

# WeavePoint

# Complex Drafting

# Manual

Version 7

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# Preface

The book "1700-tals textil. Anders Berchs samling i Nordiska museet" ("18th century textiles. The Anders Berch Collection in the Nordic Museum"), edited by Elisabet Stavenow-Hidemark, was released in 1990. This book made it possible for me to become more familiar with these textiles. I drew weaves to familiarize myself with their structure and found that drawing them by hand was too unmanageable. I needed a computer program that could draw with more than one shaft group. I discovered that no such program existed.

I had bought an early version of WeavePoint and contacted the author, Bjørn Myhre. In collaboration between us, a new program was created: WeavePoint Complex Drafting, which works with multiple shaft groups. The first version came in 1996 and when the program in November 2005 came in a Windows version, I could draw patterns in the way I always dreamed of! In 2020, Complex Drafting has been released in version 7.

*Åsa Martinsson*

## About Complex Drafting

The Complex Drafting program is made for constructing drafts for fabrics with multiple shaft groups, such as damask with pattern and ground shafts, lampas with pattern, ground and binding shafts and fabrics with two warps. The program can combine different shaft groups and works in the same way as a drawloom with pattern/figure shafts and ground weave shafts.

There are two groups of ground shafts, which allow you to combine weaves of different size. An inspiration for this comes from the Chinese silk looms, where in addition to threading the warp for the pattern shafts, it is threaded through two groups of shafts, one for raising and one for sinking shafts.

In the program, you draw the pattern, expand it to the unit size (découpure) that you have decided and then add the ground weave. A pattern drawn in WeavePoint standard version can be opened in Complex Drafting for further work.

What you can do with Complex Drafting is not easy to describe in words only. Therefore, Examples is an important chapter in this manual. By studying the workflow, you will become more familiar with the possibilities the program offers.

When I worked out the examples, I have used "Pattern and Loom" (1987) by John Becker, "Siden, Indo-Chinese profsamling" (1995) by Ulla Cyrus-Zetterström and "Textil terminologi" (1995) by Ulla Cyrus-Zetterström.

I refer to the WeavePoint standard version manual on how to draw, cut and paste, etc. The basic rules therefore do not need to be repeated here.

## Literature

To get full benefit from Complex Drafting, you should have more than basic knowledge of weaving theory. Suitable literature can be Ulla Cyrus-Zetterström "Handbok i vävning" (out of print); Mariana Eriksson, Gunnel Gustavsson, Kerstin Lovallius, "Varp och inslag. Bindningslära. 2008".

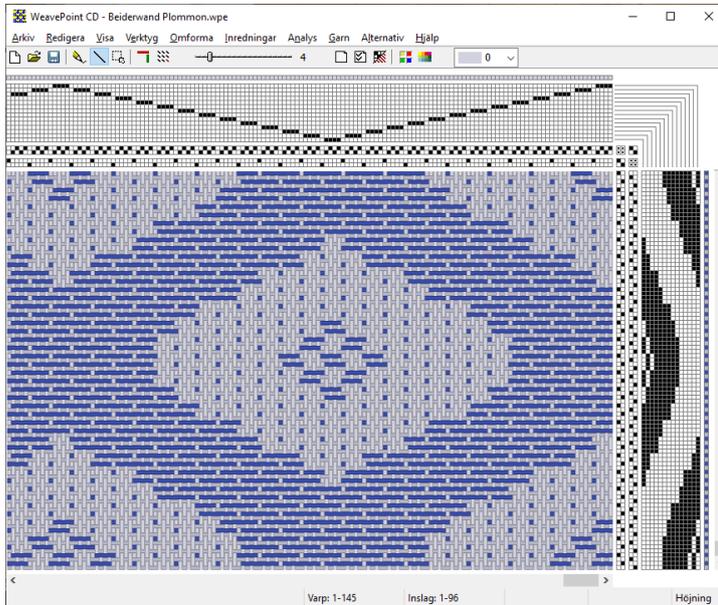
Besides general literature on the drafting of weaving patterns, I can highly recommend the book "Pattern and Loom" by John Becker. This has long been out of print, but is available in a second edition as a downloadable file - free of charge. It has also been reprinted. The link to the file and details of the reprint: [www.donwagner.dk/Pattern-and-Loom.html](http://www.donwagner.dk/Pattern-and-Loom.html)

# Workspace and tools

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There are two basic ways to work – in Draft mode and in Design mode.

