. If you look at ***14-36.psd*** on the CD, and go to **Image>Pixel Aspect Ratio** you will see that a factor of 2 is selected. A portion of the design now looks like Figure 14-36 (nothing in the two images is changed other than the visual shape of the pixels).



14-35

14-36

To make the loom-ready file, we would duplicate the layered weave file and put the original away. If we need to resize the image after weaving a sample, we would return to that file. Working in the duplicate, we flatten it and save as a .bmp or .tif. When weaving this type of continuous weft brocade, be sure to beat hard enough to have the brocading wefts pack down over the ground weft. Although you throw two wefts in sequence, they should look like one line in the face of the cloth.

Adding A Second Brocading Weft and Tacking at the Back

Let's say the cat is dreaming about a mouse, and we decide to add a few to our image. We now need three wefts, the ground plus two supplementary wefts. The image will look like this:

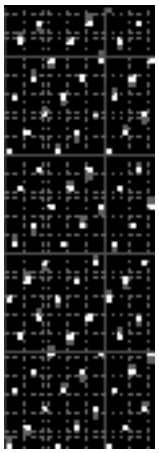
14-37

We know we have to modify our structures to account for three wefts. Since the mouse image is not as frequent as the cat, there are going to be huge weft floats at the back of the cloth. Let's modify our structure so the supplementary weft interlaces in a very loose structure at the back. We could designate some of the warp ends to act as stitching threads, working only at the back of the cloth—making the cloth into a multi layered fabric. That would work, but to ensure even tension on all warp ends, we will use all the ends to tack at the back in a 24-end satin.

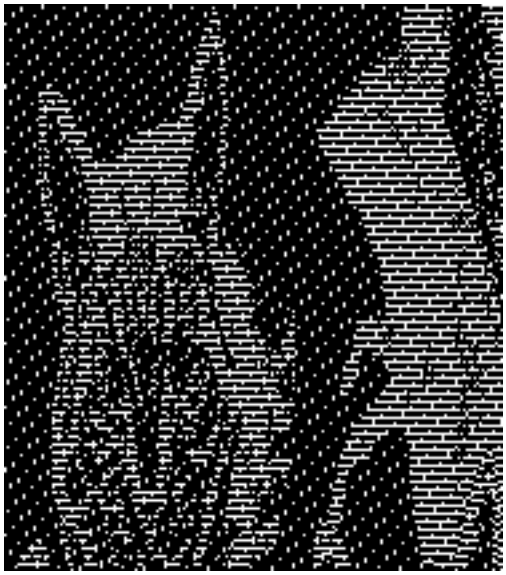
To modify the weaves to account for the back stitching of a 24-end structure, and expand to account for three wefts, the structures become 24 pixels wide x 72 pixels high. The sequence of picks is ground, pattern weft one (the cats) and pattern weft two (the mice). The ground still weaves as an 8-end satin in all three structures. When the first supplementary weft works on the face (we are leaving these floats alone), the second supplementary weft is tacked on the back in a 24-end satin (Pattern Preset 2SW003). When the second supplementary weft works on the face, the first supplementary weft is tacked on the back (Preset 2SW004); and when both supplementary wefts work at the back they are both tacked by the 24-end satin (Preset 2SW005). We saved the Presets as black and white files, but on the CD you can look at ***14-38a.psd*** through ***14-38c.psd*** to see them with the new sinkers marked in red (they are the light gray marks in the illustrations). We shifted the tacking points on the back for the 2SW005 so they are not identical for both back wefts in an attempt to make them less visible on the face. The new structures look like this:

14-38a 2SW003

14-38b 2SW004



14-38c 2SW005



14-39

We had to expand our file by three in the height before putting in weaves. Again, the image looks stretched, but when weaving, the supplementary wefts should beat down over and under the ground weft and increase the visual ppi of the face just slightly. After weaving a sample of the file, if it needs to be resized, go back to the image with the weaves in as Layer Styles, and change the height (number of picks) to reflect the true Pixel Aspect Ratio of the cloth. You can see the file with layers and weaves on the CD (***14-39.psd***). A small section of the file is shown here as Figure 14-39.

The Layers palette for the image with weaves in it is shown in Figure 14-40.

Remember to duplicate the file (put the original away so you can return to it if necessary), flatten the duplicate file and save it as a .tif or .bmp to bring to an AVL or TC-1 loom.

14-40

Intermittent Weft Brocade Working Selvedge to Selvedge

A major advantage of intermittent weft brocading is that motifs can be added to a fabric and the extra weft thrown only in those areas, saving a mill the expense of yarn used throughout the cloth. Again, these horizontal bands of supplementary weft can be tacked or left as loose floats on the back of the cloth. The use of the cloth will help determine which method to use. Loose floats on the back of upholstery fabric will not be seen and should not affect the durability of the cloth, but long floats on fashion fabric can catch on jewelry or other objects, making them problematic.

The principal of designing for intermittent weft brocade is similar to continuous weft brocade, with a few modifications. You need to have your structure(s) for the ground cloth saved as Presets for sections of the cloth that only have the ground weft. Then you need to save Presets for those weaves that include the extra patterning wefts working on the back of the cloth, and others that have the wefts working on the face of the cloth.

Photoshop will not make a file automatically that has differential ppi (a component found in most dedicated jacquard software). However, we have found several ways to make this work in Photoshop. Using our cat and mouse image, we will show two ways to place them as discrete bands of supplementary weft in a ground of 8-end satin.

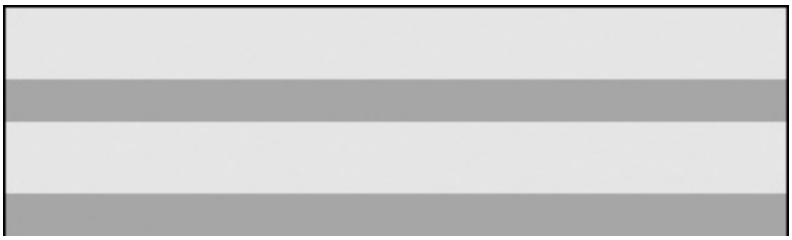
An important factor to take into account is that Photoshop floods a pattern into a file from the upper left hand corner of the design, when using Pattern Presets as Pattern Overlays with both Link with Layers and Snap to Origin unchecked. (Fill also works from the top left corner of the design.) Since we have drummed this method into ourselves, as well as into you, we

want a file that will work with this method. Therefore, we begin by making sure that both our bands of supplementary weft and the bands of ground weave, are heights which when expanded are evenly divisible by the heights of all structures to be used in the cloth. This will ensure that the ground structure, which should appear as a uniform field throughout the cloth, has a continuous repeat of its structure.

