

# Chapter 15

## Dobby Design in Photoshop®

The doobby weaver will want to work with existing weave programs to create threadings and to drive the loom. Photoshop adds a new capability to doobby designing. We may utilize the special strengths of Photoshop to create liftplans which are easily resized and adapted to variations in sett without redoing the entire file from scratch. An even more exciting use of Photoshop in doobby design is being able to take advantage of Photoshop's filters in the design process itself. We begin by discussing the link between Photoshop and existing doobby software.

### Importing Photoshop Files into Weave Programs

As of this writing, four weave programs permit the importing of graphics files: **ProWeave** (Macintosh and Windows), **WeaveMaker** (Macintosh and Windows), **WeavePoint** (Windows), and **Fiberworks PCW** (Windows). Graphics for import should be indexed to black and white, and have a resolution of 72 dpi. For more information, contact the software vendors. Addresses may be found in Appendix J.

#### **ProWeave**

**ProWeave** for Macintosh allows a simple cut and paste. The material copied from Photoshop should be at 72 pixels per inch, indexed (black and white only). **ProWeave** should be set up in 1 pixel scale. Paste the image onto the **ProWeave** screen, select it with the marquee, **Draft>Make Object**, and then use the object with a threading and tie-up (straight diagonal line) to do a drawdown (**Draft>Make Drawdown**).

**ProWeave** for Windows does not permit a direct cut and paste from a graphics program. The image should be saved in Photoshop (black & white only) as a bit-mapped file (.bmp), then opened in **ProWeave**. Once the image is opened in **ProWeave**, proceed as above for Macintosh version.

### **WeaveMaker**

**WeaveMaker**, both Macintosh and Windows versions, allows pasting of graphics files into the liftplan area of a doobby file. Copy the black and white graphic liftplan in Photoshop, then go to **Weavemaker** and paste. A paste icon will appear in place of the cursor. Position the paste icon over the bottom right corner of the liftplan and click.

### **WeavePoint**

**WeavePoint** (for Windows only; unfortunately there is no Macintosh version) allows pasting of graphics files into the liftplan area of a doobby file. Copy the black and white graphic in Photoshop, then in **WeavePoint** first select the area in which to paste. It is not necessary to select the entire area –one pixel will do; select the lowest lefthand square in the desired paste area, and the paste will flood in upwards and to the right.

### **Fiberworks PCW**

**Fiberworks PCW** provides for graphic import through the Sketchpad. Open **Fiberworks**, Open Sketchpad, choose the .bmp file. It will open in a grid. Regrid to *1 grid square to one black square* if needed. The grid may have to be adjusted left/right or up/down. If it is one square per pixel, then no grid adjustment is needed. There are two ways to get the image into the liftplan in the Design window.

Method 1: Go to **Analysis** and choose **Analysis>Make drawdown**. Choose Pegplan in the popup dialog. The draft will now appear in the design window as a liftplan. You may also do this by copy/paste from the Sketchpad.

Method 2: Select one repeat, or the image as appropriate. Go to **Edit>Copy** or use Copy tool or CTRL + C. Open a design with max shafts and treadles (64x64) or the appropriate number if you know it. Click into the top left of the liftplan and then **Edit>Paste** or use the paste tool or CTRL + V.

### **Another Translation Method**

If you are using a weave program that does not currently accept graphic import, and if you have enough patience, you may enlarge the scale of your Photoshop image, turn on a single pixel grid, do a screen capture, print it out, and enter the liftplan into your weave program one square at a time: inelegant but doable.

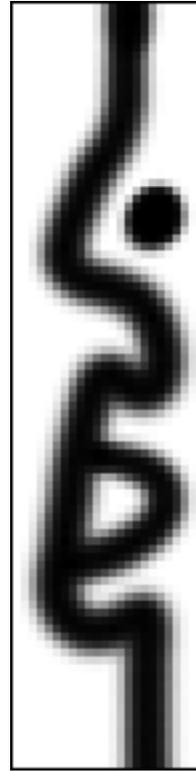
Clever weavers will invent other ways of importing graphics into their weave programs. We are a hardy bunch.

# Setting up a Template for a Two-weave Dobby Design

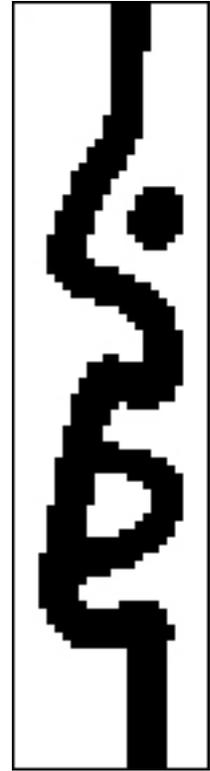
In Photoshop open a new RGB file whose width in pixels equals the number of shafts on the loom, and whose length in pixels is a multiple of a single repeat of the weave structure being used. For instance, for a 4-end twill, the length would be a multiple of 4 pixels; for an 8-end satin the length would be a multiple of 8 pixels. Zoom the file to about 600% for easier visibility. If you wish, turn on the grid (**View>Show>Grid**).

## Drawing a Design

Using the Brush tool, paint or draw an image on the Background layer (click on Background in the Layers palette), as in Figure 15-1, then in the Menu, perform **Layer>New Adjustment Layer>Threshold**. In the Threshold window which appears, be sure that the Preview button is checked, drag the triangular slider right or left to your satisfaction, and click OK. In the Layers palette, click on the Background, and continue drawing. Notice that now everything you draw in gray or colors is immediately reduced to either black or white pixels because of the *Threshold* layer above it (Figure 15-2).



15-1



15-2

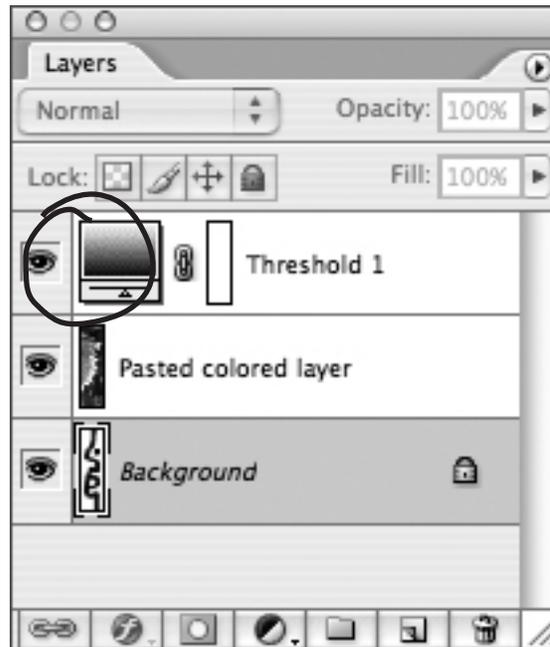
If you highlight the Background layer and paste a colored image on top of it, so that the *Threshold* layer is still topmost in the stack, the appearance of the window will still be reduced to black and white (Figure 15-3). If you double click on the layer thumbnail (circled in Figure 15-4) just to the right of the eye icon on the *Threshold* layer, the Threshold dialog will reappear, and you may adjust the Threshold level again. Doing the thresholding in an Adjustment Layer is a good way of preserving your options. You may always revisit this adjustment and change it, as the adjustment is non-destructive.

