Appendix D

Preparing a File for an Industrial Jacquard Loom (Beljen Mills and Stäubli JC5)

One of the biggest constraints for individuals and companies using Photoshop for jacquard design has been the conversion of files to loom-ready formats. The programmers for dedicated jacquard software have had to write programs that will work for each model of jacquard controller, which constantly change and improve. It is a daunting task, and one that we could not undertake. However, knowing that both TC-1 and AVL looms read and weave either .bmp or .tif files, we approached Stäubli to see if their jacquard controllers had this capability too. Stäubli's jacquard machines can be mounted on many types of industrial looms. They are an international corporation whose products are used worldwide, including the schools and manufacturers that we know of in the United States. They were the logical company for us to approach.

Simultaneously with working with Stäubli, we worked with Beljen Mills to test and weave our files. As of this writing, the majority of looms with Stäubli controllers in the United States are still using a Stäubli JC4 controller. Beljen Mills, however, has a newer system, the JC5. (The latest version of the Stäubli loom controller, the JC6, will be released in 2006.) This was good news, since the JC5 can read .bmp files, while the JC4 cannot. It was suggested to us that we also write a stand-alone program to meet our needs. Neither of us is a programmer, so we approached Jane Eisenstein with this idea. Jane is a professional software developer, who owns a TC-1 loom and understands the intricacies of jacquard weaving. Happily she took up the challenge and succeeded.

We also did tests with Carla Tilghman of Lapin Textiles, who owns a dedicated jacquard software program. Working with Carla, we were able to produce cloth in several ways. Sometimes we sent her a file that already had weaves inserted, and asked her to convert it to a Stäubli file. Other times we sent her an image file and asked her to choose and insert structures based

on the colors in the image. Both methods worked well. You might find that working with her, or another company that owns a dedicated jacquard program, suits your purposes.

Therefore, in this Appendix, we will present three ways to make a loom-ready file for an industrial loom mounted with a Stäubli JC5 jacquard controller. All of the methods will work with the Beljen Mills loom. We are confident that they will work on other JC5 setups as well, but, technology changes quickly, so we cannot guarantee this.

Loom Setup

Hook Setup/Harness Tie

Whatever conversion you choose to follow, you must make a final file that fits the hook setup of the loom where you plan to weave your design. Although the new systems use solenoids and other devices instead of hooks to control the lifting of the warp ends, the language has lagged behind (thus hook setup really refers to solenoid or loom setup). In the past, jacquard looms had ingenious hook plans (think of them as block threadings) so that border patterns could mirror each other and be different than the body of the design, which itself might be in straight or mirrored repeats. Some hooks were also used to represent the box motion (sequence of shuttles), some hooks were used to control technical processes, such as the take-up of the warp, and some hooks were not used at all (the term is "cast out").

Looms with Repeats

The relatively small number of hooks available on early jacquard heads meant motifs were small and repeated across the width of the loom. It was critical that the weave structures used in the cloth would fit evenly into the number of design hooks. For example, if a five-end structure was used on a repeat of 202 threads (hooks), it would break at the end and beginning of each repeat (5 does not divide evenly into 202), causing a vertical line in the cloth. To rectify this, designers set up looms using a hook count divisible by many numbers, thus increasing the pool of workable structures. Periodically, when creating the harness tie, a hook would be left unused, i.e., cast out. In the example above, casting out two hooks from the 202 would leave 200 threads for the repeat. This is a better number, allowing a weaver to insert any 2, 4, 5, 10, or 20-shaft structure for any part of the design that ran across the repeat lines. These ground weaves act like fields in the cloth, and seamlessly mask the duplication of the repeat. The designer still had the option to use weave structures that did not divide evenly into the number of design hooks in areas of the cloth that did not touch a repeat boundary.

Looms with No Repeat

Today many jacquard looms have jumbo heads, with each warp end being controlled by its own "hook." This allows for a single repeat in the cloth. It gives maximum flexibility to a designer, who can still divide the width of

the cloth into small duplicated motifs, but now has the possibility to create one large full-width image. You don't need to consider the relationship of your structures to the total number of ends if each thread is independently controlled by the loom controller–but you do need to consider it if the loom has two or more repeats in its hook setup.

If you are designing a file that will be repeated for yardage, you still need to make sure the height of the file is a number evenly divisible by all structures that cross the boundary between the end of one repeat and the start of a new repeat.

Selvedge Ends

Not Fast Selvedge

Handweavers know the word selvedge to mean the edges of the cloth, often woven with a slightly tighter structure than the body of the cloth. The weft, in a shuttle, goes back and forth across the web of the cloth and encloses the edges, preventing unraveling. Today's electronic looms do not use shuttles. Each pick (weft) comes from one side of the loom and is carried to the other by air or devices called rapiers and grippers. The wefts always work in one direction (for example, from left to right) and each pick is cut off at the starting side. This happens very quickly, and the cut ends of the picks tend to snap back and get caught in the edge of the cloth. To prevent this, looms are set up with a false selvedge (or "not fast" selvedge), which is a narrow series of ends that is situated an inch or two away from the body of the cloth. This tape gets cut away from the cloth as it is being woven (a razor-type device is mounted on the loom and sits in the space between the cloth and the not fast selvedge). The false selvedge is directed into a compartment where it is collected, and often sold to other companies who weave them into rag rugs and innovative products. Beljen Mills uses a not fast selvedge for all designs, but this is not programmed into the design files so you will not have to indicate it in your files.

Leno Ends

The not fast selvedge prevents the weft from wrapping back into the cloth, but it does not stop the unraveling of the edges. Leno ends of a fine strong yarn are woven at the very edge of the fabric to control for this problem. Weavers of trim and ribbons will have a series of small warp tapes threaded across the loom, with cutters between them, and synthetic leno edges that get heated and fused as the wefts are cut. Again, these leno ends are controlled outside the design files, so you do not have to worry about them.

Fast Selvedge

Some companies still like to weave a selvedge (tighter, even construction) connected to the body of their cloth (this is called a "fast selvedge"). In this case, they will designate body ends to be used for the selvedge. Beljen Mills weaves this way. You will have to designate some ends on either side of the

body of your design for fast selvedge. It can be small, just 12 ends wide, or it can be large and act as a border. We use 32 ends on each side (weaving as a 12-end satin) for the fast selvedge. It ends up looking like a quarter-inch tape in the final cloth.

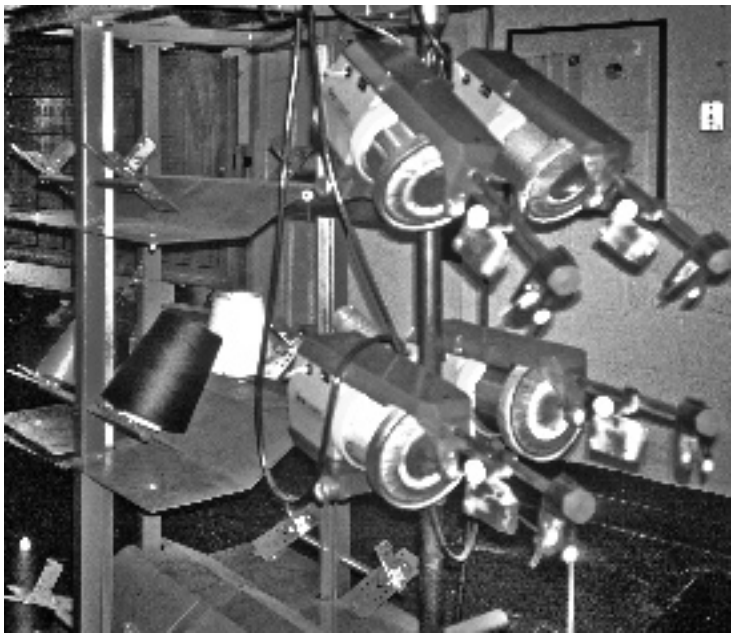
Box Motion

Box motion is the industrial terminology for the sequence of wefts. Those of you who have worked with fly shuttles will immediately understand this term. At the side of the race of the beater sits a box, or series of boxes, that can hold a shuttle. If you are weaving with one weft, one box on each side is sufficient. As the shuttle is sent from edge to edge, box to box, you can see how the term "fly shuttle" originated.