First Method of Making Discrete Bands of Supplementary Weft

This method allows the whole file to be resized in one step but it requires that the same number of pattern wefts be used in each brocaded band. In our example we are using one supplementary weft per band of patterning. By doubling the size of the original file the height of the ground bands in the cloth is actually going to double, but the supplementary bands, because of the way that the supplementary weft packs down over the ground weft, is going to remain visually the same height, even though the number of picks is doubled. The structure that will fill the ground bands uses a single weft system, but the structures that fill the pattern bands have two weft systems that end up looking like one visual pick in the cloth.

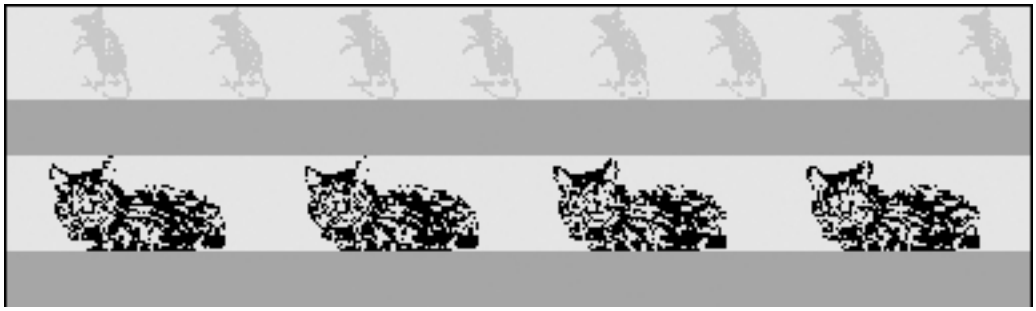
We opened a new file the width of our loom (880 ends) and a height (256 picks) divisible by 8 and 16 (the heights of our structures). Then we divided the file into bands that would represent the areas of the cloth that would become ground alone and areas of ground with supplementary weft. We did this by making a Fixed Rectangular Marquee, 880 pixels wide x 80 pixels high, positioning it at the top of the file, and filling it with a light color (yellow). Then we made a Fixed Rectangular marquee of 880x48 and filled it with a light pink. We repeated these steps to create a file with bands of pink and yellow. Looking at the file the way it will be woven, with pink (ground) at the beginning of the weaving and ending with yellow (supplemental brocade), we have set up a file that can be repeated as yardage, alternating bands of ground and brocade. If we only wanted to weave one repeat, we would probably add another band of ground (pink) at the top of the file. Although the current image makes the supplementary bands thicker than the ground, when the file is expanded and woven, the ground will actually weave slightly larger than the supplementary areas. The file looks like this:



14-41

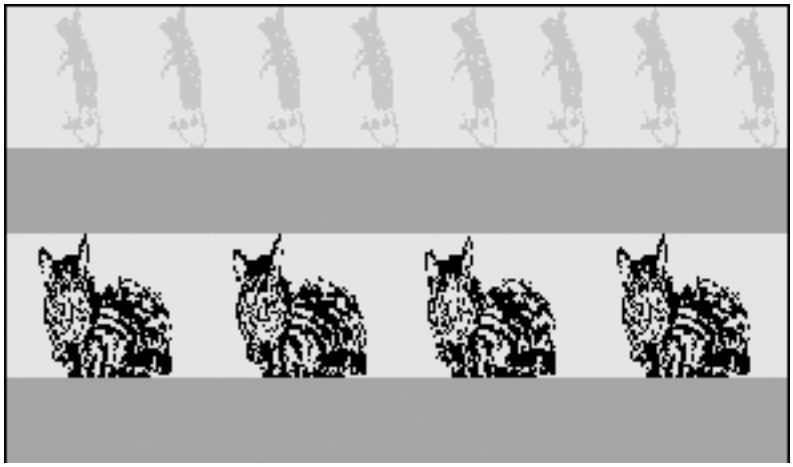
We resized the cat and mouse images from the original file to have heights of 80 pixels each that fill the height of the yellow bands. We did this in separate temporary files, in Indexed Mode, so we would not have additional colors added as we resized the images (**Edit>Transform>Scale**). When they were the correct sizes, each was brought into the banded file with the Move tool, selected, copied, and filled, until we

had the images repeated across the file. We indexed the file again to be sure we had only four colors in it. It now looks like this:



14-42

Still in Indexed Mode, we resized the file to double the height. **Image>Image Size,** select Nearest Neighbor for Resample Image, uncheck Constrain Proportions, and change the units next to Pixel Dimensions Height to percent, then change 100 to 200. Click OK. The image is now elongated in the height, the correct file size to accept the weave structures (880x512). Duplicate the file. Save the original file and put it away. The image looks like this:



14-43

Working in the duplicate file, change Mode to RGB so we can make layers for each color. The keyboard shortcut is **Command(Control)-J.** Refer to Chapter 4 if you need to review how to do this. Make sure you have saved the structures you need as Pattern Presets. We will use the Presets 1SW001 and 1SW002 for the brocaded areas (see Figures 14-33a and 14-33b), and a 7/1 satin for the ground bands. These Presets are saved in both the master Weave Presets folder and the Chapter 14 folder of the CD.

We labeled each layer of the Layers palette to reflect the Preset number. The Layers palette is shown in Figure 14-44.

A section of the image is shown in Figure 14-45, and the full file can be seen on the CD, saved as ***14-45.psd.***

14-44

14-45

Let's review the mathematics of the expanded file. When we doubled the height of the file, the bands with supplemental patterning expanded so they would fit the structures written for two weft systems. The bands of ground with no pattern weft also doubled. Their structures are written for one weft, so expansion here doubles the physical height of the band in the cloth. The bands with the supplemental weft, though expanded to twice their height, will remain visually the same height as the original image because their pattern wefts beat down and appear to occupy the same horizontal line as the ground warp.

The reason we need to make sure that each area of the expanded file is evenly divisible by all the structures is that the Pattern Presets flood into the image from the top left hand corner of the file. We want each structure to fit its band correctly. You can see from the following detail of the image that the ground satin is continuous in the bands. It looks expanded in the supplementary weft area (the angle of the stitching points is modified), but as the supplementary weft packs down over and under the ground pick, the two wefts appear to occupy one line in the cloth, and the ppi of the ground remains visually the same. The patterned area will need to be more forcefully beaten than the areas of only ground weft to maintain an even ground. A detail of the final flattened loom-ready .tif file (***14-46.tif***) shows the variations of pick density in this cloth:

14-46

In most fabrics, if we find that the ppi of the actual cloth is not weaving as planned, then the file can usually be resized without modifying the weaves. However, in this case, it won't work. Even if you resize to a new number that is evenly divisible by the heights of your structures, the software will automatically distribute the new height across the file, and the modified bands will probably not work correctly with the structures. In fact, you might find that you need a different ppi for each area of the cloth. Resizing your file using the following method should work.