## Assigning Weaves

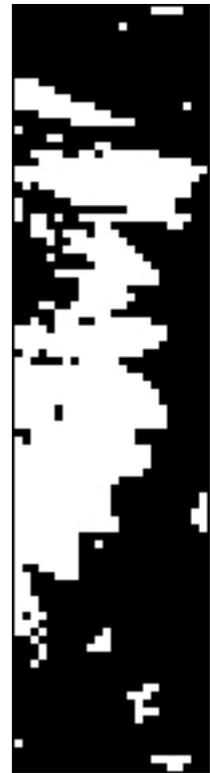
### Preparation

Now you may assign weaves. Duplicate the file, save the original in case you want to revisit it later and make changes to the image, and from now on work on the duplicate.

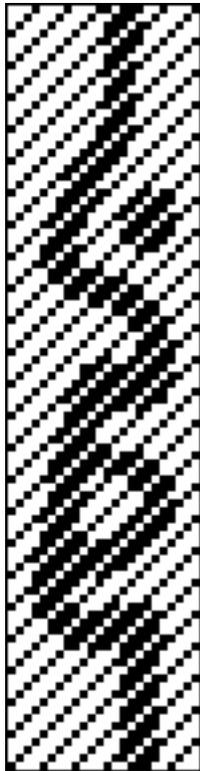
Remove the pasted colored layer (which was for demonstration



15-4



15-3

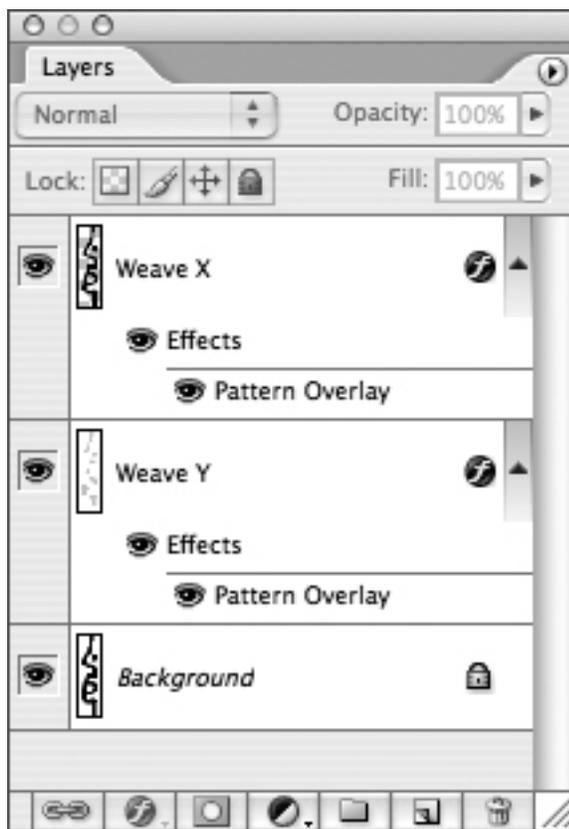


15-5

purposes only—we don't need it any more) by dragging the layer onto the Trashcan icon at the bottom of the Layers palette. Flatten the file (**Layer>Flatten Image**). With Magic Wand tool selected, Tolerance 0, Anti-alias, Contiguous, and Sample All Layers all unchecked, click on a black pixel. All black pixels are now selected. **Layer>New>Layer via Copy** (or **Command (Control)-J**). This will create a new layer containing nothing but the black pixels. Name this layer *Weave X*. Click on the Background layer in the Layers palette to highlight it, and this time click on a white pixel with the Magic Wand. All white pixels are now selected. Perform **Command (Control)-J** once again, and a new layer containing only white pixels will be created. Name this layer *Weave Y*.

### Weaves as Layer Styles

Weaves are assigned the same way as for jacquard (see Chapter 4). In brief, highlight the layer named *Weave X*, then **Layer>Layer Style>Pattern Overlay**, in Layer Style window uncheck Link with Layer, choose desired Pattern, click OK. Repeat the process for *Weave Y*, choosing desired weave pattern (Figure 15-5). If the words “Effects” and “Pattern Overlay” are not visible in your Layer Palette, click on the small disclosure triangles to the right of the “f” symbol to reveal them (Figure 15-6).



15-6

### Transporting the Liftplan

Duplicate your file, save the original, and work on the duplicate. **Select>All, Edit>Copy Merged**, and you may now paste the liftplan into your weave program.

Figure 15-7 on the next page shows the liftplan after pasting into *WeaveMaker*, with two repeats of straight threading and two repeats of the liftplan.

### Possible Threadings

Let's pause and consider which threadings will be appropriate for our Photoshop-designed liftplans.

#### Straight Threading

Obviously, a straight threading (or straight draw) would cause the liftplan to be reproduced in the cloth, the size of the horizontal repeat being determined by the number of shafts employed. In other words, a liftplan 16 pixels wide and 48 pixels high applied to a straight threading on 16 shafts with a sett of 16 epi would repeat width wise every inch. If this cloth were to be woven square, the ppi would also be 16, and the design would

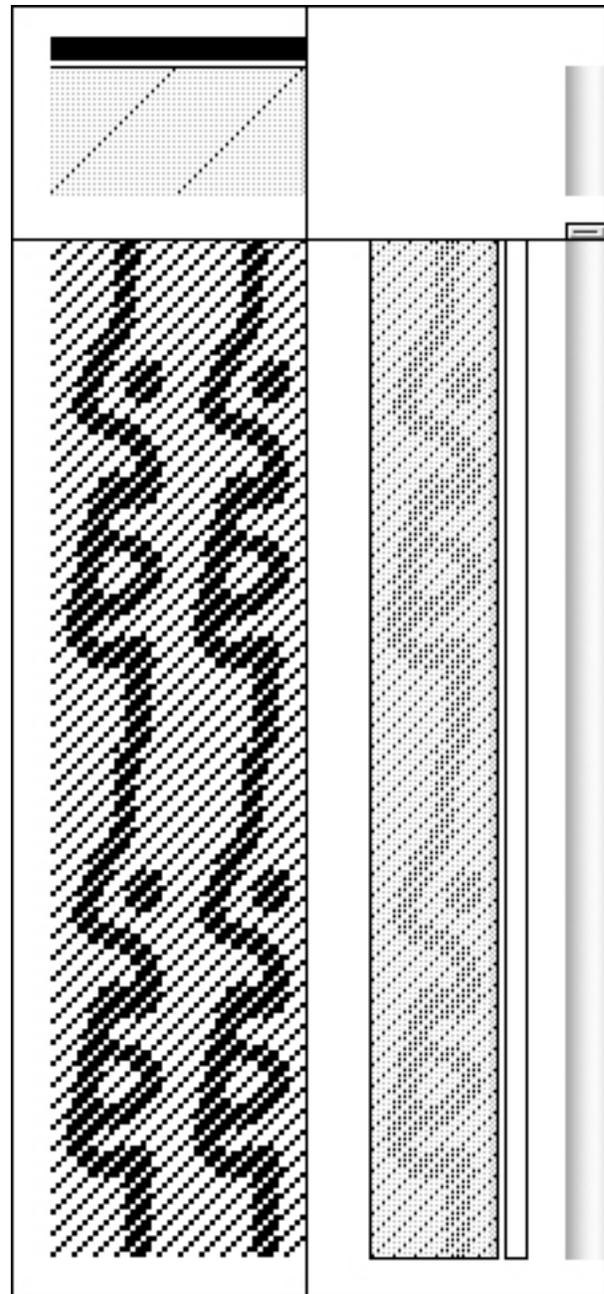
repeat lengthwise every three inches (48÷16). Some weavers have labeled this use of a straight threading on a dobby loom a “mini-jacquard,” and indeed it is—we are using the method of single thread control on a virtual loom of 16 heddles.