If you want to use two weft systems, or be able to switch between two colors in a one system cloth, then you need to have two boxes on each side sitting on top of each other. You also need the capability to raise or lower them so either one can be in position to throw or catch the shuttles. Two boxes on each side actually allow you to weave with three wefts, just as long as you follow a sequence that always sends the active shuttle to the empty box. Some looms had four boxes on each side, allowing a sequence of seven shuttles to be used.

Shuttles are Obsolete

Once again terminology has lagged behind change. Today's industrial looms have stands that hold cones of weft yarn (Figure D-1). Each yarn is threaded through an accumulator (a tensioning device) and then brought to the loom where it is threaded into the eye of a moveable part called a weft selector. There can be as many as 16 of them on a modern loom (though 8 is more common). The textile designer has to decide which weft color is going to be used for each pick of the cloth. If your loom has 16 selectors, you can weave a plain weave structure but have it woven with an intricate banding of 16 distinct colors. You could create an ombré pattern that shades from one color into another into yet another; or even create a random sequence of weft colors. Of course you can still weave with one weft color and use only one selector.



D-1 Stand with Weft Yarn Accumulators

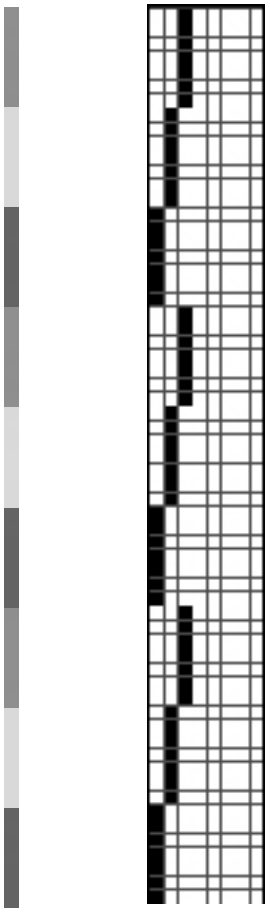
Figure D-2a shows a vertical column representing one weft system with three colors used in it in bands of 7 picks each. This is actually how you would want your wefts to proceed, one after another. However, it needs to be written

differently for a loom-ready file, with each weft color having its own assigned hook or vertical column.

Placement of the Box Motion

The place where you would put the instructions for the loom, as to which selector to use for each pick, is called the box motion information in a loom-ready file (the loom layout), and would be designated by "box motion hooks." The old industrial looms actually had hooks that would raise and fit into holes of the jacquard cards that would then inform the machine which shuttle to send across the cloth. Figure D-2b shows the 8 columns of the box information showing the weft sequence from Figure D-2a. Notice that there are only marks in the first three columns, because this box motion is for three weft colors, not eight. If eight colors were used, there would be some black marks in each of the eight columns. The marks would line up with the picks that use those colors.

The concepts of weft colors and weft systems and box motion are often stumbling points for handweavers learning jacquard. If you are working on a hand jacquard loom, such as the TC-1, then you (the weaver) are still in control of which shuttle to pick up and use. In this case, you don't have to program anything for box motion into your loom layout. (The TC-1 loom controller allows you optional visual information of which weft to throw.) However, for fully automated looms, this is an essential element that must be understood and designated. The loom won't weave without this information.



D-2a *D-2b*

An Example of Weft Systems and Box Motion

Assume you are weaving a double weave cloth with two weft systems. You have created weave structures that sometimes put the first weft system on top and the second one below, and other structures where you have the second weft system on top, and the first one below it. The sequence of weft systems is an integral part of your weave drafts. For jacquard files you need to create the structures so that the order of the weft systems is always the same in every structure used in that file. You can make the first pick go to the top or the bottom, but it always has to be the same weft system. If using white yarn for weft system one and black yarn for weft system two, then all structures are designed for repetitions of white then black yarn (system one followed by system two).

Let's assume that the loom for this double cloth has 8 weft selectors. This means we can use 8 different weft colors in the design. We decide to keep one system always the same color–white. But we want to have the second weft system weave as bands of four picks of seven different colors.

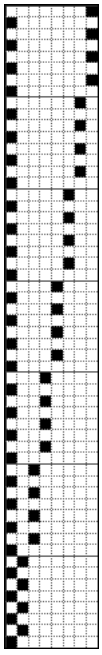
Designer Decides Weft Sequence and Colors to Use

As the designer for this cloth, you need to tell the mill in which order the weft colors are to be threaded through the eight selectors. If the white weft is threaded on the first selector, then every other pick of your design is going to have a mark in the column that is designated for the first selector, or first box.

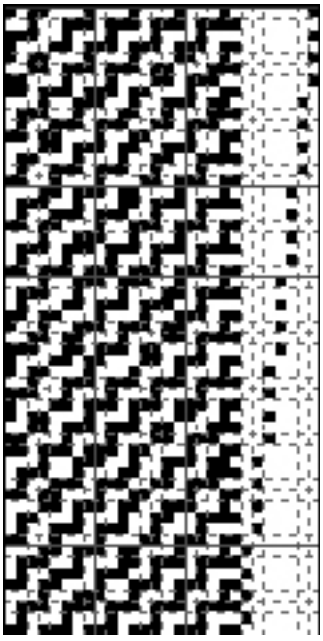
Then you need to know which colors are represented by the other selectors. Usually the designer tells the loom operator what type of weft yarn and color to use for a design, and what position they need in the selectors. This will be part of the information tag or file that accompanies a loom-ready file. If this is wrong, you will come up with some surprises in your weaving (sometimes good). For Beljen Mills you must give instructions for weft sequence and type of yarn with each file, even if you always designate the same information.

In our example, the designer has decided she wants small, even stripes of color, and she writes instructions to the loom operator to place the weft colors through the selectors in the same order she designated them in her weave file. The box motion area of the loom file is going to indicate that the weft from selector 2 will be used for four picks of weft system two, then selector 3 will be used for four picks of weft system 2, and so on through selector 8. These marks will be placed on every other pick of the design under the columns designated for those selectors–but not on the same picks that already have the marks for the white weft (selector 1). The marks for selector one will always fall on the structural picks that work with the first warp system, and the marks for selectors 2 through 8 will always fall on the structural picks that work with the second warp system. In the final loom file every pick must have a mark in one of the columns that represent the box motion. The woven cloth for this example will have motifs in white weft yarn working against motifs of horizontal banding of seven weft colors.

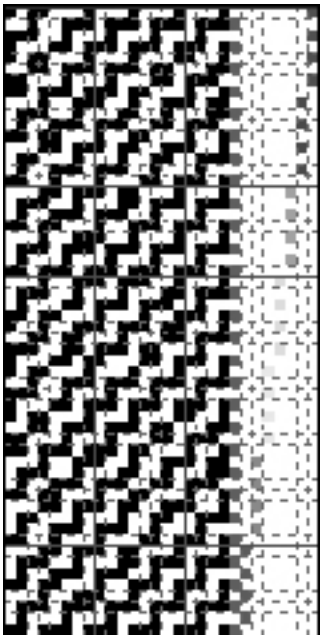
Figures D-3a-d show a structural file with the box motion information on the last eight columns on the right. Figure D-3a shows the box motion alone; D-3b is the black and white weave file; D-3c shows the box motion in the colors of the weft that will work on each pick; and D-3d shows the file with the weft colors in the weave area as well as in the box motion. Weft system



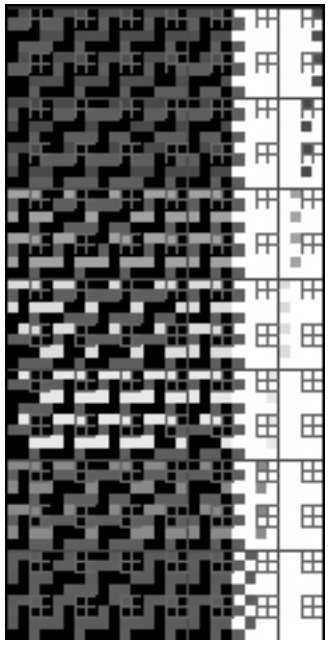
D-3a



D-3b



D-3c



D-3d

1, the odd picks of the structural file, are always the same weft color. Weft system 2 has stripes of seven weft colors, four picks each. They work on the even picks of the structural file.