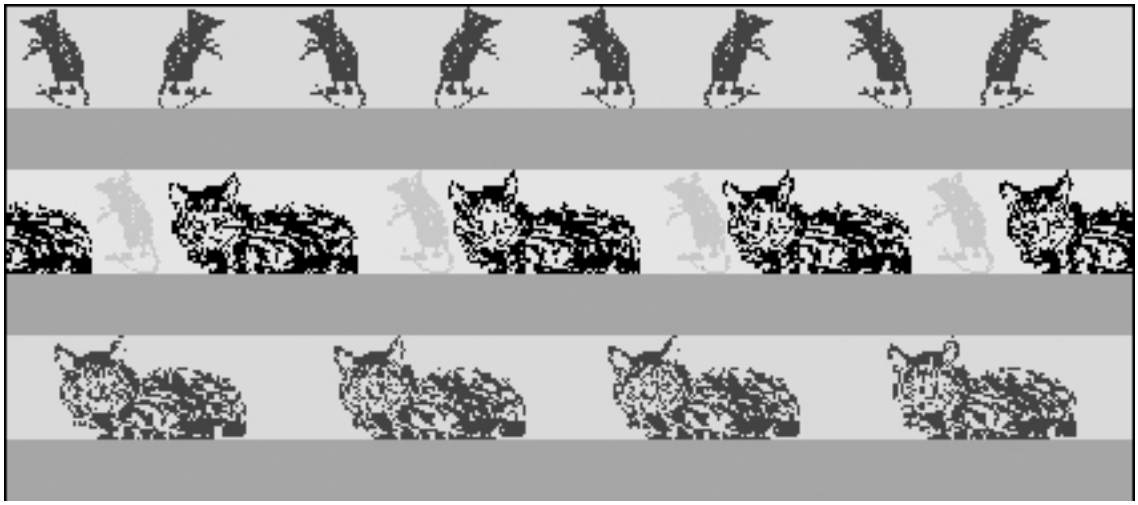
Another Method of Creating Bands of Supplemental Weft

This method of making files for supplementary weft allows you the freedom to make bands of different heights and different ppi. In this method you make separate files for each area of the cloth, then bring them together into one weave file. The final weave file cannot be resized. If you need to modify your file after weaving a sample and finding out the correct ppi, you will have to go back to the separate sections and modify them, then bring them together again into a flattened .bmp or .tif loom-ready file.

Let's make things a bit more complicated in this sample. Did you notice that the two bands of supplementary weft in the image above used different colors for the motifs, yet the same weave structure replaced both colors? Both supplementary bands were two-weft structures—the ground weft and a supplementary weft. At the loom, it would be your choice what yarn to use for

the supplementary weft. You could weave them with the same yarn, or change colors for each band, or even make horizontal bands of different colors within a supplementary band. If you were designing for an industrial loom, these decisions would be part of the loom-ready file, the box motion. Working at a hand jacquard loom, you have the flexibility while weaving of making the decisions about what weft yarns to use.

In this next sample, let's add a band to the file that has both cats and mice together—an area that is going to need three wefts, the ground and two supplementary wefts. That means this new file will have areas of the cloth where a single weft is thrown, bands using two wefts, and a band using three wefts. Again, the image file is composed so the full image can be woven in repeat to make yardage. It looks like this:



14-47

You can find this file in color on the CD as ***14-47.psd***. Notice that we changed the colors of the background and the figures in the bands where only single supplementary wefts would be used. We made both the cats and the mice in these areas the same color. At the loom, you can choose the actual color of weft to use, making them different. The weave structures however are still the same in these two areas. This file will need 6 structures: the ground woven with only the ground pick, the ground woven with a supplementary weft going to the back, the ground with two supplementary wefts going to the back, the ground with one supplementary weft working on top of it, the ground with one supplementary weft working on top of it and the second supplementary weft going to the back, and a structure that reverses the positions of the two supplementary wefts from the previous one.

The ppi of each of the three sections (ground alone, ground with one supplementary weft, ground with two supplementary wefts) is going to be different. We are going to make each band as its own file, fill it with the correct weaves, save them, flatten a duplicate file of each band, then make a composite black and white file of the bands. Make sure that each band before expansion is a height that expands to a number evenly divisible by the structures used in that area. You only need to make one new file for bands that are identical

(in this example, the pink bands that represent the ground weave working alone).

Working with image ***14-47.psd***, using the Rectangular Marquee tool, select a ground band. **Edit>Copy**; then go to **File>New**. The file size will be the same as the band you just copied. In the new file, **Edit>Paste**. Do this for each of the bands. We now have four new files. Save these bands, duplicate them, and put the original files away. We will modify the duplicate files. You can find our four new files on the CD in the Chapter 14 folder, named as ***14-48a.psd*** through ***14-48d.psd***. We had to flatten them before saving since **Paste** made an extra layer.

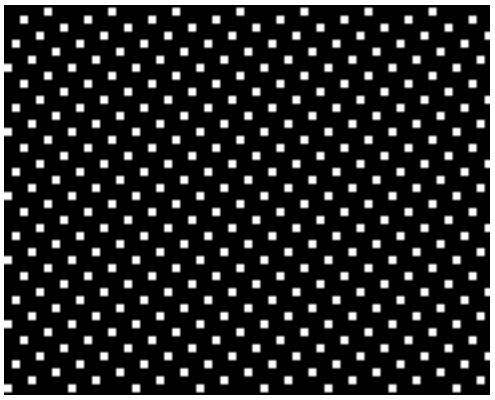
14-48a

14-48b

14-48c

14-48d

The first image, Figure 14-48a, represents the bands with only the 7/1 satin weaving with the ground weft. This will be repeated three times in our file between the other bands. We checked to make sure that the 8 picks of the 8-end satin structure divided evenly into the height of the file (48). It does; if it did not, we would change the height so that it did. Since this is single cloth, this file does not need to be expanded. Make a new layer from the color (keyboard shortcut **Command(Control)-J**) and use Layer Styles to place the 7/1 satin as a Pattern. You need to make a new layer even though there is only one color in the file because Layer Styles will not work on the Background layer. Save this file. We called our file ***14-48a.psd***. Then duplicate it and put the original away. Flatten the duplicate. A portion of the band looks like Figure 14-49a.