### Advancing and Networked Threadings

Our designing scope is greatly increased if we consider threadings that conform to a network. (Many, but not all, advancing threadings are included in this group.) For more information on network drafting, refer to Schlein, *Network Drafting: an Introduction* in the Bibliography. The following few paragraphs, however, will get you started.

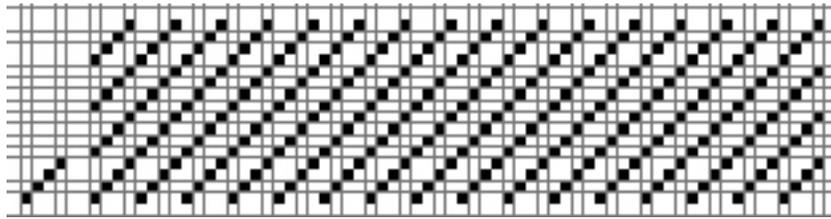
A **threading network** is built from the repetition of an **initial**. An initial is the minimum amount of information necessary to define a threading. A four-end initial defines a straight threading on four shafts, on which may be woven plain weave, straight and broken 4-end twills (3/1, 2/2, 1/3), basket weave, double weave, and many other weaves. Any weave which may be woven on the 4-end straight threading may also be woven on any draft plotted on a network derived from the corresponding initial. Additionally, two or more of these weaves may be combined in a single liftplan and woven successfully on these networked threadings.

Likewise, any threading draft plotted on a network derived from a 5-end straight initial may be woven with liftplans composed of any 5-end satin. Networks derived from 8-end straight initials may be used as the basis for threadings on which 8-end satins, plain weave, double weaves, 4-end twills, and so on, may be woven.

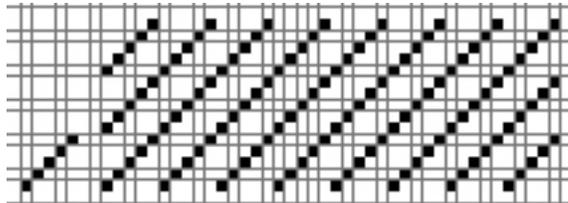


15-7

Following are examples of 4-end and 5-end initials and networks:

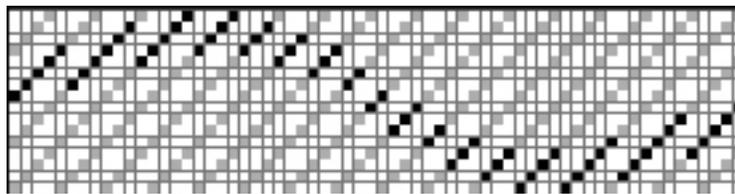


15-8 16 shafts, 4-end initial



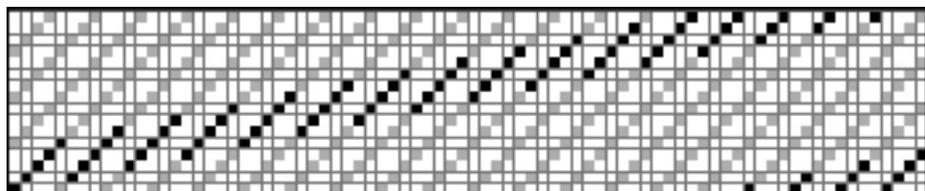
15-9 15 shafts, 5-end initial

Following is an example of a threading plotted on a network derived from a straight 4-end initial:



15-10

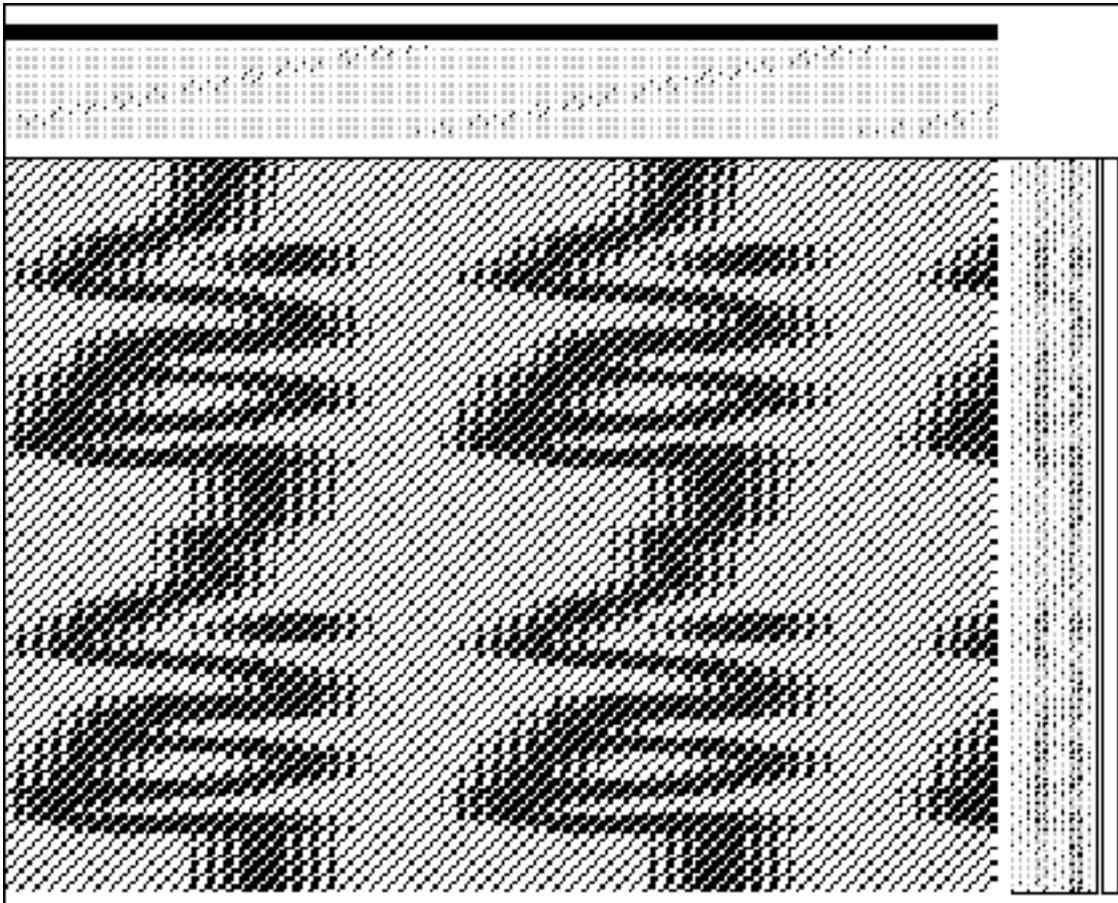
Following is an example of an advancing twill which happens to fall on the same network:



15-11

And on the next page we see what our Photoshop liftplan looks like on that advancing twill threading, in *WeaveMaker* (Figure 15-12).

Notice that as a single threading repeat of this advancing twill is five times as long as a single repeat of straight threading, the motifs are expanded fivefold width wise. Even though the edges of the design have become ragged through the effects of network drafting, the integrity of the weave structures remains intact, because the underlying network has been followed. If we wish to extend the design lengthwise to compensate, it is necessary to go back to the original Photoshop design file. Here is how we would do this.