Although the box motion can theoretically be placed anywhere in the file, it is usually found to the right or the left of the loom-ready file, before or after the selvedges and body of the design. Beljen Mills puts their box motion to the right of the fast selvedge.

Note: Just a reminder that the Figures can be found in color on the CD in the Appendix D folder.

Regulator Hooks

Sometimes there is additional technical information that needs to be included in the loom-ready file. This information is lumped under the category of "regulators." Probably the only regulator you need to understand is the one for Dead Picks. A dead pick is one where the warp is not advanced from back to front. It is a crammed pick, usually used for supplementary wefts, but sometimes used to modify the ppi of a cloth.

Handweavers are used to some variability in the ppi of their cloth. They might even point to these shifts in density as proof of the hand of the weaver; contrasting it with the monotonous regularity of cloth woven on a mechanical loom. The public, on the other hand, wants their sheets and pillow cases to be woven with exact precision. Today's machines have controls that can be dialed and set before weaving, so a cloth will weave at exactly the picks per inch required, and at speeds as fast as 1200 picks per minute. Very subtle regular and even movements of the back warp beam and the front cloth beam have to be regulated so that the reed is always hitting the fell of the cloth in the same place, and the resultant movement of the warp into cloth will equal the necessary ppi. Watching a well-conditioned loom with a jacquard controller weave off cloth faster than you can blink is an awesome experience. It is also a good idea to be wearing ear plugs while you are dancing in delight to the music of the loom!

Chapter 14 gives you detailed information on designing and weaving with supplementary weft threads, so we don't need to discuss them in depth here. However we do want to remind you that if you are designing a cloth with variable pick density, such as bands of supplemental weft, then you need to tell the loom not to advance on either the pick before the supplementary one or on the supplementary pick itself. This information becomes part of the loom-ready file. A mark for a riser will go on the pick in the column that represents the hook that is designated as the Dead Pick Regulator. Beljen Mills uses hook 12,305 for the stop motion (dead pick) regulator.

Cast Out Hooks

There might be hooks on the loom that are cast out, but still need to be designated in the final loom ready file. If they are not there, the controller will probably give you an error message and refuse to accept the file. Cast out ends have no marks in them. They look the same as a column of all sinkers; all white in our files.

Photoshop Loom Layout

If you are planning to work with a mill and send them loom-ready files, you must find out the hook layout of their loom(s) and write your files accordingly. If they have more than one setup, you need to design for each one separately. A mill might use the same setup on many looms, each with a different color warp. In this case, if you designed for that setup, your file can be loaded into several looms and woven with the different warps. The structure/imagery will be the same but the colors of the cloth will be different.

If you load that design on a loom with more hooks, or less hooks, the file probably won't weave at all, or it will weave with problems. If your file is written for a narrower loom setup, there will be ends that never lift (which will quickly lead to slack ends and the loom shutting down). If your file is wider than the loom setup, it might activate several wefts at the same time since it is reading structural marks rather than the box motion which falls outside the loom's setup. So we reiterate, find out the layout of the loom that will weave your design and check your file for accuracy before sending it to the mill.

Your final, loom-ready file (with only black and white marks) should include data (hooks) that represent the information for:

- selvedge hooks
- body of design hooks
- box motion hooks
- regulator hooks
- cast out hooks

Beljen Mills Information

We are sharing this information with you through the generosity of Brian Bunch, owner of Beljen Mills. We believe he is at the forefront of a new mode of working for textile mills in the United States. The tradition here has been large minimum orders of the same design, and rigidity in terms of change. Unfortunately, many of the mills adhering to these practices have closed, as their business has gone to other countries. At the same time more people like us have had access to design programs and are interested in having one-of-a-kind weavings produced. As the remaining mills realize there is an educated audience who can send them loom-ready files, we believe they will accommodate our needs. If this doesn't happen in the United States, small companies around the world will become accessible to us through the Internet. Whatever the future scenario, we are very fortunate to have Beljen Mills available to us today.

Note: This information is accurate as of the publication of this book, but we can make no guarantees that it will stay that way.

It is best to contact Beljen Mills directly before proceeding. In any case, you will need to set up an account with Mr. Bunch before anything can be woven. This is his contact information:

Brian Bunch
Beljen Mills, Inc.
PO Box 6283
1706 Heathgate Point
High Point, NC 27262
phone: 336-887-1828
fax: 336-887-1840
e-mail: **Brian@BeljenMills.com**

At this point, Mr. Bunch is happy to weave for individuals or schools, with a five yard minimum (which can be five yards of the same design or a number of different designs that add up to five yards). The company is extremely busy and you must send files to the mill that are loom-ready. It is not possible for the designers at Beljen Mills to make adjustments for you. When you send the file, you also must indicate how many picks per inch you want, what is the sequence of weft colors and what type of yarn should be used. The fees for weaving at Beljen Mills are very reasonable. Contact Mr. Bunch for the specific charges.

Note: Working with a mill can be a delicate operation. If you send them files that do not weave correctly, taking up precious loom time as well as their employees' time, you will quickly find that they no longer are willing to work with you. In fact, they might hesitate to work with other free-lance designers too, so please be considerate of everyone involved. Check your files for accuracy before sending them to the mill.

Loom Information for Beljen Mills

Beljen Mills has a Stäubli JC5 controller on a Somet Loom that weaves a full width cloth of approximately 72 inches. You can design for full width, or have more than one design (the same or different) weaving across the cloth. The construction is a warp tapestry setup with a rotation of 8 colors of 50/2 cotton. The warp rotation is: **black, blue, white, yellow, brown, green, pink, and red** from left to right.

In the final cloth, there are 170.6 ends per inch (but we suggest that you design for the face of the cloth, 1536 ends at 21.33 epi, and then expand the image before putting in your weaves).

The preferred weft sequence is a three weft rotation of: natural (6/1 cotton), black (6/1 cotton), and black binder (50/2 cotton), weaving at 80 picks per inch (or 26.67 ppi when designing for the face of the cloth).

The Pixel Aspect Ratio for the FACE of the cloth is 1.25.
The Pixel Aspect Ratio for the final cloth (80 divided by 170.6) is 0.47.

To ensure that all weave structures (if using the ones we provide) have the box motion correspond to the correct weft system in the structure, have the number of picks in your face design be a number evenly divisible by the height of the structure (6 or 12 will work).

The total number of hooks for the Beljen Mills loom layout is 12,320.

Of these, 12,288 represent design ends and 32 represent technical information, such as box motion. None of these hooks control the not fast selvedge. They have those ends controlled by a separate system, and you do not need to be concerned about them. You should, however, designate some of your design ends as fast selvedge ends, that will weave a smooth structure at the sides of the body of the cloth. We usually designate 32 ends on each side (4 per side when designing for the face of the cloth), but you can increase that to have wider selvedges (which makes it easier to turn back the sides of your cloth for finishing).

You should read through Chapter 13 for a detailed description of Tapestry Weave structures. There is an example in that chapter on how to design for this type of structure, but that discussion presupposes 4 warp colors and Beljen Mills uses 8 colors. We have also discovered through trial and error that the loom at Beljen Mills is very sensitive to slack ends. Structures that float unused ends in the center (as is the case with the tapestry structures in Chapter 13) do **NOT** work well at Beljen Mills. We will discuss this further later on in this Appendix.

An Example of Designing for Beljen Mills' Loom

We will walk you through our design process for Beljen Mills. You can find the images we discuss in color in the Appendix D folder of the CD.

Design for the Face of the Cloth

We design to the face of the cloth, which means each pixel of our design actually represents 8 warp ends and 3 weft picks. Since the total number of design ends equals 12,288, we divide that by 8 to get 1,536 face ends. The Pixel Aspect Ratio we use for designing is face picks (80÷3 = 26.67) divided by face ends (170.6÷8 = 21.33). So face picks (26.67) divided by face ends (21.33) equals 1.25. You can save a Custom Pixel Aspect Ratio by going under **Image>Pixel Aspect Ratio** and choosing Custom Aspect Ratio. A dialogue opens up that allows you to name it and put in a factor number. Do this and call it Face Beljen, or something you will remember, and type in the number 1.25.