14-49a

Now let's work on the two layers, 14-48b and 14-48c, that will weave with two wefts (ground and supplementary weft). Expand each file by going to **Image>Image Size,** unchecking Constrain Proportions, changing Resample Image to Nearest

14-49c

Neighbor, and change the height to twice the original (from 80 to 160 in these examples; or you can change pixel dimension to percent and type in 200, which will double the height). Click OK. Do this for both files. Make layers from each color and add the structures as Layer Styles. We used Pattern Preset 1SW002 for the ground color and 1SW001 for the motif. Save these files (***14-49b.psd*** and ***14-49c.psd***), then duplicate and put the originals away. Flatten the duplicate files. A portion of ***14-49c.psd*** is shown in Figure 14-49c.

Now we will expand the remaining layer, ***14-48d.psd***. This band will weave with three wefts: the ground and two supplementary wefts. We need to expand the image by three in the height to account for the three weft systems. In the cloth, the two pattern wefts will beat down covering the ground weft when they work on top, and packing beneath the ground weft when they go to the back. The ground cloth should appear to have the same ppi as the bands with only the ground weft, since the three picks pack tight to look like they are on the same horizontal line. Go to **Image>Image Size,** uncheck Constrain Proportions, have Resample Image checked and reading Nearest Neighbor, and change the height by multiplying by three (80 becomes 240 in this example). Click OK. Put in the Pattern Overlays. Save the file (***14-49d.psd***), duplicate it and put away the original. Flatten the duplicate file. A portion of the expanded file looks like Figure 14-49d.

14-49d

We have saved all the flattened weave files on the CD as ***14-49aflat.psd*** through ***14-49dflat.psd***. Now we will assemble the loom-ready file. Make a new file, 880x1000. We could have added up the heights of each of our components and put that in as the height. Being lazy, we choose a large number intending to crop the composite file. If it turns out we have miscalculated, we can go to **Image>Canvas Size,** anchor the image to the bottom quadrant, and increase the height. You don't even have to use a Selection tool to move the bands into the new file. With the Move Tool simply drag the bands, in the order you want them placed (we worked from the bottom to the top of the file), into the new file. Zoom up and use the Move tool to nudge each new layer so that it starts flush with the left column and directly above the previous band (Move will place what you move into its own layer).

When the composite image was finished (did you place bands of ground between each of the horizontal pattern sections?) we used the Rectangular Marquee to select only the structural area. The Info Palette told us the selection was 880x704. (Let's do the addition to see if this is correct: 3 bands of ground x 48 = 144; 2 bands of 2-weft structure x 160 = 320; and 1 band of 3-weft structure = 240. 144 + 320 + 240 = 704. Triumphant!) We went to **Image>Crop**. The file is cropped to our selection size, 880 pixels wide x 704 pixels high. We saved the image with the separate layers as ***14-50.psd***. Looking at the file you can see the different ppi, particularly in terms of how

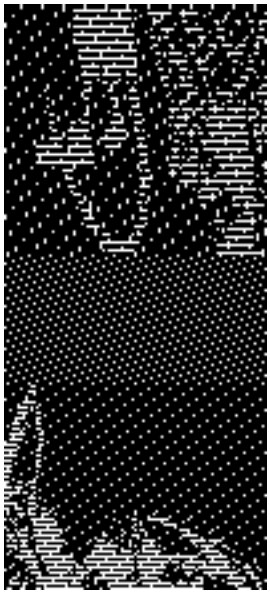
the angle of the ground structure changes. A section of the composite file is shown in Figure 14-50.

The Layers palette of the cropped composite image looks like Figure 14-51. You can see this palette on the CD if you look at ***14-50.psd***.

After saving file ***14-50.psd***, we duplicated it, put the original away, and flattened the duplicate. We went to **Mode>Indexed** and were relieved to see the window read Palette: Exact, Colors: 2, and Forced: None. Click OK. Then we saved it as ***14-50.bmp***, ready for the loom. You can see the file on the CD.

If you find that you need to change the loom-ready file because the ppi of the cloth is different than you expected, you will have to resize the separate bands of the design, then reassemble them into a new flattened .bmp or .tif file. If the adjustments are small, perhaps they can be rectified through the beating of the weft. We assume you will have to beat the weft harder in the areas of supplemental weft versus areas where there is a single weft.

One other comment: if you don't like the floats of the supplementary weft on the back of your cloth you can snip them away with scissors. If the fabric is intended for heavy use, which might cause the wefts to slip out of the cloth, you can modify the file before weaving by adding a boundary of plain weave around the motifs. This should tack the supplementary wefts tight, allowing you to cut the floats outside the boundary weave.



14-50

14-51

Discontinuous Supplementary Weft

Many cultures that weave supplementary weft motifs add them to the cloth as distinct areas of weft, working only in the area where the motif appears in the cloth. In other words, the supplementary weft does not work edge to edge. This type of cloth can be woven face up or face down, but for jacquard design, weaving face down makes cleaner edges for the motifs on the face, with floats at the turning points on the back. One of the disadvantages of weaving face down is that you can't see the image evolving. Using a mirror can help, and tapestry weavers should be familiar with this method of weaving.

We are going to work through an example of discontinuous supplementary weft on a damask ground, weaving the cloth face down. In some areas of the design we will have motifs using one supplementary weft, and in some areas we will have motifs using two and three supplementary wefts. It is important to realize that even though the extra wefts work in discrete areas, all the structures used in the cloth in those horizontal bands need to be created to take into account ALL the weft systems in that band. This means a structure for a portion of the ground design that does not have extra patterning wefts, must still have the picks of the extra wefts included. They will appear as picks with no risers, for a face-down structure.

Let's make a design. Again we will make a file the full width of our loom, 880 ends. We are going to make a loom-ready file by following the method we used in the previous example. The plan is to take the original ground image (880x660) and divide it into bands that will represent ground alone

and ground with discontinuous brocaded images. We will place the motifs into the bands intended for brocading, expand those bands by the number of wefts to be used, and then fill the sections with Pattern Presets as Layer Styles. A composite file will be made of the flattened bands, the image flipped horizontally and the black and white marks inverted, so that we have a file ready to be woven at a loom with the face down.

We began by turning a digital image of twigs and natural debris into a black and white image by using **Image>Adjustments>Threshold**. This file was larger than we needed, and we intended to use only a portion of the full image. We decided to change the colors in the thresholded image to something other than black and white. Using the Magic Wand tool, we selected the black areas and filled them with yellow, then selected the white areas and filled them with a light tan.

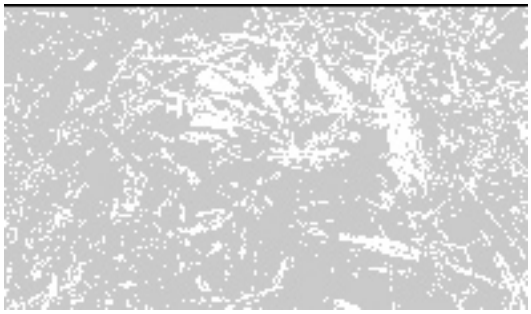
The next step was to separate the file into horizontal bands. Working in the two-color file, we started at the top of the image and selected an area 880x80 pixels using a Fixed Rectangular Marquee. Then we went to **Layer>New>Layer via Copy** which made a new layer of the selection in the file which we named *Ground-Top*.