### Expanding Length of Liftplan

15-12

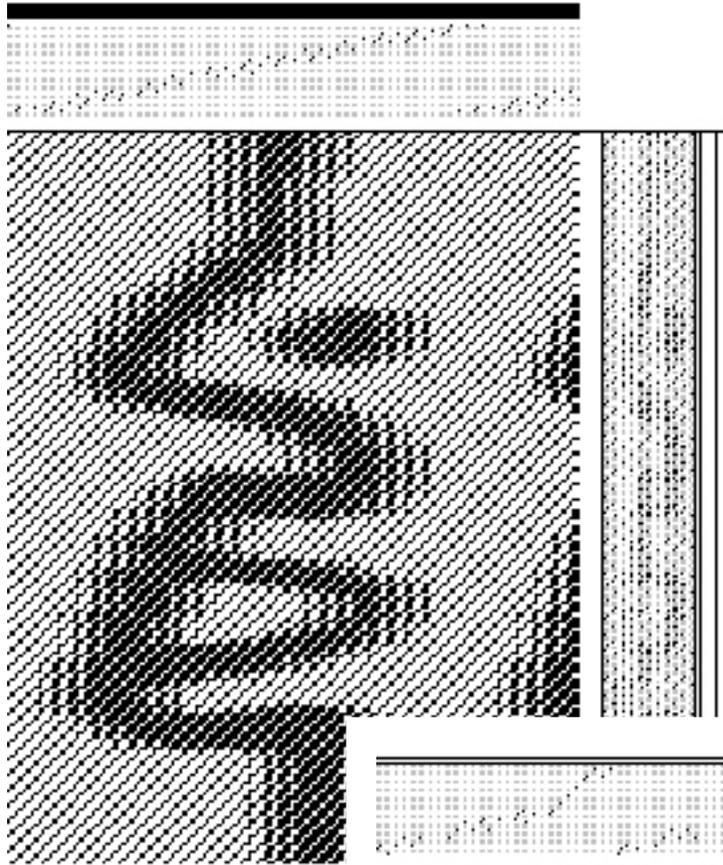
Returning to the layered Photoshop file, Figure 15-5 (*5aWeaves.psd*), and looking at the Layers palette (see Figure 15-6), we see that the X and Y layers have weaves applied as Layer Styles. This will enable us to resize the file and still retain the weave assignments. Duplicate the file and work on the duplicate (*5bWeaves.psd*). Let's elongate this file by doubling its length (we could triple or quadruple it, or indeed elongate it by any factor, as long as the length is still a multiple of 4 pixels, 4 being the size of our initial). **Image>Image Size**, and in the Image Size window uncheck Constrain Proportions, Check Resample Image (Nearest Neighbor), and look in the Height box. Current value is 96 pixels, and we will double this number and enter 192. Click OK. Save. Notice that the image is now elongated, but the weaves are still correct. The new Photoshop file looks like Figure 15-13 on the next page.

Duplicate this file, flatten it (**Layer>Flatten Image**), **Select>All**, **Edit>Copy**, and go to the *WeaveMaker* file. While in *WeaveMaker*, **Edit>Paste**, position the loaded cursor over the lowest right hand corner of the liftplan, and click. The elongated weave image will flood into the liftplan area. If using another weave program, use the appropriate paste routine for that application. The new draft looks like Figure 15-14.

Finally, take a look at this new liftplan with a networked threading based on a curve (Figure 15-15 on the next page).



15-13



15-14



15-15

# Photoshop Design Tools for Dobby

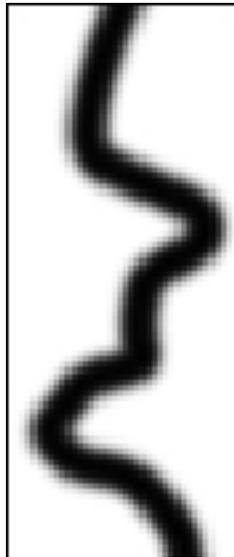
## The Offset Filter

Now that we know how to get Photoshop files with their applied weaves into weave programs so that we may drive our looms, let's explore some of the versatile design tools that Photoshop affords us. This is, after all, why we are going to the trouble of using Photoshop for our doobby design.

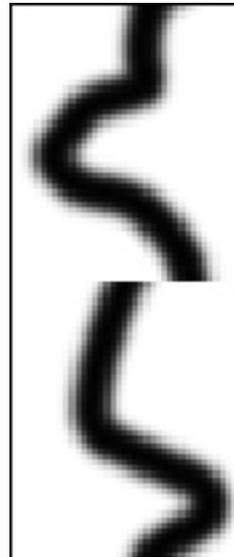
For this example let's revisit our hypothetical 24-shaft loom. (The process would be the same for other looms, such as 16-shaft, 32-shaft, and 40-shaft. The pixel width of the file would change to 16, 32, or 40 in these cases.) We will use a straight threading, and our liftplan will be a multiple of 4. Open a new Photoshop file in RGB mode, with a size of 24 pixels wide by 96 pixels high, resolution 72 pixels per inch, Background white. Zoom in to at least 400% for easier viewing on screen. Choose the Brush tool, diameter around 8 pixels, default foreground color (black), mode normal, opacity and flow 100%. So far there is only one layer (the Background layer); using the mouse or graphics tablet and pen, draw on this layer. You may use the Eraser tool to make corrections, but we find it easier to stay with the Brush tool and simply switch the foreground and background colors (black and white) with the keyboard shortcut "X". With one hand on the mouse and the other on the "X" key, this process goes very quickly.

Notice that the edges of the design are anti-aliased with gray pixels to produce the illusion of smoothness. We want to eliminate everything but black and white pixels, but we will do this later. The question arises: why not draw in Bitmap or Index Mode with a black brush on a white background, to automatically force only black and white pixels? The answer is that in these modes we lose the ability to use layers and filters, so we will work in RGB mode for now (Figure 15-16).

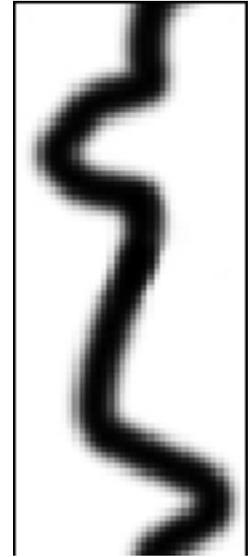
As there are no parts of the design that touch the side edges, we may assume that the design will not conflict with its neighbors in the horizontal direction, but we want to see how the top and bottom edges connect when the design is repeated in the liftplan. **Filter>Other>Offset** will give us this information. Perform this command, and in the resulting Offset window, with the Preview and Wrap Around buttons checked, slide the Vertical slider back and forth to see the effects of wrapping; alternatively, you may enter a value directly into the Vertical pixels down box. A