Aspect Ratio for the FACE is 1.25

We designate the first four ends and the last four ends as (fast) selvedge. This is the layout we use for the FACE of the cloth:

Layout for the FACE Design	
Hook Numbers:	**Hooks Represent:**
1 - 4	Left Selvedge
5 – 1,532	Body of the design
1,533 – 1,536	Right selvedge

File ***D-4.psd*** in the Appendix D folder of the CD is our starting design file, with the selvedge ends indicated in light green. Figure D-4 represents this file. It has 6 colors in it, including the color for the selvedges at the edges.

D-4

Height of the Face Design

Photoshop will lay in your weave structures from the top left corner to the bottom of the file. It is easiest to check for accuracy if your weave structures get placed so that the first pick of the design, at the bottom, corresponds to a pick in the structures that represents the first weft system (natural white in our weft sequence). We put the box motion into the file at the last moment, so we can be sure we are lining up box sequence with the correct weft system. The weave structures in this example are designed for 12 picks. We have found that if we design an image so the height is divisible by the height of the weave structures (12 in this case), we have no problems confirming that the structure and the weft rotation match. We suggest you increase or decrease the number of face wefts to be a number that can be divided evenly by the height of the structures (6, 12 or 24 if you use the structures in our Pattern Preset libraries).

Add a Border to the Top and Bottom of the File

There are a couple things we want to mention. The weaver at the mill will begin your file with pick one and end it at the last pick of your file; when they send you the cloth, that is what you will get. It is a good idea to add a hem at the top and bottom portions of your design that weaves at least a couple of inches of cloth. Then you have some extra fabric to turn under for finishing your work. You can have the hems represented by a color different than any used in your design. Then you have the option of placing a new structure in them or designating one of the structures already used in your design for that color too. Figure D-5 shows the image with borders. If you look at ***D-5.psd*** you will see it now has seven colors.

D-5

Test New Structures

Industrial looms do not have the leeway of a hand loom. If a warp is tight and breaks, the loom will stop. If a warp is slack and sags, the loom will stop. If you use the weaves we are giving you as Presets, and follow these instructions, you should not have problems in your cloth. They are interchangeable structures, and the take-up across the loom should be even. However, if you design your own structures, one problem to watch out for

is placing a tight construction next to a loose one which can cause tension problems. When a loom is down, a company is loosing money. This is one of the reasons most mills have been very hesitant to weave work designed by anyone except their own designers. Dedicated jacquard software can scan an image and give feedback on excess floats and tight ends. We do not have this capacity in Photoshop. Please be very careful before sending "experimental" structures to the mill. If you do design your own weave structures, be sure and have a blanket woven of the structures first, to test for problems as well as to give you a visual key to the structures.

Finally, if you have a vertical line in your image, a border or anything else that continually uses the same ends as stitching ends, you will cause them to get tighter than the other ends. To equalize the tension, it is better to change the structure that fills these vertical lines periodically. There are many structures in the blanket that read as similar hues, and perhaps this type of color modulation will improve the visual look of your design, as well as insure that the loom continues to run smoothly.

Library of Weaves and Weave Blanket

On our CD in the master Weave Presets folder we have given you three libraries of Pattern Presets for use at Beljen Mills. They are saved in a folder called Beljen Presets. For all Pattern Presets we have assumed a weft color rotation of natural white 6/1, black 6/1, and black binder 50/2. In other words, weft system 1 (box 1) is white, weft system 2 (box 2) is black, and weft system 3 (box 3) is black. If you change the weft sequence, the structures will be the same but they will look radically different in the cloth. (We found this out when we made a mistake. Eventually we will quantify those "mistakes" because they are really beautiful.) The Pattern Preset libraries can also be found in the Appendix D folder of the CD.

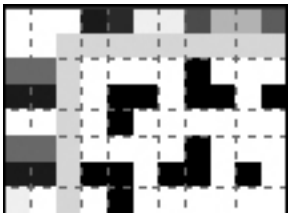
Another convention we have used throughout these Pattern Presets is that "b" weaves are the inverse of the "a" weaves. You can use either face of the weave structures in your designs.

In every Preset Library, we have taken the root structure through modifications so there is a plain weave structure for each warp color combined with the other warp colors as the binder. We have saved this combination with the white 6/1 weft on top as one Preset, and with the black 6/1 weft on top as a different Preset. We will give you charts describing the Pattern Presets, but nothing compares to having a weave blanket in hand when making decisions.

Library 001a-112b

The first library, ***001a-112b.pat***, are double weave structures with plain weave on both sides. The "a" structures have two warp systems weaving plain weave with a 6/1 weft and the binder weft; the "b" structures show the reverse side where six warp systems weave plain weave with the other 6/1weft. There are two picks on the face to one pick on the back. These are straight double weave structures that forms pockets in the cloth. Large areas can be

problematic and we suggest that you do not use these weaves in files that have big areas of solid color. Figures D-6a-d show examples of four structures. D-6a is the Preset that weaves the blue warp on top with the brown warp as binder weaving with weft system 1 (white). Figure D-6b is the inverse of this. Figure D-6c is the blue warp on top with the brown warp as binder, weaving with weft system 2 (black). Figure D-6d is the inverse of this. If you look at these images on the CD you will see the warp systems marked in color, which should help interpret the structure. These structures are 8x6 pixels in size.



D-6a 017a

D-6b 017b

D-6c 024a

D-6d 024b

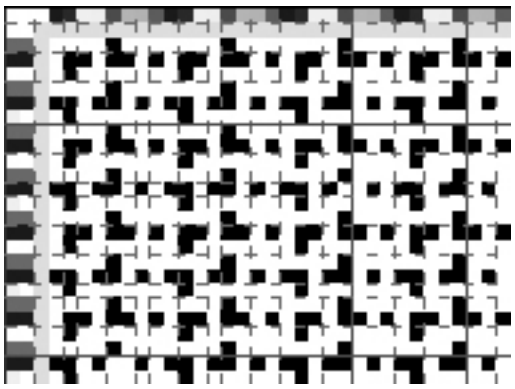
Beljen Tapestry Presets 001a through 112b		
Plain Weave Face and Back, Unstitched Double Cloth		
Preset Numbers	**Top Warp Color**	**Top Weft**
001a–007a	Black	White
008a-014a	Black	Black
015a-021a	Blue	White
022a-028a	Blue	Black
029a-035a	White	White
036a-042a	White	Black
043a-049a	Yellow	White
050a-056a	Yellow	Black
057a-063a	Brown	White
064a-070a	Brown	Black
071a-077a	Green	White
078a-084a	Green	Black
085a-091a	Pink	White
092a-098a	Pink	Black
099a-105a	Red	White
106a-112a	Red	Black
"b" Pattern Presets are the inverse of the "a" Pattern Presets		

Library 113a-224b

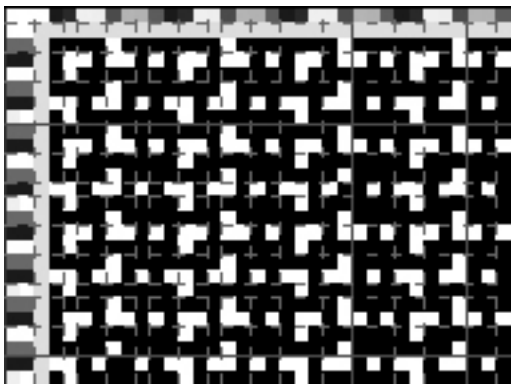
Library 113a-224b uses the same double cloth structures as the previous library except they are stitched double cloth. These are the safest Presets to use in a file. The root structures were repeated four times in the width and

height. These structures are 32 pixels wide by 24 pixels high. We only placed two stitching points in each structure, but we could have placed more. In some of the Presets, the stitching shows as visual marks. Again, the best way to see this is to have a weave blanket woven that you can work from when choosing structures for designs.