We turned off the visibility of the Background layer, made a new rectangular selection of 880x64 pixels and positioned it directly below the *Ground-Top* layer. Then we turned on the visibility of the Background layer and made it the active layer. Again we did **Layer>New>Layer via Copy** and named the new layer *Brocade-3*. We continued making new layers of alternating size for bands of Ground and Brocade.

14-52

When finished, we turned the visibility of the Background off so only the new layers of bands were visible, made a selection of the area encompassed by the bands, then went to **Image>Crop** to get a final image file of 880x512 pixels. The Layers palette for the file is shown in Figure 14-52.

When all the layers are made visible, the image shows the damask ground we want for our fabric. It is a two-color image, which will be woven using 8-end satins (the yellow a 7/1 satin and the tan a 1/7 sateen). It is shown in Figure 14-53.

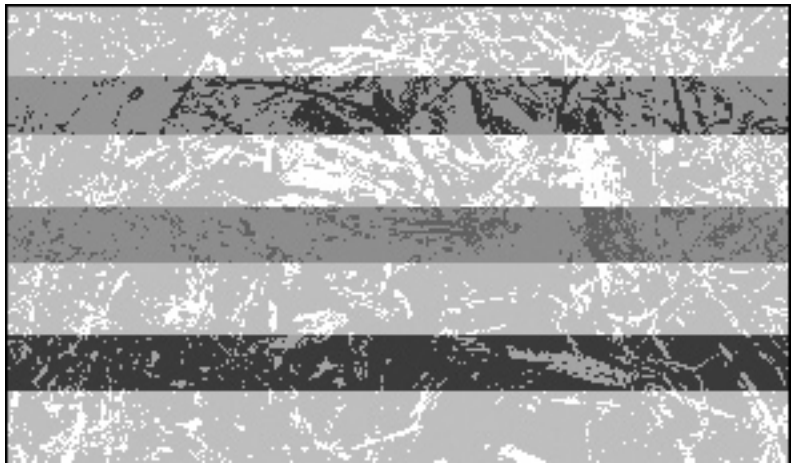


14-53

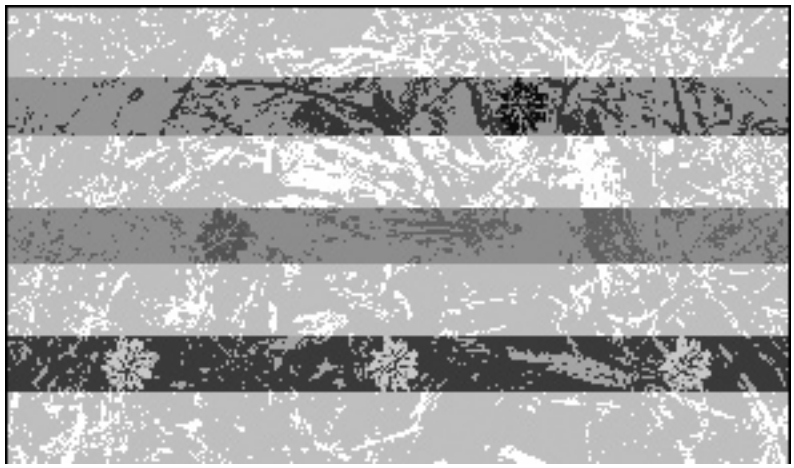
Now we need to distinguish the areas in the ground image that will have different weave structures. We left the bands of ground which would be only damask alone, retaining the yellow and tan for the two single weft structures. In the other layers, where we will place brocade, the yellow was changed to three shades of orange, a different hue for each of the brocade layers, and the tan was changed to three tones of green. Even though we hope the variations of structure will look like a continuous damask field (the brocaded wefts should pack down to cover the ground picks leaving the visual ppi of the ground similar in all areas), the structures placed in the brocaded bands must be modified to include the supplementary wefts. The damask file, ready for the brocade imagery, looks like Figure 14-54, seen in color on the CD as ***Figure 14-54.psd.***

We are going to put a flower image in each of the bands and they will be woven using one supplementary weft. In the bottom band, labeled *Brocade-1* in the Layers palette, all the images will be made with single brocaded wefts. In the second band, *Brocade-2*, the images can be woven with single pattern wefts or double pattern wefts, but all the structures have to be composed for two pattern wefts and the ground weft. In the *Brocade-3* layer, all the structures will be constructed for three pattern wefts (and the ground weft, of course), even though some of the images will be created using single brocade wefts, some with two extra wefts, and some with three. Therefore, our flower, though it will be composed of a single brocade weft in all bands, has to be placed in three different colors, to represent the three variations of the structure. Our file looks like Figure 14-55 with the flower image scattered in the design (***14-55.psd*** on the CD).

Then we added a word, Delight, that is to be woven with two brocaded wefts. It is placed in both the *Brocade-2* and *Brocade-3* layers. In the *Brocade-3* layer, the structure will be modified to reflect three brocade wefts, even though only two wefts will actually be used. We also added an image of the cat drawn in three colors to the *Brocade-3* layer. This image does need three pattern wefts to weave correctly. The final image file, all together, is shown in Figure 14-56 (***14-56.psd*** on the CD).



14-54



14-55

14-56

14-57

The Layers palette for our finished image file is shown in Figure 14-57.

We made four charts to show the weave structures saved as Pattern Presets that we need to weave this file. They are shown here as Charts 14-1 through 14-4.

Ground Layers			
Pattern Preset Name	Color in Image	Number of Wefts in Structure	Face Structure
7/1 Satin	Yellow	1	7/1 Satin
1/7 Satin	Tan	1	1/7 Satin

Chart 14-1

Brocade-1 Layer (Expanded Layer by 200% in Height)			
Pattern Preset Name	Color in Image	Number of Wefts in Structure	Face Structure
1SW002	Lt. Orange	2	7/1 Satin
1SW006	Lt. Green	2	1/7 Satin
1SW007	Lt. Red	2	1/7 Twill

Chart 14-2

Brocade-2 Layer (Expanded Layer by 300% in Height)			
Pattern Preset Name	Color in Image	Number of Wefts in Structure	Face Structure
2SW005	Mid-Orange	3	7/1 Satin
2SW008	Mid-Green	3	1/7 Satin
2SW009	Mid-Red	3	1/7 Twill
2SW009	Lt. Blue	3	1/7 Twill
2SW010	Mid-Blue	3	1/7 Twill

Chart 14-3

Brocade-3 Layer (Expanded Layer by 400% in Height)			
Pattern Preset Name	Color in Image	Number of Wefts in Structure	Face Structure
3SW011	Orange	4	7/1 Satin
3SW012	Green	4	1/7 Satin
3SW013	Red	4	1/7 Twill
3SW013	Blue	4	1/7 Twill
3SW014	Dk. Blue	4	1/7 Twill
3SW013	Blue-Green	4	1/7 Twill
3SW014	Bluer-Green	44	1/7 Twill
3SW015	Dk. Green		1/7 Twill

Chart 14-4

We modified the brocade picks for this design, stitching them on the face with a 1/7 Twill. Since they work in discrete areas of the cloth, we didn't worry about tacking them on the back of the cloth.