## Draft mode



*Visa|Inredning*

In Complex Drafting, the threading is always positioned above the drawdown. The top threading is the pattern threading. The pattern is shown as the pattern threading and the corresponding liftplan.

In addition to the pattern shafts and the liftplan, there are two groups of ground shafts and treadles (A and B). This is where the ground weave is inserted. One group of shafts and treadles (B) can be hidden. See Options|Options.

Because the program works with double shaft and treadle groups, you cannot draw directly in the drawdown in Draft mode.

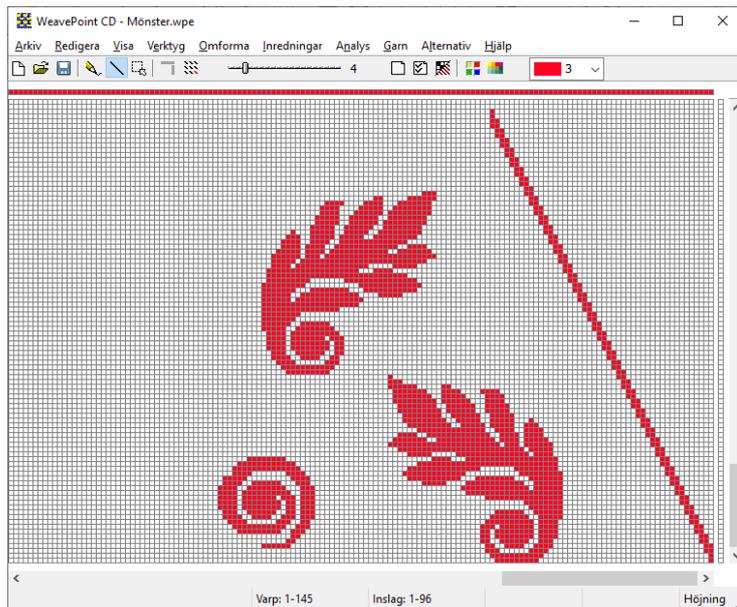
You can open a pattern made in WeavePoint standard version, if it was saved with a liftplan. The threading is put in the pattern threading and the liftplan becomes the pattern liftplan. The colors are also included. If there is already a color order, you can use File|Open Components instead and select the threading and liftplan.

Max number of pattern shafts: 128

Max number of shafts and treadles in Shafts/Treadles A and B: 32

Max number of warp threads/picks: 4800 x 4800

# Design mode



*Visa|Mönster*

Only one grid is shown here, besides warp and weft colors. You can draw freely over the entire surface.

When you then change to Draft mode, the pattern threading and liftplan are constructed.

Typically a square in the pattern means a unit of more than one warp end and weft pick in the finished fabric. Transform|Expand Pattern determines how many warp threads and weft picks each square in the pattern will consist of. If the pattern is large, it is better to go to Draft mode first, as the Design mode is limited to 2400 x 2400 squares.

Note that if the pattern is saved before determining the unit size, it can be used as a basis for other fabrics with different unit sizes.

## Switching between Draft and Design mode

### From Draft to Design mode

In Design mode, only the pattern is shown = what is drawn by the pattern threading and the liftplan. The ground weaves added with shaft groups A and B are not shown.

If the pattern consists of more than 2400 x 2400 threads, it is cropped.

### From Design to Draft mode

The pattern will be cropped if it consists of more than 128 different vertical columns = 128 pattern shafts. The pattern is analyzed to use the minimum number of shafts and treadles.

# The Toolbar



The toolbar contains shortcut buttons for frequently used commands. Place the cursor on a button and an explanation will appear.

From left to right in the toolbar:

- New - start a new pattern (*File|New*)
- Open - open a file from disk (*File|Open*)
- Save - save present pattern (*File|Save*)
- Pen - free drawing (*or press the P key*)
- Line - draw lines (*or press the L key*)
- Selection - (*or press the L key*)
- Toggle threadings - display threadings or not (*View|Show Threading*).
- Repeat - repeat pattern (*Edit|Repeat*).
- Zoom – (*Options|Zoom or press left/right arrow keys*)
- Notes- open the Notes window (*Options|Notes*)
- Options - (*Options|Options*).
- Draft/Fabric - switch between workspace and fabric view (*View|Fabric*).
- Color Palette - opens the color palette (*Yarn|Color Palette*).
- Edit Colors – open the Edit Colors dialog (*Yarn|Edit Colors*)

# Keys and keyboard shortcuts

In many cases, using the keyboard instead of the mouse can be quicker and easier on the body.