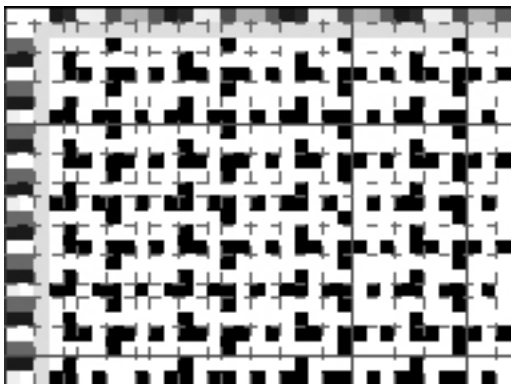
Figures D-7a-d show what the same combination of warps looks like in these Pattern Presets (blue warp weaves on top with the brown warp as binder and the white weft (weft system 1) in D-7a; D-7b is the inverse of that; D-7c has the black weft (weft system 2) weaving with the top blue and brown warps; and D-7d is the inverse of that. On the CD we have saved versions of these structures which show the stitching points in color. In ***D-7astitch.psd*** and ***D-7cstitch.psd*** the stitching points represent sinkers; in ***D-7bstitch.psd*** and ***D-7dstitch.psd*** they represent risers.



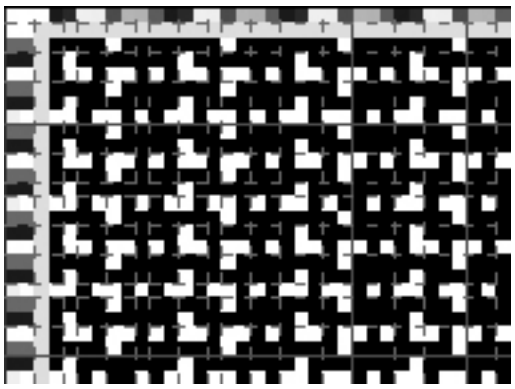
D-7a 129a



D-7b 129b



D-7c 136a



D-7d 136b

Note: Although we have run successful fabrics with these Presets 301a-458b, they can cause slack ends and make a file unweaveable at Beljen Mills.

Beljen Tapestry Presets 113a through 224b Plain Weave Face and Back, Stitched Double Cloth		
Preset Numbers	**Top Warp Color**	**Top Weft**
113a-119a	Black	White
120a-126a	Black	Black
127a-133a	Blue	White
134a-140a	Blue	Black
141a-147a	White	White
148a-154a	White	Black
155a-161a	Yellow	White
162a-168a	Yellow	Black
169a-175a	Brown	White
176a-182a	Brown	Black
183a-189a	Green	White
190a-196a	Green	Black
197a-203a	Pink	White
204a-210a	Pink	Black
211a-217a	Red	White
218a-224a	Red	Black
"b" Pattern Presets are the inverse of the "a" Pattern Presets		

Library 301a-458b

These Pattern Presets have plain weave on the face (the "a" side) and twill on the back (the "b" side). They are created by the same method discussed in Chapter 13 for Warp Tapestry. The binder warp consistently stitches the two surfaces together; two warp systems work on the face; one warp system weaves on the back; and the remaining warp systems float in the middle of the two layers. Although you will find this type of structure discussed in several published articles and on the internet, the set-up of the loom at Beljen Mills does not like this type of structure. The warps in the center can go slack causing problems for the weaver. In some cases, files cannot be woven. For this reason, we caution you to use these Pattern Presets in small areas rather than in large areas, and use them interspersed with the stitched double cloth Presets.

They are created in a different sequence than the other Beljen Presets. **All the odd numbered "a" structures show the natural white weft on top, and all the even numbered "a" weaves show the black weft on top.** The "b" versions are just the opposite, with odd numbered "b" structures showing the black on the face, and even numbered "b" structures showing the white on the face. The Presets are arranged so they take one warp system through the possibilities with other warp systems acting as binders.

For example, 301a through 314b represent the sequence using black warp as the main warp. 301a has black working with the blue warp as binder, while the green warp works on the back in a twill. Since it is an odd numbered "a" weave, the white weft shows on the front while the black weft is on the back.

301b is the inverse of 301a. 302a is the same combination of warps, with the same function as 301a, but the black weft works on the face while the natural white weft goes to the back. 302b is the inverse of 302a. In the next structure, 303a, the warps for binder and back shift over one. 303a has the black warp up, working with the white warp as binder and the pink warp works on the back in a twill. This shift continues until you have examples of black working with each of the other warp colors on the face.

Structures 413a through 468b were created using two warp colors on the face of the cloth as main warps. Figures 8a-d show the structures with blue warp working with brown warp as binder on top.

D-8a 319a

D-8b 319b

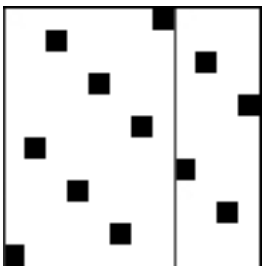
D-8c 320a

D-8d 320b

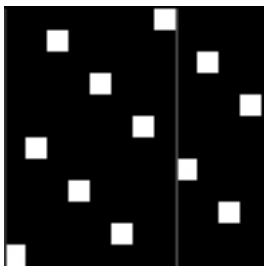
Beljen Tapestry Presets 301a through 468b	
Plain Weave Face ("a" side), Twill Back ("b" side), Stitched Double Cloth	
Odd Numbers have White Weft on Top	
Even Numbers have Black Weft on Top	
These structures have floating inner warps.	
Use sparingly since large areas create slack ends when used on Beljen Loom	
Preset Numbers	Top Warp Color(s)
301a-314a	Black
315a-328a	Blue
329a-342a	White
343a-356a	Yellow
357a-370a	Brown
371a-384a	Green
385a-398a	Pink
399a-412a	Red
413a-426a	Black plus one other
427a-438a	Navy plus one other
439a-448a	White plus one other
449a-456a	Yellow plus one other
457a-462a	Brown plus one other
463a-466a	Green plus one other
467a-468a	Pink plus Red
"b" Pattern Presets are the inverse of the "a" Pattern Presets	

Selvedge and Box Motion Presets

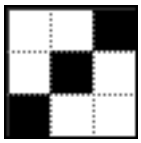
In each of the three libraries we have also saved Presets for the selvedge and the Box Motion. They are found at the bottom of the lists. Preset 225a is a weft-face satin and 225b is a warp-face satin. Use one of these for your selvedge. We tested both of them and prefer the warp-face satin but there is no reason why you must make the same choice. The Box Motion Preset looks like a 1/2 twill because it has marks for weft system 1, then weft system 2, then weft system 3. You will want to make sure that it starts at the mark for weft system 1 on the first pick of your file (at the bottom). If it starts on either weft system 2 or weft system 3, the weave structures will not line up with the correct weft system and the woven cloth will be a big surprise (perhaps pleasant, perhaps not). Figure D-9a and D-9b show the two 12-end satins, and Figure D-10 shows the Box Motion.



D-9a 225a



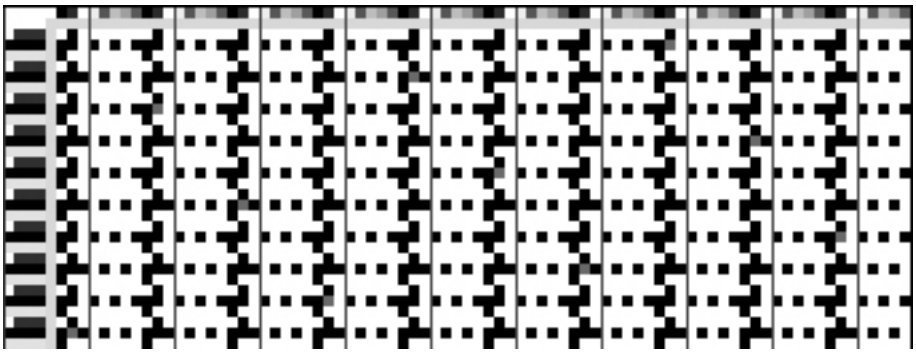
D-9b 225b



D-10 Box 1 2 3

Even Stitching

If you want to create a series of Pattern Presets for Beljen Mills that have more stitching points than in our Presets 113a-224b, we suggest you follow the example shown in Figure D-11 (***D-11a.psd*** is the structure and ***D-11.psd*** shows the stitching points in red on the CD). The root structure is the plain weave double cloth, but here the two layers are stitched together by a 10-end satin. The stitching points are gray in Figure D-11. They represent sinkers.