15-16



15-17



15-18



15-19



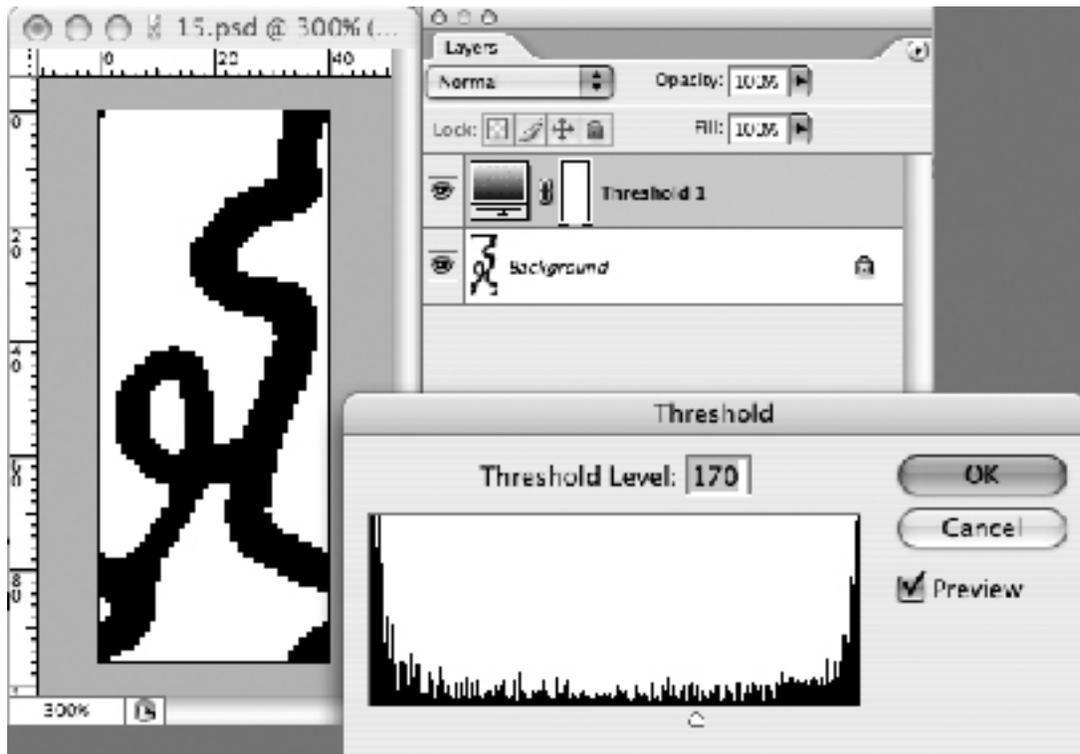
15-20

value of around 48 will put the repeat area right in the middle where it is easily seen. (You can also try minus numbers here.) Click OK. The image is now wrapped halfway down. In this view correct the join area with the brush and black and white paint. The wrapped image before and after correction is seen in Figures 15-15 and 15-16 on the previous page.

To add elements to the design that will connect it sideways, do another wrap, but this time in the horizontal direction. **Filter>Other>Offset**, Horizontal 12, Vertical 0. The design is now wrapped halfway to the right, and with the Brush tool add an element or two to connect the designs. The wrapped version before and after this addition is shown in Figures 15-19 and 15-20.

### The Threshold Adjustment

It is now time to reduce the design to black and white. **Layers>New Adjustment Layer>Threshold** will bring up the New Layer window; click OK. Now the Threshold window appears; with the Preview button checked, move the slider triangle under the histogram back and forth to preview the results of the operation in your design. When it is to your satisfaction, click OK. We chose a value of 170 to make the design moderately bold. Moving



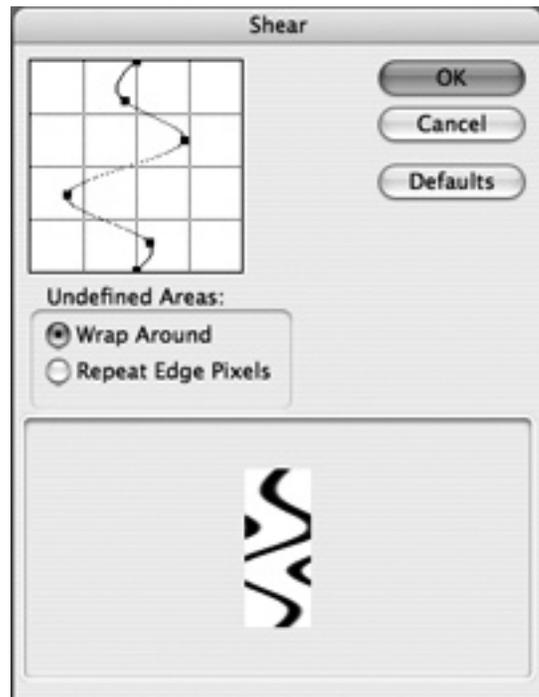
15-21

the slider to the left will make the black areas narrower. The Image Window, Layers palette, and Threshold control window for this operation are seen in Figure 15-21.

It is possible to revisit the Threshold control for further adjustment at any time, as long as the file is saved as a Photoshop file (.psd) with layers intact. In the Layers palette, highlight the Threshold layer, and double click on the gray Layer Thumbnail immediately to the right of the eye icon for that layer. The Threshold window will reappear, and the slider may be adjusted again. This is another example of the advantage of working with Adjustment Layers; all the operations are infinitely adjustable, even after the file is saved, closed, and reopened!

If you prefer to leave the Threshold layer in place, you may make changes to the drawing by highlighting the Background layer to make it the active layer, draw, erase, and apply filters to the Background, and the thresholding will update as you work. If you wish to leave the Threshold layer in place but turn off its visibility temporarily, merely click on the eye icon for that layer to render it invisible. You may turn it back on at any time.

In addition to the Offset filter and the Threshold image adjustment, there are a number of other tools we find useful in doobby work.



15-22

## The Shear Filter

In a new RGB file of 40x96 pixels, with the Brush tool, we have drawn a rough vertical stripe down the center of the image, and checked the meeting of the top and bottom borders via the Offset filter, as described in the previous example. Distort this stripe to make gentle waves. **Filter>Distort>Shear**, for Undefined Areas choose Wrap Around, and click and drag on the vertical line in the Shear window. You will see the effects of the shear in the small proxy image at the bottom of the Shear window (Figure 15-22). When the image is the way you want it, click OK.

The resulting image, both before and after the Threshold adjustment is shown at Figures 15-23 and 15-24, and the file with weaves applied at 15-25.