When the cloth is being woven it is necessary to pay attention to what part of the design is being worked on. In the areas with damask only, each pick will lift ends and the ground weft will be thrown. When you reach the band with flowers (one pattern weft motifs) the lifts will be ground, working across the full width of the loom, and then lifts of ends in only the areas where there are flower motifs. A separate pattern weft is used in each area (a simple butterfly of yarn will suffice). If you place these discontinuous wefts in the cloth following the direction of the ground weft (in a shuttle), you can use the shuttle direction as a reminder whether or not you have "thrown" them. Each flower can be a different color and/or type of yarn since they are individually manipulated and placed in their sheds.

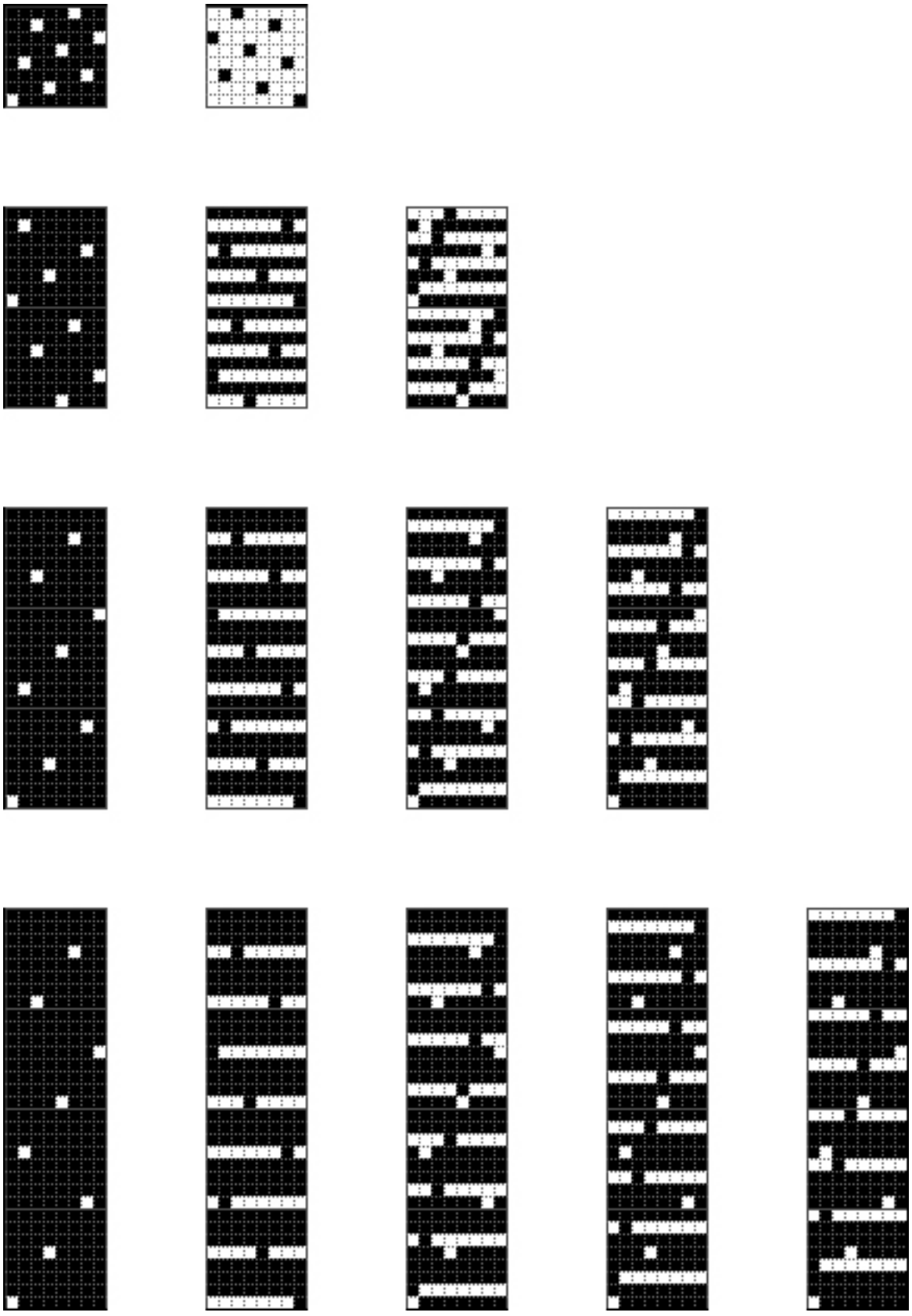
When you get to the band designed for two pattern wefts, you will have the lifts follow this sequence: a ground pick where ends lift throughout the cloth, a pattern pick lifting ends in discrete areas, and a second pattern pick lifting other ends in discrete areas. You can weave single pattern motifs and double pattern motifs in this area. The first pattern pick will lift ends in both types of motif. The second pattern pick will lift ends only in the area of the 2-weft motif.

The band designed for three pattern wefts will have sequences of four lifts: first the ground pick with ends lifting across the width of the loom, then a pattern pick where ends lift for all the motifs, then a pattern pick where ends lift only in areas where motifs are composed of two and three pattern wefts, and finally a lift where only the ends lift in the area of the three-pattern weft motifs. It sounds more confusing than it is on the loom.

Therefore, the pattern wefts for the flower images in all the bands are thrown on the second pick of the weft sequence; the words have one of their pattern wefts thrown on the second pick of the sequence and the other pattern weft on the third pick of the sequence; and the cat, composed of three pattern wefts, will have one color thrown on the second pick of the sequence, one color thrown on the third pick, and one color thrown on the fourth pick.

We were very careful not to have overlaps of motifs that would confuse us (that is, if a flower overlapped a word, we would not be able to distinguish the ends lifting for each motif). If you look at historical fabrics with discontinuous weft brocading that was woven face down, you will often find the motifs arranged with space around them. Now you understand how this helped the weaver with the placement of the brocading wefts.