## Drawing with keys

Keyboard Input mode can be accessed from the Edit menu or with function keys:

Pattern threading	F2
Liftplan	F3
Tie-up AA	F4
Shaft group A	F5
Treadling A	F6
Undo	Esc

Use the arrow keys to move the cursor, the space bar to fill a square or erase a filled square. When a square is filled in threading or treadling, the cursor automatically moves to the next square. This is useful when working with a small zoom.

## Keyboard shortcuts

P for Pen

L for Line

M for Mark/Select

S to alternate between Pen, Line and Mark/Select

D to switch between Draft and Design mode.

Right and left arrow keys to increase and decrease zoom.

Home and End to switch between minimum and maximum zoom.

PgUp and PgDn to zoom in three steps.

Insert and Delete to add and remove respectively.

Open	Ctrl+O
Save	Ctrl+S
New	Ctrl+N
Undo	Ctrl+Z
Repeat	Ctrl+R
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Paste special	Ctrl+W
Crop	Ctrl+K
Select and Copy	Ctrl+E
Options	Ctrl+I

To select a color in warp and weft color grids, right-click on the color. Right-click to return from Select to Line/Pen.

# Options

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In the dialog under Options|Options, there are various options for how the pattern draft will look on the screen and in print. Here you determine the settings for the current work, but also the settings that will apply when the program starts.

Settings are most easily accessed with the shortcut button on the right side of the toolbar or with Ctrl+I.

## Pattern

2400 warp ends and weft picks is the maximum number in Design mode. In Draft mode you can use 4800 ends and picks.

In Complex Drafting it is preferable to work with a rising shed. A filled square means that the warp thread goes over the weft.

Fabric Density and Compression affect how the pattern appears in fabric view.

Shafts/Treadles A is always shown. The pattern threading and Shafts/Treadles B can be hidden.

## Layout & Style

Here you decide where the threading and weft order starts and which is the shaft and treadle 1.

The pattern can be displayed in different ways - with and without grid or as threads. Showing the pattern as threads can in many cases help to understand how the threads bind in the fabric.

If Use Grid Style in Design Mode is checked, the pattern is always displayed with a grid in Design mode. If it is not checked, the same choice applies as for the drawdown.

## Preferences

Save Layout Options in Wpe Files: If you send files to other weavers and want the pattern to open with the settings you used, regardless of the settings the recipient has in the program, check this box.

Save Settings Automatically: If this is checked, the current settings will apply the next time the program is opened.

You can make the choices in Options that you want the program to always open with. Then uncheck Save Settings Automatically and click Save Settings.

# Workflow

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You can fill in the threading and treadling in any order. However, to see clearly how the pattern and the weaves are joined together, it is advisable to fill in the pattern/figure threading and the liftplan first.

If you then fill in both a threading and a treadling for ground weave, the drawdown disappears. This also happens if you fill in a tie-up consisting only of filled and unfilled squares. In this case, only the ground weave is shown. The pattern is only shown together with the ground weave if the dot/point notation is used.

To see how the ground weaves are inserted into the pattern, first fill the tie-up with dot/point marks. The quickest way to do this is to use Fill|Tie-up and select Point marks in the submenu, or you can use ctrl-click in the tie-up. When you then fill/unfill (click/left-click) in the tie-up, you can see how the structure emerges.

## Dot notation

For dot/point notation, hold down the Ctrl key while drawing.

In a countermarch loom, both rising and sinking shafts are used, but some shafts should be left untied. A dot in a square indicates that the shaft is not tied.

In patterns where the ends are threaded on both pattern shafts and ground shafts, the dot notation must be used for the pattern to appear. Note that if several shaft and treadle groups are used, the effect of the dot marks may be ambiguous, and you will need to try it out to obtain the desired effect.

## Unit size

In a pattern, one square (=one unit) usually denotes a number of warp ends and weft picks, varying for different techniques. Use Transform|Expand Pattern to enlarge the unit.

If the pattern is large, it is better to be in Draft mode, as Design mode only covers 2400 x 2400 squares. Draft mode covers 4800 x 4800 squares.

The warp and weft color order is not affected when the unit is enlarged in Draft mode.

In Design mode, the warp and weft colors follow the unit.