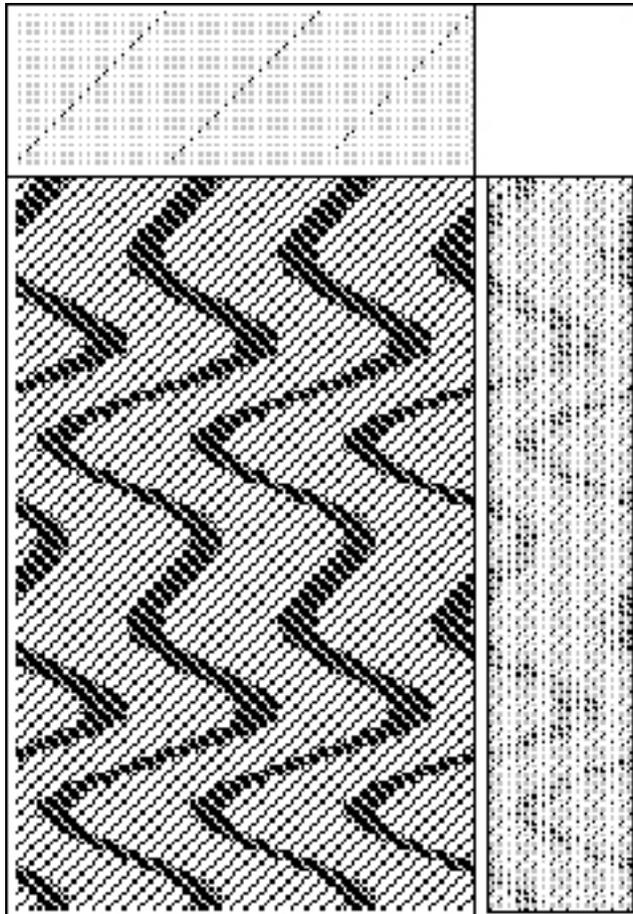
15-23



15-24



15-25



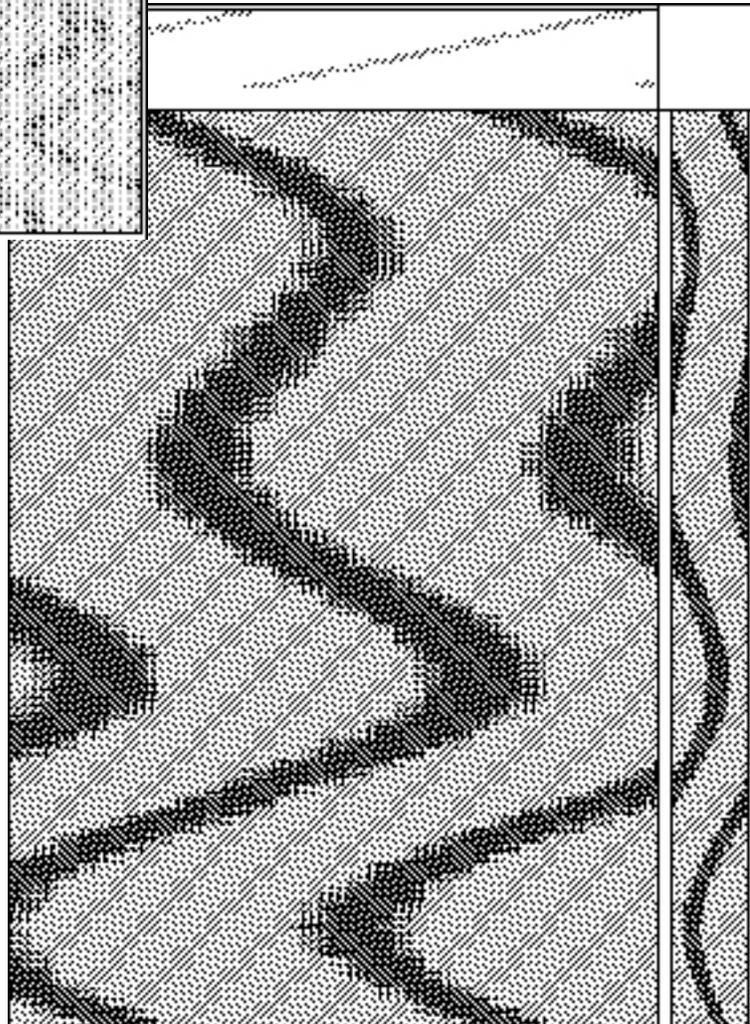
15-26

Finally, here is the file in *WeaveMaker* with a straight draw (Figure 15-26), and also in an elongated version with an advancing twill (when resizing the file, be sure to use “nearest neighbor” as the resampling method and remember to resize to a number evenly divisible by the initial) (Figure 15-27).

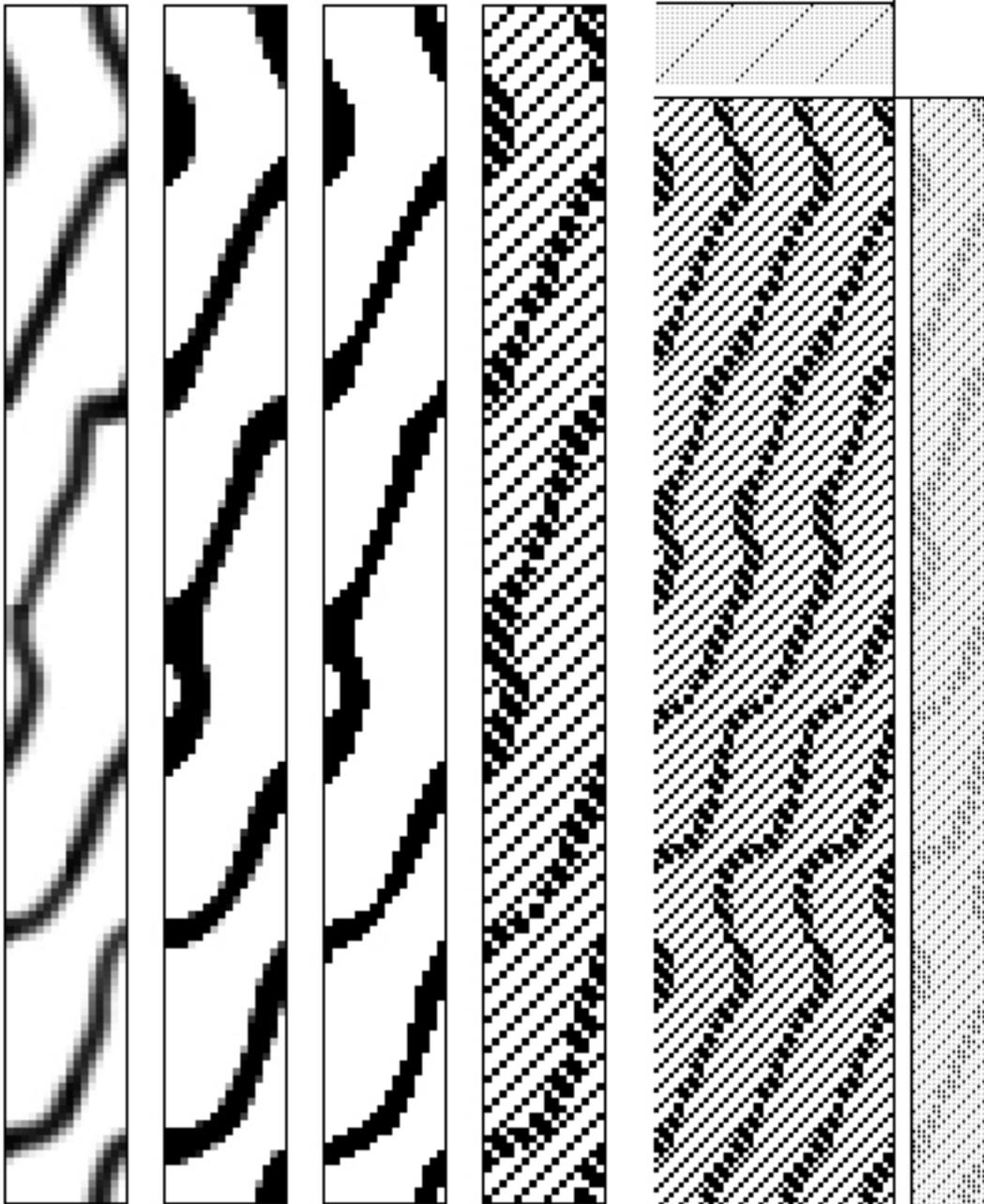
### The Stamp Filter

This filter smooths and distorts the image in fluid and unpredictable ways. When applying it, use the slider controls to adjust the settings to your liking. The filter works differently on smaller images, and it will take some fiddling with the sliders to get usable results.