D-11

Make Weave Blankets

If you are interested in working with this palette of weave structures in our Beljen Pattern Presets, we urge you to create a weave blanket design with

small squares of each structures placed in it, and have it woven for you. Then you can choose color for your designs by referring to your weave blanket. If you modify these weaves or make new ones, make weave blankets for them too. Remember you can use both sides of the structure, so weave two repeats of the blanket, cut them apart, and label one side of each ("a" on one blanket and "b" on the other). Now you can place them side by side for viewing.

Expanding the Design

We suggest that you do not use white or black as colors in your design. If you have already done so, perhaps you can change them into another color that is not used elsewhere in the design. (They can still look white or black but use a hue with a different RGB value.) Be sure and save a layered version of the face design (if you have been working with layers) so you can return to it if you need to make any revisions. We use *Filenamestyled.psd* as the format for our names. Duplicate it and put away the original. Flatten the duplicate image.

Index to Check Number of Colors

It is a good idea to find out if your design really has the number of colors you think it should have. Remember, colors represent weave structures. If you are planning to use 12 structures, and you find out you have 13 colors, you either have to find the extra color and eliminate it, or decide which structure you will attribute to that color. In any case, you want to be sure of the number of colors in your design. Go to **Image>Mode>Indexed** and choose Exact, Forced: None. Hopefully you will see the number next to Exact is the number of colors you expected to see. If it is more or less, check the Color Table to see what is actually in your design and make a decision of what you want to do. Assuming everything is okay, let's continue. You should have a number that adds up to all of the structures you plan to use in the body of the design, your borders if they are different colors, and the fast selvedge. In our example (***D-5.psd***) there are seven colors.

Expand

Now that the design is complete and we are sure we have the correct number of colors, we must expand it. This is a place in the process where the road has a fork. You can choose your direction–you can add the weaves as Layer Styles now, before expanding or you can expand first. The beauty of placing your weaves as Layer Styles is that the weave structures form their own space that is like a sheet of pattern imposed on the design. When the design is in Face size, you only see a small part of each weave showing through. When the design is expanded to full width and height, the design allows for full repeats of the structure to show through. This only works if you expand using Nearest Neighbor and you have not checked Link with Layer and not clicked Snap to Origin. The Beljen files are large. Adding the weaves before expansion makes working with the file quicker, because the file is smaller. If you have put your weaves in first as Layer Styles, you should make a duplicate file and

put your original away. If you need to resize the file, you would return to the layered RGB original to resize. Flatten the duplicate, then either change the mode to Index or leave as RGB, and proceed.

That said, the end result of expanding before or after weaves are inserted is the same. We will proceed with these instructions expanding first, but you should definitely try both methods.

We have to multiply the width by 8 (to account for all the warp systems) and the height by 3 (to represent the three weft systems). You can expand in either Indexed or RGB modes. Since ***D-5.psd*** is in Indexed Mode, we will continue in that mode.

Go to **Image>Image Size**. Uncheck the box next to Constrain Proportions. The link between the width and the height is now removed. Next to width, change pixels to percent, and make it 800 percent. Height will change to percent when you change width, but, since you unchecked Constrain Proportions, the number will not change. Type in 300 percent for the height. Next to Resample Image, change Bicubic to Nearest Neighbor. (If you don't do this, you will suddenly have thousands of colors in your design, added at the edges of each color change by Bicubic. If you see this, choose undo and redo the Image Size, being sure to choose Nearest Neighbor.) Click OK. You will see your file is now significantly larger. If you go to Image Size under the Image Menu you will find your width is now 12,288 and the height is the number of your face picks multiplied by 3. If these numbers are anything else, you have done something wrong and should undo and try again. Our expanded file is saved as ***D-12a.psd*** on the CD.

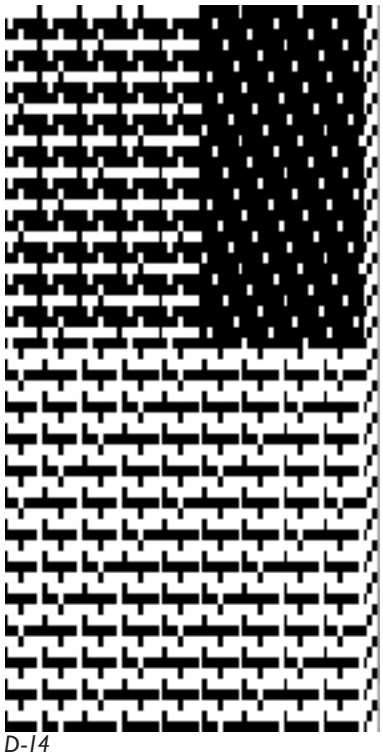
D-12

Your image is going to look squashed like Figure D-12 because it is being displayed with the Pixel Aspect Ratio for the FACE of the design. You need to go under **Image>Pixel Aspect Ratio** and choose Custom. A window opens that lets you name the new ratio and type in a number as the Factor. Name it Final Beljen, or something you will remember, and type in .47. Click OK and you will see your image return to the proportions you intended. The Pixel Aspect Ratio is a visual component and should not interfere with other aspects of the work. You might want to save your design as *FilenameExpanded.psd*. Our expanded file is saved on the CD as ***D-12b.psd*** with the True (expanded) Pixel Aspect Ratio.

Inserting Weaves into Design

We use a 12-end satin for the selvedge, and have one saved with the Beljen Presets as 255b. You are going to need to have Presets loaded, one for each color in your design. You can work from the full set, or delete the ones you won't use, and then save the group for your design with a new name. This is helpful if you find a mistake in the actual cloth. Then you have the group of

D-13



D-14

weaves you used collected in one space, and can check to see if the problem is found there.

Follow the directions in Chapter 4 for replacing color with Pattern Overlays. That is, convert the image to RGB mode and make separate layers for each color. Then make a Layer Style for each layer and fill it with your designated structure. As you proceed, you will see your design turn into a black and white image. These files are really big, and you will need to be patient while the computer completes the actions.

File ***D-13.psd*** in the Appendix D folder on the CD shows our file with Presets added as Pattern Overlays. We named each file to show you the color in the image as well as the Preset imposed on the layer. Figure D-13 shows the Layers Palette for this file.

We need to add the technical ends to this file, but first save it (we title this version ***Filenameweaves.psd***), duplicate it, and put the original away. If you need to change any of the weave structures, you can go back to the original file, click on the Pattern Overlay layer, and modify the structure. Flatten the duplicate file.

Adding the Technical Ends

We are going to add the technical ends in two steps. First we will add the three ends that control the box motion. Go to **Image>Canvas Size** and change the width to 12,291. Be sure to anchor the image to the left square so the three new ends will be attached to the right of the image, and have the Canvas Extension Color read White. Graphically, a box sequence of box 1, box 2, and box 3 in repeat will look like a 1/2 right hand twill. We have one saved as ***Box 1 2 3*** in the Beljen Presets.

Make a fixed rectangular marquee, 3 pixels wide by the height of the design, place it over ends 12,289–12,291, and fill it with Preset ***Box 1 2 3***. Since we try to keep our face design to a number divisible by structure heights, and we expanded the height by multiplying by 3, this "twill" should flood into the marquee and end up having the bottom square land on end 12,289. If something is wrong, adjust it. File ***D-14.psd*** on the CD shows the file with the box motion added. Figure D-14 shows what the bottom righthand corner of the file looks like. You can see the hem at the bottom, the body of the design in the top left corner, and the selvedge in the top right. In our file the selvedge does not extend into the hems. You might want to extend your selvedge into the hems. It will weave without problems either way. The box motion is all the way to the right in the illustration.

Now we need to add 29 ends that are cast out. Go to **Image>Canvas Size** and change the width to 12,320. Be sure the image is anchored to the left, so the extra ends will be added to the right, and have the Extension Color read White. Click OK. **ALL final Beljen Mills files must be 12,320 pixels wide.** Save this file.