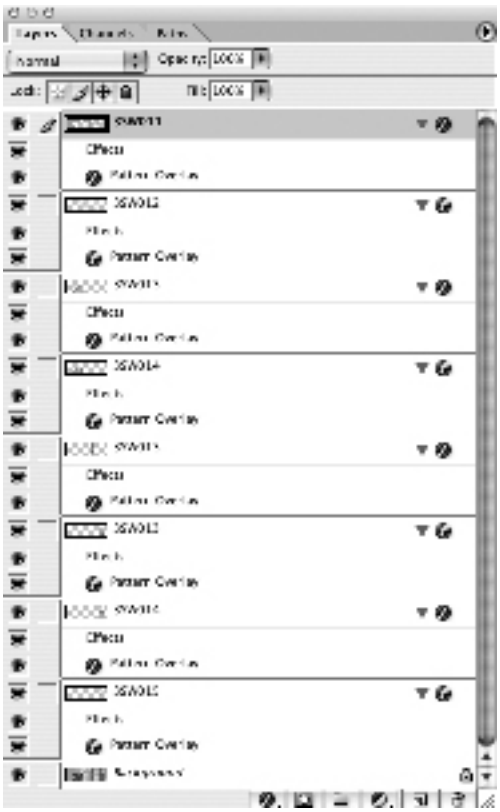
The Pattern Presets for this design are all saved on the CD, both in the master Weave Presets folder under Weft Brocade, as well as in the Chapter 14 folder. On the following page is an illustration (Figure 14-58) of the Presets arranged in rows according to the number of weft systems in each group. Reading each structure from bottom pick to top, the ground weft is always the first weft system, followed by the pattern picks. The top two structures in the illustration represent the satin structures of the ground with no weft patterning.



14-58

Now we are ready to disassemble the file into separate bands, add the weaves as Layer Styles, save and duplicate each weave file, then flatten the duplicates and paste them in order into a new file. We are going to have seven bands. In this case, the bands that weave the ground are not identical images, and each needs its own file. We have saved the individual weave files for the bands as ***14-59a.psd*** through ***14-59g.psd*** on the CD, starting with the *Ground-Top* layer as ***14-59a.psd*** and working down through the file.

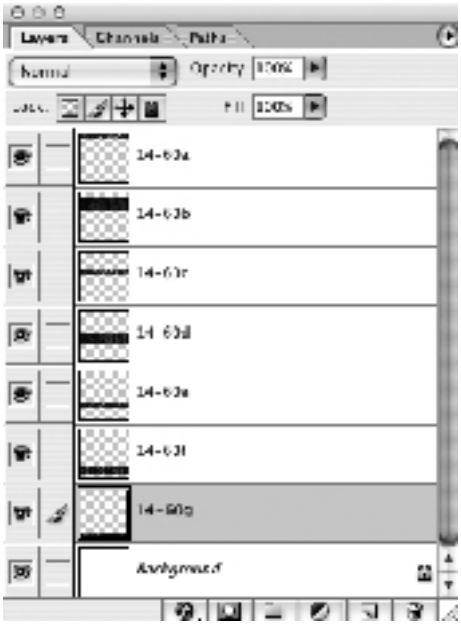
Remember to expand *Brocade-1* layer by 200% in the height, expand *Brocade-2* Layer by 300%, and expand *Brocade-3* layer by 400% before adding the Pattern Presets. A section of the file with four weft systems (one ground and three pattern wefts), ***14-59b.psd***, is shown as Figure 14-59b and its Layers Palette is shown as Figure 14-59.



14-59

14-59b

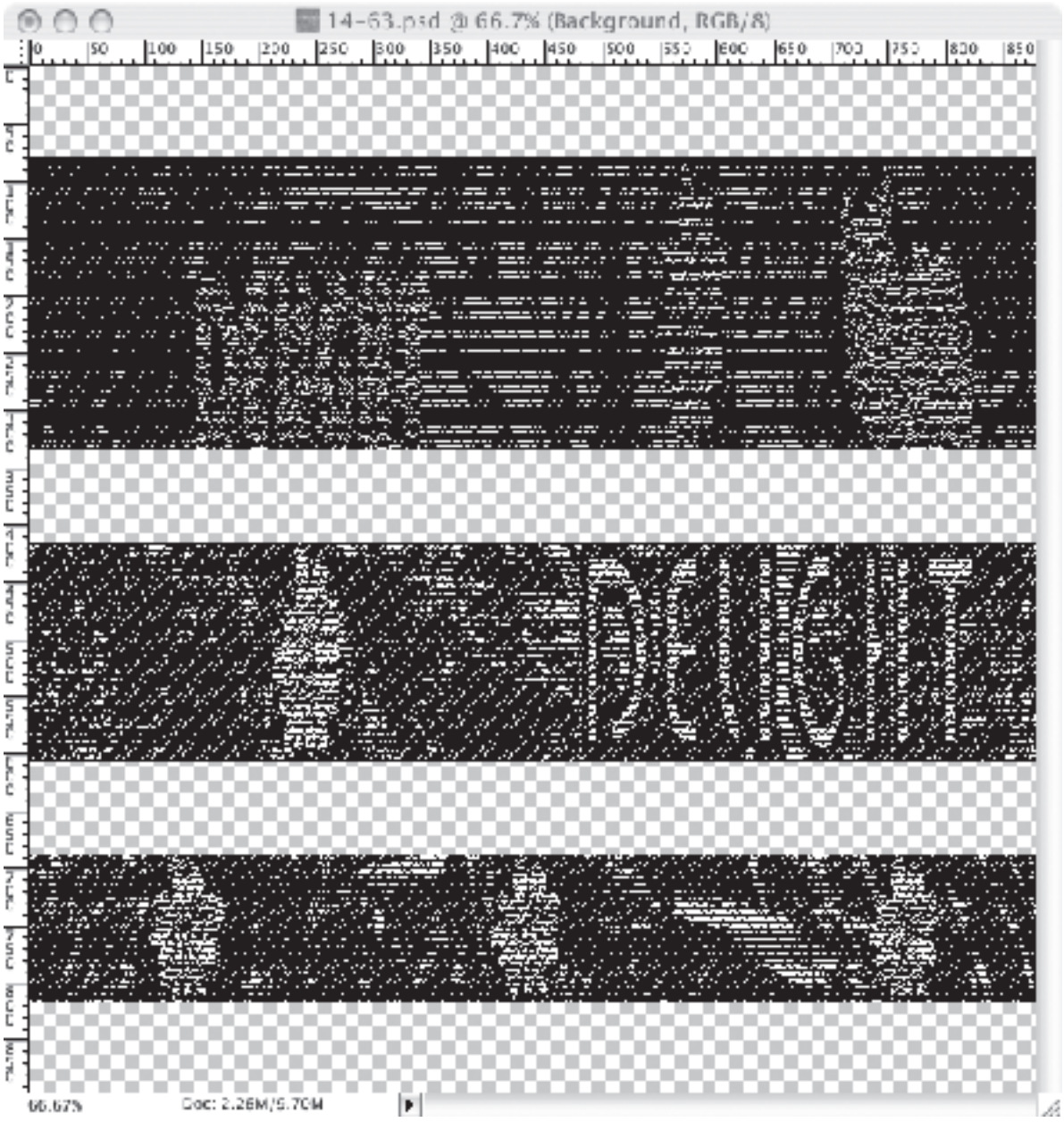
We duplicated the layered files, put away the originals, flattened the duplicate files, and saved them as files ***14-60a.psd*** through ***14-60g.psd***. Then we made a composite layered file of them, saved as ***14-61.psd***. The Layers palette for the composite file is shown in Figure 14-60.