On the next page is an example of a liftplan for a 16-shaft dobby loom, which may be used for



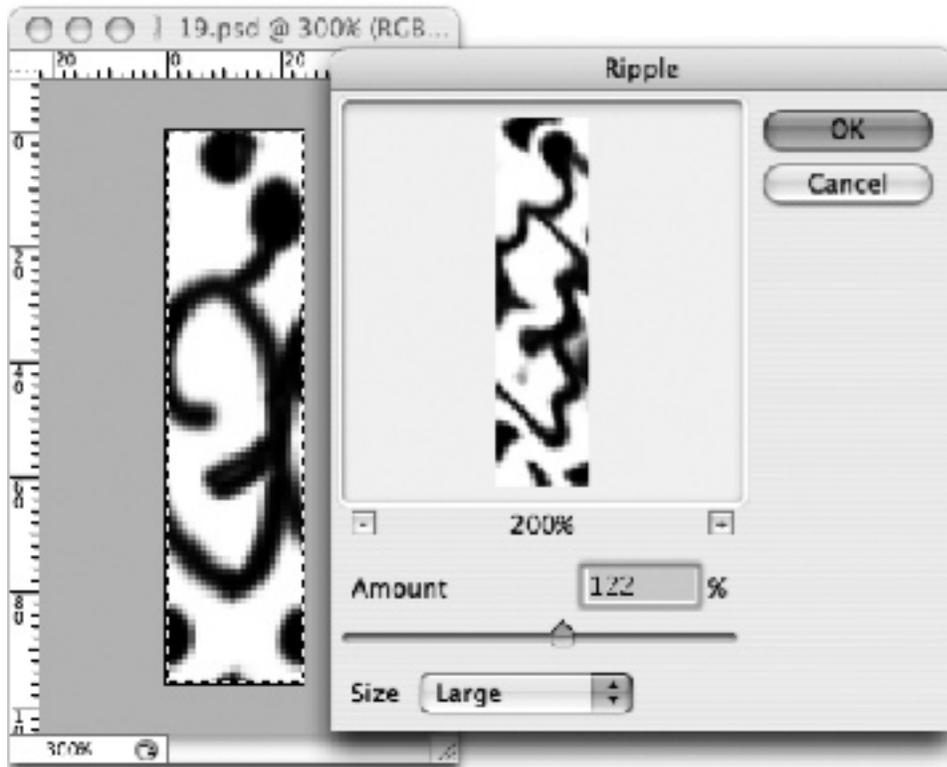
15-27



15-28

straight draw or an advancing threading that conforms to a network. Start with a 16x160 pixel RGB file, and draw on it with the Brush tool, wrapping several times with the Offset filter to check on joins at the edges. After the drawing is complete, apply the Stamp filter (**Filter>Sketch>Stamp**, and be sure the foreground and background colors are set to the default black and white). Then apply the Threshold adjustment. Touch up the boundaries by using the Offset filter and the Pencil tool with black or white. Finally, assign separate layers for the black and white pixels and apply weaves as Layer styles.

In Figure 15-28 the steps shown, from left to right, are: original drawing, Stamp filter applied, Threshold applied, weaves applied, and final drawdown in *WeaveMaker*.

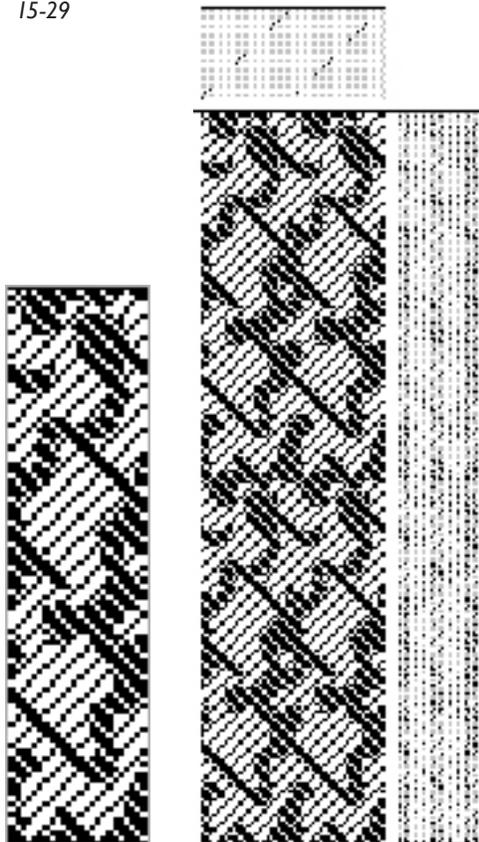


15-29

### The Ripple Filter

Figure 15-29 shows the original 24 by 96 pixel image for a 24-shaft loom, and the Ripple controls. In Figure 15-30 the Rippled image was touched up via the Offset filter, has had Threshold applied and the weaves added. The resulting liftplan is used with straight draw in *WeaveMaker*, and shown in Figure 15-31.

The previous examples of the use of Photoshop filters and adjustments to design dobby designs only scratch the surface of possibilities for weavers. Spend a few hours experimenting with your own designs and other filters, such as Sponge, Crystallize, and Photocopy, and you will quickly become a Photoshop for Dobby fan.

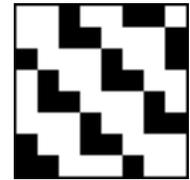


15-30

15-31

# Using Dobby or Shaft Loom To Test Weave and Sett

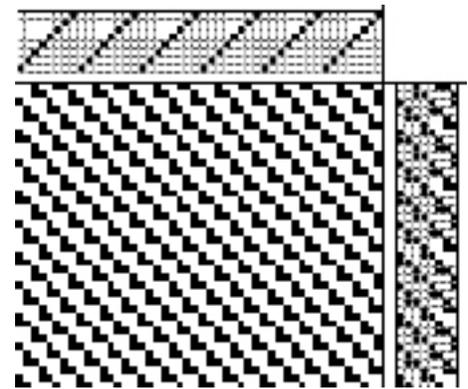
If the size of your jacquard weave structure repeat is compatible with the number of shafts on your doobby loom, it is a simple matter to put short warps on the doobby loom to test yarns and setts. For instance, if you are testing 8-end satins and weaves compatible with them, such as plain weave, double weaves, twills, and others, and you are working with an 8-, 16-, 24-, 32-, or 40-shaft doobby loom, warp your loom with a straight draw and enter multiples of your proposed weave structures in the liftplan.



15-32

Figure 15-32 shows an example of a weave based on an 8-end multiple; 15-33 is the weave used as a liftplan on a straight threading on an 8-shaft loom; and 15-34 is the same weave used as a liftplan on a 24-shaft loom.