The final layout for all loom-ready files for Beljen Mills is going to look like this (if you have chosen to create your fast selvedges as the same width we use):

Layout for the FINAL Beljen Loom-Ready File	
Hook Numbers:	**Hooks Represent:**
1 - 32	Left Selvedge
33 – 12,256	Body of the design
12,257 – 12,288	Right selvedge
12,289-12,291	Box Motion
12,292-12,320	Cast Out

We should mention that hook number 12,305 is not really cast out. It controls the regulator for the stop-motion. We have never used it, so we always leave it blank (white), but if you decide to design with extra patterning wefts you might need to use it. In that case, you would fill the space where column 12,305 intersects with a pick of supplementary weft with a black mark (it looks like a riser). The loom controller will read this mark and know to stop the advance take-up of the warp.

You want to be sure this file has only two colors, black and white, so go to **Image>Mode>Indexed**. You should see Exact and 2 as the number of colors. If it is different, then you have some extra colors in your design. If you have an extra color or two, and don't care whether it is turned into a riser or a sinker, you can choose Local Adaptive: 2 colors, and Force: Black and white, and your image will become two colors, black and white. Otherwise, you should look at the Color Table and see what is extra, return to your image, find the color(s) and make adjustments. We will assume that you see the number 2 in the first place. Click OK and save this image as a .bmp file. (You can save it as either 4 or 8 bits.) We call our file *Filename.bmp* (it is on the CD as ***D-15.bmp***).

Creating a BMP File for a JC5

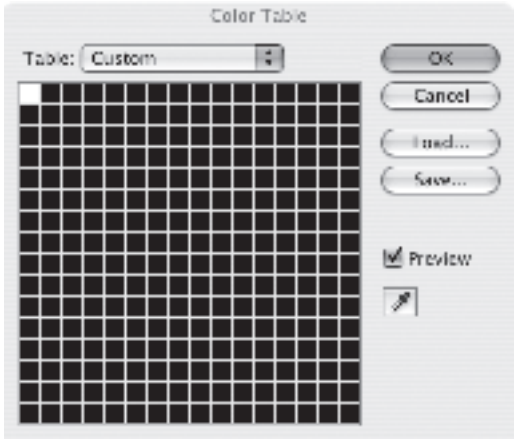
We are going to explain several ways to make a file for a JC5. Making a .bmp file was the first way we worked with Beljen. It worked okay with small test files but large files took too long to download. Beljen Mills prefers that you did not use this method but use the ***Gif2BeljenJC5*** conversion explained later in this Appendix. Therefore you can skip this section, or read on if you are curious about our explorations. If you are working with a different mill, this information might help you.

Stäubli JC5 controllers will read .bmp files, reverse .bmp files, and files made for jacquard heads of other manufacturers. It is the .bmp or reverse .bmp files that we are interested in making. You need to have a full Grayscale Color Table available with your .bmp file or the JC5 will reject your file. The location of the white and black in that Color Table will determine whether you want the image read into the JC5 as a .bmp file or a reverse .bmp file.

We have had endless hours of mind-stumbling confusion over the issue of what colors represent risers and sinkers. In Photoshop, we use the convention that black represents risers (warp up) and white represents sinkers (warp down, weft up). The traditional textile industry almost universally, except in Scandinavia, uses red to represent risers and white to represent sinkers. Stäubli JC5 "thinks" in terms of red and white, but it displays the data on their controller as black and white. However, it takes the white data from our Photoshop files (regardless of whether it is in position 0 or 255) and reads it as red (riser); and it takes the black from our files (regardless of whether it is in position 0 or 255) and reads it as white (sinkers). In order to get the file to read the way we intend, we either have to invert it in Photoshop, or invert it at the JC5. Perhaps we have already thoroughly confused you, so just follow the instructions below and you will get a good final file.

File to be Read as Reverse BMP

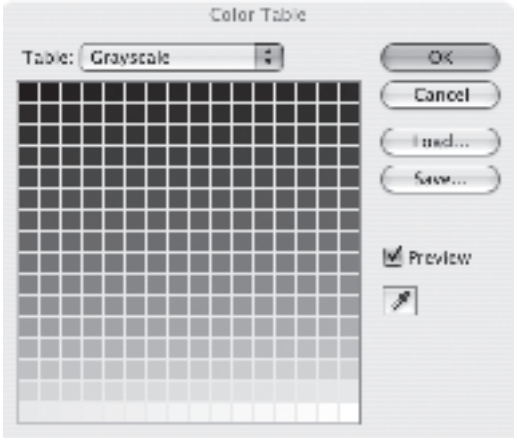
If you look at the Color Table of the ***D-15.bmp*** file (**Image>Mode>Color Table**), you will see it has only two colors–black and white (Figure D-15). If you created your file by saying Forced: none, you will see white in position 0 and black in position 1. If you created your file by saying Forced: Black and White, you will see black in position 0 and white in position 1. Your design looks the same in both cases, but the Color Table positions are reversed. Either way, if you try to bring this file into a JC5, you will get an error message because the Color Table is incomplete.



D-15

Go back to **Image>Mode** and choose Grayscale. If you try to look at the Color Table now, it is unavailable to you. You must go back to **Image>Mode>Indexed** and then look at your Color Table. Now you have a full table shading from black in position 0 to white in position 255 (Figure D-16). This is the same whether you started with white as 0 or black as 0. The Grayscale Color Table in Photoshop will read from black to white.

You can save this file now. Save it as a .bmp file and send it to a JC5. (Our final file is found on the CD as ***D-16.bmp***.) However, be sure to instruct the weaver to **import** it into the JC5 as a **Reverse BMP**.

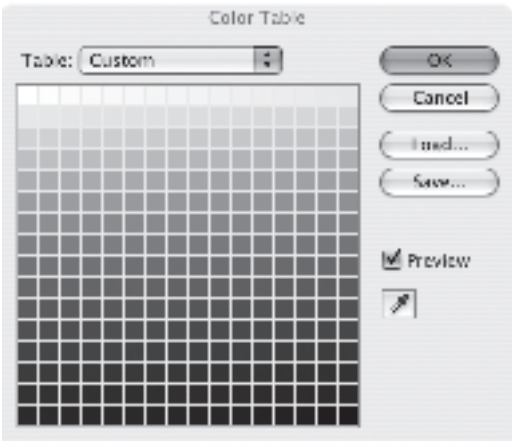


D-16

File to Be Read as BMP

If you want to have the weaver read your file as a BMP, you need to do another adjustment. Go to **Image>Adjustments>Invert**. The black and white portions of your design have just changed places. Look at the Color Table (**Image>Mode>Color Table)** shown in Figure D-17. The white is now in position 0 and the black is in position 255, and the table shades from white to black.

You can save this file now as a .bmp and send it to a JC5. You should instruct the weaver to **import** this file as a **BMP**. We saved our file in this format as ***D-17.bmp***.



D-17

Filenames of 17 Characters or Less

Whichever way you choose to do the file, as a .bmp or a reverse .bmp, save files with names less than 17 characters. You also must save your files as Windows versions (even if you use a Macintosh) for them to be read at Beljen Mills. (In general, it is safer to save files as Windows versions because Macintosh can read them, but Windows will not read Macintosh files.)

Send as Zip File

Beljen Mills can accept .bmp files via e-mail. These files are very large though and need to be compressed before sending them. Make a zipped compression file for them to read. We have also found that large files take a long time to download at the mill. For this reason, Beljen Mills prefers that we use Jane Eisenstein's conversion program and send JC5 files to the mill.

Softweave's Conversion Program (Gif2BeljenJC5)

Jane Eisenstein has created a stand-alone program to convert .gif files to JC5 files. You can get it directly from her web site. She is making it available as donationware for a very reasonable amount. Here is her information:

Web site: **www.softweave.com**
Jane Eisenstein e-mail: **janee@softweave.com**

Currently, there is a specific version of her program, ***Gif2BeljenJC5***, that you should use to make the conversion when designing for Beljen Mills. The program is fast and extremely easy to use.