14-60

If you turn off the visibility of the damask layers without brocade (layers 14-60g, 14-60e, 14-60c, and 14-60a) in the Layers palette, then file ***14-61.psd*** looks like Figure 14-61 shown on the next page. You can also open up file ***14-61.psd*** and turn on and off the visibility of different layers.

Duplicate the layered composite file (***14-61.psd***) and put away the original. If you find you need to adjust the ppi of the file, you will have to resize the separate bands and reassemble the composite. When you resize, you still want to have the height of each band evenly divisible by the height of the weave



14-61

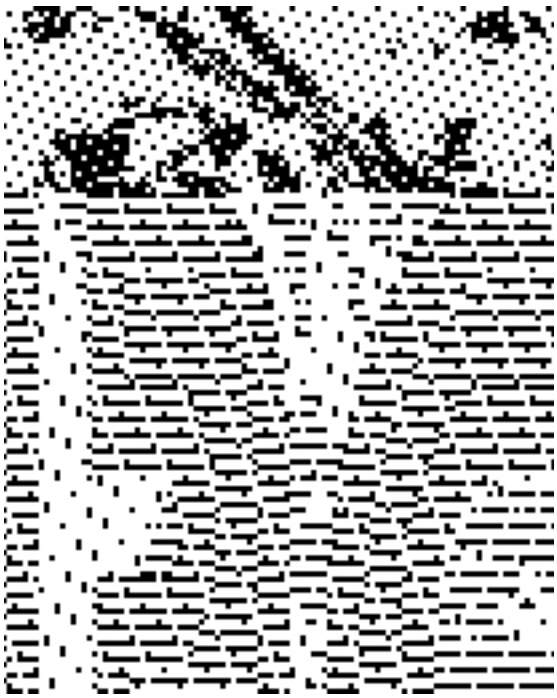
structures (8 for the ground bands, 16 for *Brocade-1* layer, 24 for *Brocade-2* layer, and 32 for *Brocade-3* layer).

You can weave the file as it is, but you will have very heavy lifts and the edges of the brocaded images will be awkward if you turn them on the face of the cloth. For these reasons, we are going to modify the weave file so it can be woven face down.

Flip the flattened file horizontally (**Image>Rotate Canvas>Flip Canvas Horizontal**). Now invert the structures (**Image>Adjustments>Invert**). Our file, the loom-ready file, is saved as ***14-62.tif*** (we could have saved it as a .bmp instead of .tif). A section of the loom-ready file is shown as Figure 14-62.

Immediately you can see that the lifts of the file are now much lighter. The file is composed of mostly weft floats. In fact, when you weave this way, many of the places where it looks like there is a weft float are actually holding places in the structure where you could have weft, but since the brocade is working in discrete areas, you won't have a weft. What you will see is that warps will rise across the width of the loom only in the areas where the brocaded wefts will work. It is very cool.

What you have to remember though is what weft colors you plan to use in the brocading areas. You have flipped the image horizontally, so the placement of the motifs is reversed. We suggest you print out a version of the file that is flipped horizontally and display it somewhere you can see it easily while you are weaving. It will be an important reference to keep you on track with the placement of the brocaded weft yarns. A reference image for our file is shown in Figure 14-63.



14-62

If you look at the image saved on the CD in color, ***14-63.psd***, you can see that the flowers are different colors in the image. Discontinuous weft brocade allows you to make repeat motifs but have each of them a different color of yarn. When weaving the image above, a pink supplementary weft works in the area of the bottom left flower, an orange yarn would weave the bottom middle flower, and a purple yarn would weave the flower in the bottom right. We also changed the inner color of the E in the first DELIGHT. Since we are inserting the wefts by hand, we could, in fact, weave every letter as a different color yarn. By making the turning of the wefts on the back of the cloth, you won't have to worry about long floats or awkward transitions–they won't be seen.

14-63

Discontinuous weft brocade saves yarn. This is a good method to use for expensive yarn. Industrial power looms that always have wefts working edge to edge cannot do discontinuous weft brocade. The solution for some companies has been to throw the weft from selvedge to selvedge then cut it away in between the motifs. This is expensive but effective, especially when motifs are placed in sheer fabric.

One other comment: our image looks very striped because we have placed our brocaded shapes in distinct bands in the cloth. You can easily have the brocading work all over the cloth. If some part of the design always has

brocade, then all your structures will have to be created or chosen to reflect the total number of weft systems. If you also always use the same number of brocading wefts, let's say three, then design your file, expand the whole thing by 300% in the height, and make Pattern Overlays where all the structures are written for four weft systems (ground weft plus three brocaded wefts). Even if an area of the cloth is not brocaded, its structure or structures have to remain in sync with the rest of the structures that work next to them. When you weave, since you are viewing the back, you won't have problems in brocaded areas with one weft since there is only one yarn to place, but in motifs with multiple brocaded yarns you want to be sure of the sequence to follow: which yarn gets placed first, which gets placed second, which gets placed third. If you get out of sequence, use a mirror to see the front side of the cloth, or go with the flow and accept some surprises.

On the CD, files ***14-64.psd*** through ***14-66.tif*** are files for a brocaded image that has brocading throughout the image, using three brocading weft systems. You can open up the files and see the steps in the process, which are just the same as above, except that all the structures are written for four wefts (the ground plus the three brocade systems). Two different colors in the file were simultaneously selected and had the same brocading structure imposed on them (the red of the flower and the light green of the coffee cup become 3SW013; the green in the flower and the mid-green of the coffee cup become 3SW014; the blue of the letters and the dark green of the coffee cup become 3SW015). When weaving, a printed version of the inverted image would help as a reference for which weft brocade yarns should be used and where. The image for this example is shown in Figure 14-64.

14-64