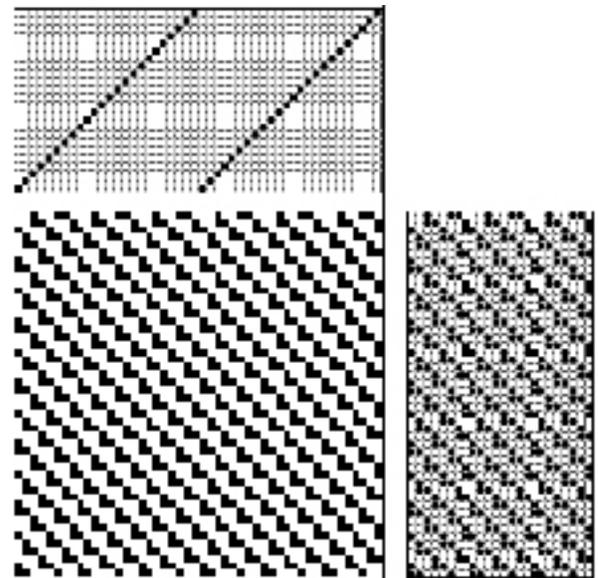
It is much more efficient to warp a doobby loom with a small sample warp to test yarns and weaves than it is to set up a jacquard loom for this purpose. One caveat: if testing for ppi for a jacquard, a narrow doobby or shaft loom sample might have a different ppi than the final ppi in a wider web on the jacquard which uses different weaves combined per shot.



15-33

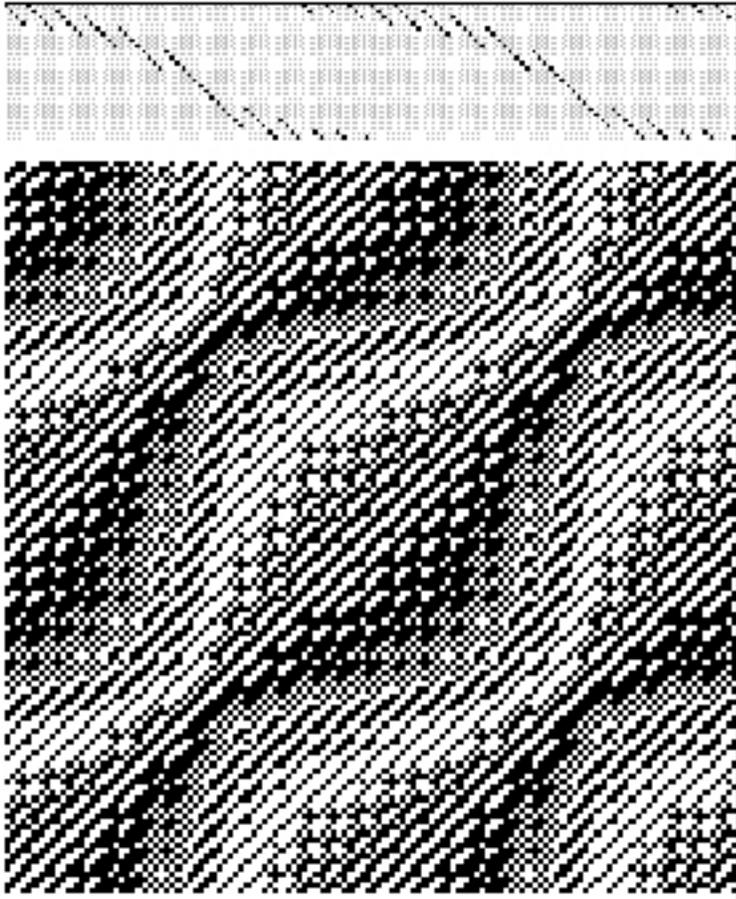
Conversely, it can be useful to test new doobby weaves (for other than straight threadings) on a jacquard loom if the jacquard loom is already set up and available. You will be limited to the yarn & sett on the jacquard loom, but if you merely want to explore structure, it is quicker than rewarping a doobby loom with a new threading.

Here is an example. We have designed a fancy networked twill and would like to see it woven without going to the trouble of warping the doobby loom with this complex threading. Our jacquard loom is ready and waiting. We copy the cloth area of the drawdown from our weave program into Photoshop. We extend this to exactly the number of threads on our jacquard setup, in our case, 880 for the TC-1. If necessary, repeat the design to fit the total number of ends on the jacquard loom. We save the new Photoshop file as a .bmp or .tif, import it into the jacquard loom driver, and weave it. We may tweak the weave (changing threadings or liftplans or both) in the doobby weaving software and repeat the process of bringing it to the jacquard to weave samples as many times as necessary until the weave is to our satisfaction, and only then warp the doobby loom. What a timesaver! Examples are on the next page.

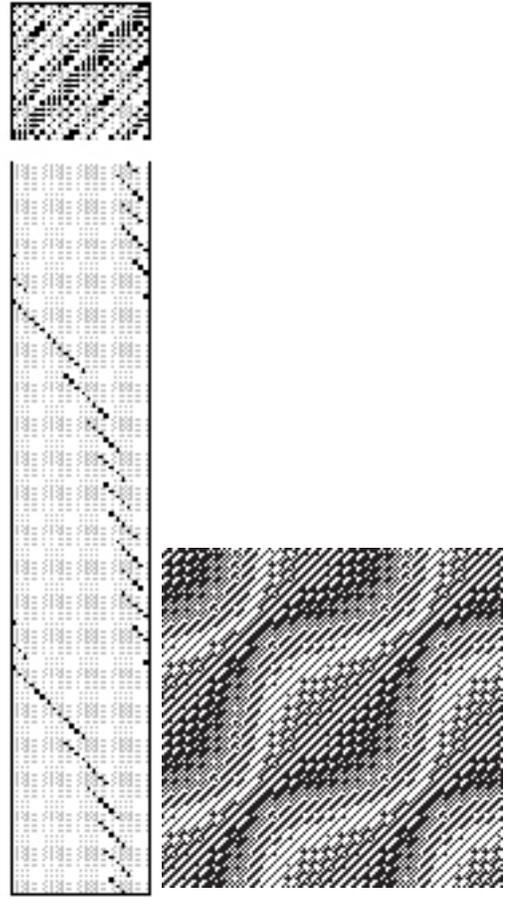


15-34

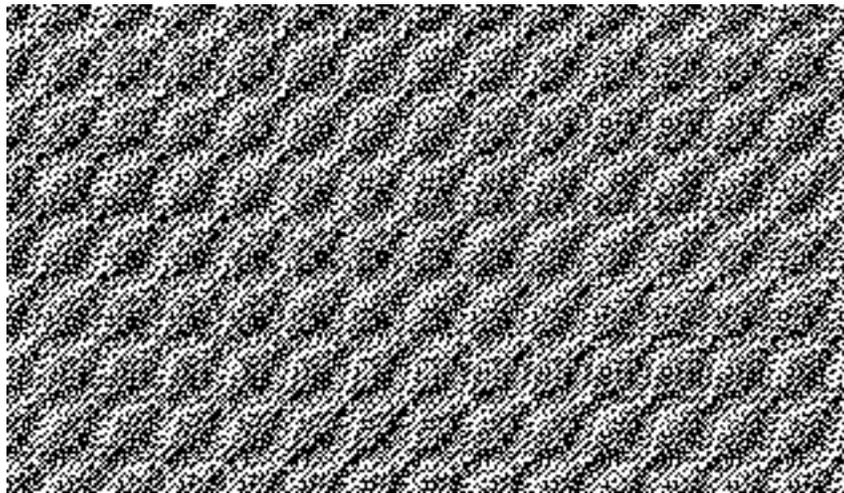
Figure 15-35 is a weave designed in *WeaveMaker*. Figure 15-36 is the same weave exported from *WeaveMaker* as a .tif, which can be copied into a Photoshop file and replicated as many times as necessary to make up the width of the jacquard warp (Figure 15-37), and then woven on the jacquard loom.



15-35



15-36



15-37