This program, as its name says, makes .gif files into JC5 files. Go back to the place where you saved your flattened file, with all the information in it, as *Filename.bmp* (our file ***D-15.bmp***). Open it and resave it as a CompuServe GIF file using Save As *(Filename.gif)*. The CD has our sample file saved as a .gif as ***D-18.gif***.

You can also go from the original flattened file with weaves in it directly to a .gif file. That image is in RGB mode and .gif files are Indexed Mode. When you try to save the RGB file, you will get the Indexed Mode window saying Palette: Exact, Colors: 2 and Forced: None. Click OK. Then you get another window asking you about Row Order (normal or interlaced). By default it will have normal checked. Leave it alone, click OK, and your image will be saved as a .gif file.

Note: Using the Gif2BeljenJC5 conversion is the best method for sending files to Beljen Mills.

D-18

Now open the program ***Gif2BeljenJC5***. It will open to a window that says "select design image file" at the top (Figure D-18). Click here and work through the lists, double clicking on folders until you get to the .gif file that you want to convert. Highlight that file and click *Open*. If your image is smaller than the correct size for the Beljen Mills loom, you will get a message telling you "The design is too narrow for the Beljen Mills loom." (However, if your design is wider than the loom, it will go ahead and create a JC5 file, which will not work on the loom. Remember, ALL final Beljen Mills files must be 12,320 pixels wide.) Hopefully your image is the correct width for the loom, and it will create an appropriate JC5 file.

Although the program is very quick, the files for Beljen Mills are large and it may take a few minutes to write the file. At first there is no indication that anything is happening. Then you get a message that starts with "Translating/Users…" When the program is finished, you will get a final message: "Done." The new JC5 file will be saved in the same location as the .gif file. You can make a zipped file of your JC5 file and send it as an attachment via e-mail to Beljen Mills. This is the best format for them and we encourage you to obtain the conversion program and use it.

Jane has another program Gif2JC5 that will make JC5 files of any size for any loom. If you have contacts with other mills and want this conversion program, e-mail Jane directly.

JC4 Files

We do not have a program that specifically writes JC4 files. Stäubli JC4 controllers will not read .bmp files or reverse .bmp files. However a Stäubli JC5 controller can convert a JC5 into a JC4. If you are working with a company that has both types of looms, then you can send them a JC5 and ask them to convert it to a JC4. Just be sure that you make your file to the specifics of the loom where the cloth will be woven.

Working with a Company Using A Dedicated Jacquard Program

Carla Tilghman of Lapin Textiles

We worked with Carla Tilghman of Lapin Textiles to test some other ways of getting our Photoshop files woven at Beljen Mills. Carla owns a dedicated software program for jacquard design and often weaves fabric through Beljen Mills. She understands how a file must be formatted for their loom, and has worked with our Presets as well as her own structures.

Here is the contact information for Lapin Textiles:

Carla Tilghman
Lapin Textiles
2414 Louisiana Street
Lawrence, KS 66046
e-mail: **lapin@windstream.net**

We tried three different possibilities with her, and they all work. Maybe one will interest you more than the others.

Sending Image Without Weave Structures

First we created a file in Photoshop, working for the Face of the cloth, and saved it as a .psd file. It could also be saved as a .tif or .pct file. We made sure to attach an area at the bottom of the file that had squares filled with each color that was used in the design, so she could see them clearly. This file was e-mailed to her (compressed with Stuffit-Deluxe®). Carla then chose weaves from her collection, made a loom-ready file, and sent it to Beljen Mills. It was returned to her (so she could see the results) and then she sent it to us. One of the issues here is that everyone has their monitor calibrated differently. What looks red brown on your screen might look red violet on someone else's screen. The interpretation of color to weave is problematic in any case since computers allow access to millions of colors and the weave blankets yield a limited palette of color. Having someone else make the sensitive decision of which red structure to use could make some people unhappy with the results. This was not the case in our study, but we can foresee it as a possibility.

Sending Image With Weave Structures

The next study we did resolved that problem. In this example, we took the same file and continued working on it–expanding it to the full Beljen size and putting in our weaves. We flattened the file and sent it as a .bmp to Carla. It would have been possible to send it as a .tif or .psd file. Again, we compressed the file before sending it as an attachment. Carla converted this file into a loom-ready file, sent it to Beljen Mills and had it woven. This method ensured that the structures (colors) of the design were the ones we had chosen.

Sending Image File and Structures Separately

A third way was to send Carla the file (either as the face version or expanded, but still as image, not with weaves) and also send her a copy of the weaves we wanted placed in the design. Then she would insert the weaves, make the loom-ready JC5 file, and have it woven. Again, this would assure that the weave structures we wanted to use were in fact used.

A Fourth Possibility

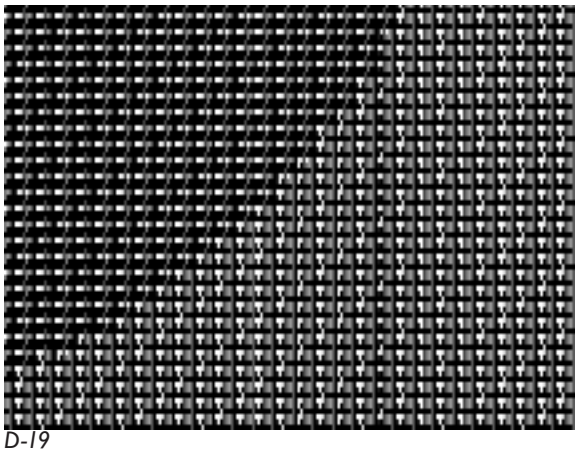
Another possibility (one that we haven't tested yet) that Carla is planning on trying, is for her to send the customer a labelled weave blanket of her structures. When someone sends her their file, they return her sample blanket and give her a list indicating which weaves should be used in the design. This

is an excellent option since it leaves the designer in control of the interpretation of color into weave, and assures Carla that the structures will work right at the mill.

Color Simulation

If you want to see a color simulation of your file, you can make a Pattern file 8 pixels wide by 1 pixel high, and pencil in the sequence of warp colors for the Beljen Mill tapestry loom (black, navy, white, yellow, brown, green, pink, and red, from left to right). Save this file as a Pattern (**Edit>Pattern**). Open another new file, this time 1 pixel wide by 3 pixels high. Pencil in the weft color sequence (white, black, black, working from bottom to the top). Save this as a Pattern. (We have saved these Presets on the CD as a library called ***warp & weft colors.pat***. The simulation is not going to be exactly right, because the third weft is much finer than the other two, but you will have a good sense of the colors in your image.

Open up your flattened final file (***D-15.bmp*** on the CD). If it is in Indexed Mode, as is our image, convert it to RGB Mode. With your Magic Wand select black, and make a new layer by using the keyboard shortcut **Command(Control)-J**, and name the layer *Warp*. Click on the Background Layer and select your white pixels with the Magic Wand. Make this into its own Layer and name it *Weft*. Now using Layer Styles (the small f icon on the bottom of the Layers Palette), add the warp colors as a Pattern Overlay on the *Warp* layer, and the weft colors as a Pattern Overlay on the *Weft* layer. You should now see your image in color. (You can also select just the black pixels and Fill with the Warp Color Pattern, then select just the white pixels and Fill with the Weft Color Pattern.) Our simulation is saved as ***D-19.psd*** on the CD. One thing you might note is that the background color, which was blue in the image file, was filled with the reverse side of a blue Preset. It weaves as a twill, where the other structures show as plain weave on the face.



D-19

Conclusion

You might ask why we bothered to tell you about so many ways to work between Photoshop files and an industrial mill. We have asked ourselves the same question. We decided that it is always handy to know more than one way to do anything, so we have included all these methods. From our experiences working with Beljen Mills, they definitely prefer if you send them JC5 files. Therefore we encourage you to go to **www.softweave.com** and obtain a copy of the software GIF2BELJENJC5.

One last comment: we have had no problem having designs woven at Beljen Mills with our Pattern Presets, but we do know of a few instances where student files would not weave properly due to long floats. We are not sure why this happened. Perhaps there were large areas of only one weave? Perhaps something was done wrong that affected the file? In any case, we certainly hope you have no problems, but cannot guarantee anything.