## Several ways to work

There are several ways to go about constructing patterns and weave structure with Complex Drafting:

- ◆ Draw a pattern in Draft mode or Design mode and determine the unit size with Transform|Expand Pattern. In Options, you specify how many shafts and treadles the ground weave will consist of. Fill in the threading, treadling and tie-up for the ground weave.
- ◆ Retrieve from previously saved files instead of drawing in the ground weave. You can retrieve parts from different files with File|Open Components. In order to retrieve a part, the threading/treadling grid must be shown on the

screen, but the number of shafts/treadles does not need to match what is retrieved.

- ◆ Starting from the basic weaves, draw or download a pattern and determine the unit size.

## Sample patterns

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### Introduction

To show the possibilities with Complex Drafting, various sample patterns are included. These sample patterns are installed in the subfolder "Exempel Complex Drafting 7" under My Documents/WeavePoint.

The samples also illustrate different ways to make patterns. These are the ways I have developed while working with the software.

With the samples where I describe the procedure for making the pattern, the final result is also included among the samples, including all threadings, treadlings and tie-ups.

To compare, you can open two program windows next to each other, one with the pattern you work on, the other with the final result.

1. Note: In all sample patterns, a filled square in tie-up and liftplan = rising warp end.
2. You can use sinking shed, but then, in certain cases, you'll need to change point marks to sinking ends.
3. The sample patterns are not write protected. It is a good idea to make a copy of the samples folder before you start working with it.

In the samples collection, there are a number of patterns from Sweden that can be developed with different weaves: Galler 1 (Lattice 1), Galler 2, Plommon (Plums), Blad (Leaf), Ekenmark and Randmönster (Striped pattern). All are made so that one square equals one unit (découpure). With Transform|Expand Pattern, you decide how many ends and picks each unit will have. Pattern and weaves can be combined in different ways with File|Open Components.

To better see the interlacement of the threads, you can select Threads as Drawdown Style in Options.

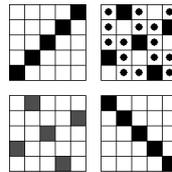
Each pattern has more than one colorway. You can switch colorways in Yarn|Edit Colors.

# Damast



Do the following to construct the weave:

1. Open the file Galler2.
2. Select View|Draft before you expand the pattern, as you will then have more ends and picks available than in Design mode.
3. With File|Save As, save the pattern with a new name.
4. Transform|Expand Pattern. Select 5 ends and 5 picks.
5. Options. Select Shafts A: 5 and Treadles A: 5
6. Draw the draft for 5-shaft satin.



Use:

Fill|Threading A|Straight

Fill|Treadling A|Straight

To draw the dots, use Ctrl-click (press Ctrl-key, click with mouse).

7. The file Damast 5 Galler 2 contains the final result.
8. Use Yarn|Edit Colors to see other colorways.

In Damast 8 Galler2, the same pattern uses 8-shaft satin as ground weave.

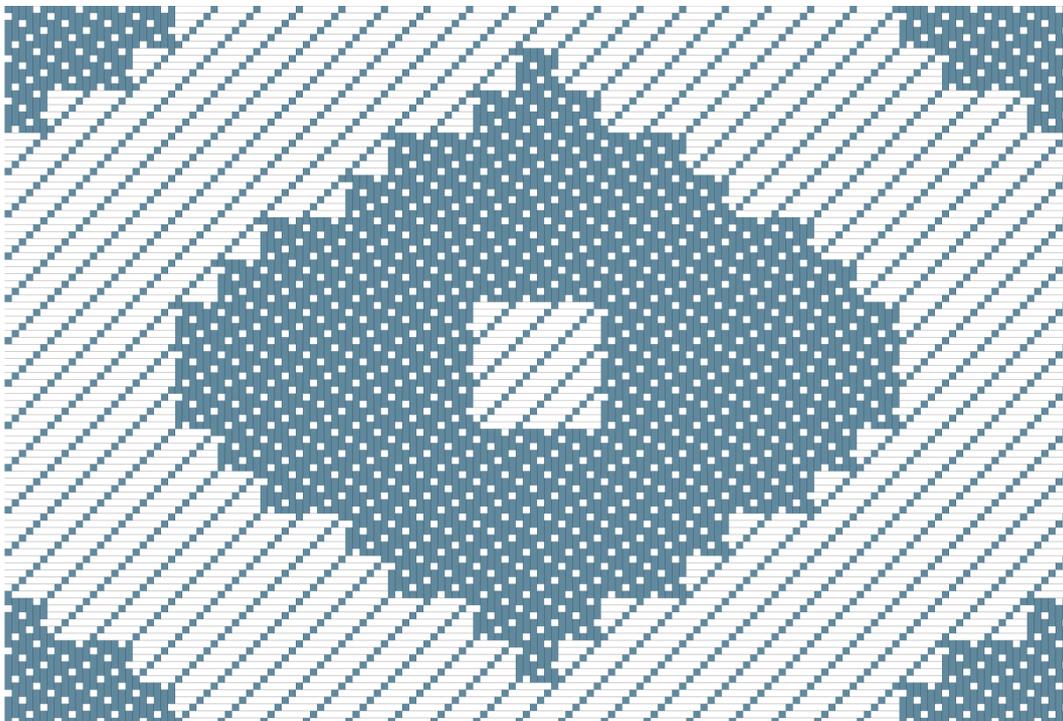
There are two different ways to display another pattern as damask with 5-shaft satin ground weave.

1. Open *Damast 5 Galler 2*.
  2. File|Open Components.  
Doubleclick on *Plommon*.  
Check Pattern Threading and Liftplan. Leave all other options unchecked. OK.
  3. Transform|Expand Pattern.  
5 ends x 5 picks.
  4. Remember to save with a new name (Save As..).
1. Open *Plommon*.
  2. Transform|Expand Pattern.  
5 ends x 5 picks.
  3. File|Open Components.  
Doubleclick on *Damast 5 Galler 2*. Check Threading A, Treadling A and Tie-up AA. Leave all other options unchecked. OK.
  4. Remember to save with a new name (Save As..).

### Combining satin and twill

In traditional damask, warp satin is always combined with weft satin. However, you can also combine other weaves, like warp satin and weft-faced twill. The only limitation is that one end cannot both rise and sink in the same shed. This means you cannot combine any weaves. If you take a 5-shaft satin, you'll note that it cannot be combined with a twill diagonal.

In the sample file *Satin-Kypert Plommon (Satin-Twill Plums)*, I have combined a 6-shaft warp satin with a 6-shaft weft-faced twill.

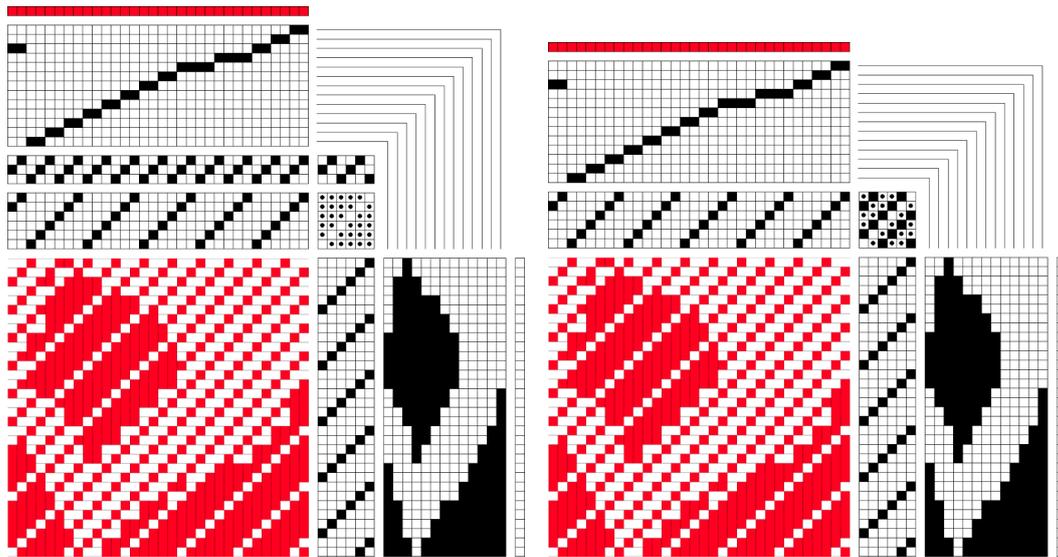


# Ling

- Twill damask.

John Becker describes a damask which has a combination of 1/2 twill and 5/1 twill. According to Ulla Cyrus-Zetterström, this combination, with the diagonals in the same direction, was popular under the Tang dynasty in China. This traditional monochrome patterned silk is called Ling.

Becker explains how one can weave this, either with two groups of ground shafts, or only with one ground shaft group:



In the Complex Drafting samples folder, you can find *Ling Plommon*.

# Florett

The sample patterns discussed so far, show how weaves with the same number of shafts can be combined. If the weaves have a different number of shafts, you can do like the ancient Chinese – use two ground shaft groups: One group for sinking ends and one for rising ends. Also here you must observe the rule that one end cannot rise and sink at the same time. If not, you will see that the structure comes out wrong – the program chooses one alternative and neglects the other. By shifting the threadings relatively (by removing ends in one of the ground threadings), you can see how the weaves must be placed to overlay correctly.

In the Berch collection in Nordiska Muséet in Sweden, there are samples of a fabric called 'florett'. Here a pattern in warp satin shows on a ground in a twill composition. These fabrics are not woven with main and ground shafts – the warp ends bind individually. They are probably woven on a drawloom containing about a little more than a hundred cords (fr. *métier à la petit tire*).

I used the 'florett' fabrics as a starting point for the sample pattern *Florett Blad*. In the Berch collection, the fabrics are woven in 5-shaft satin, but as this cannot be combined with a twill, I chose an 8-shaft satin and used a twill variation for the background.

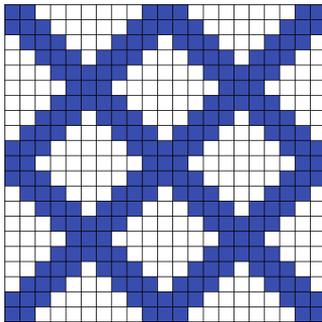


# Lampas

## Galler 1

In this sample, the main warp and binding warp are in the proportion of 3 to 1, which means three main warp ends and one binding end. One unit (découpure) has three main warp ends. Ground weft and pattern weft are in the proportion of 1 to 1. The main warp is bound in 3-shaft warp-faced twill and the binding warp in tabby.

### Pattern



### Weaves

Ground:

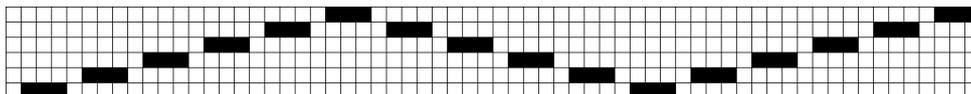


Pattern:



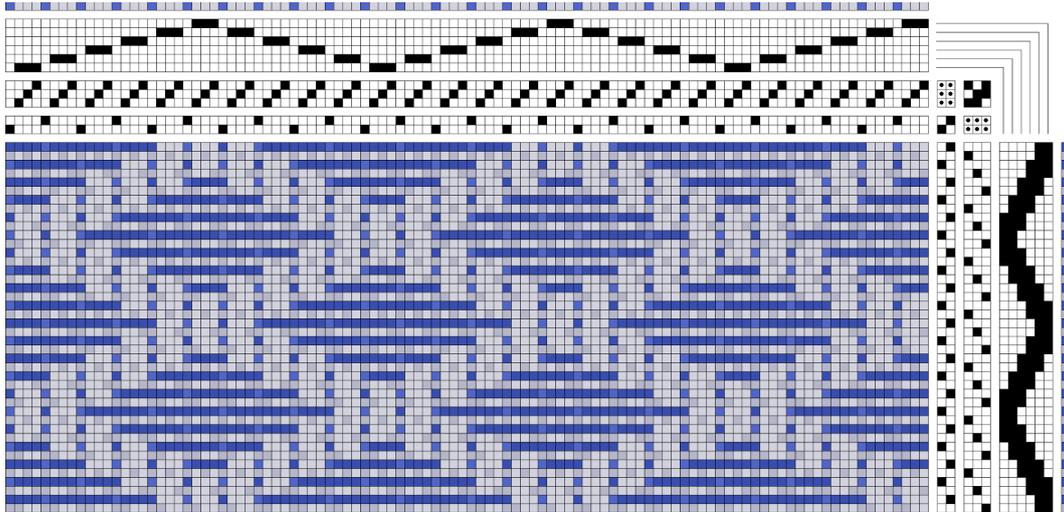
1. Open *Galler 1*. Each square in the pattern will in the pattern threading have three ends entered in one unit and one end that is only entered in the ground shafts. Vertically, one square equals two picks.

The pattern threading should look like this:



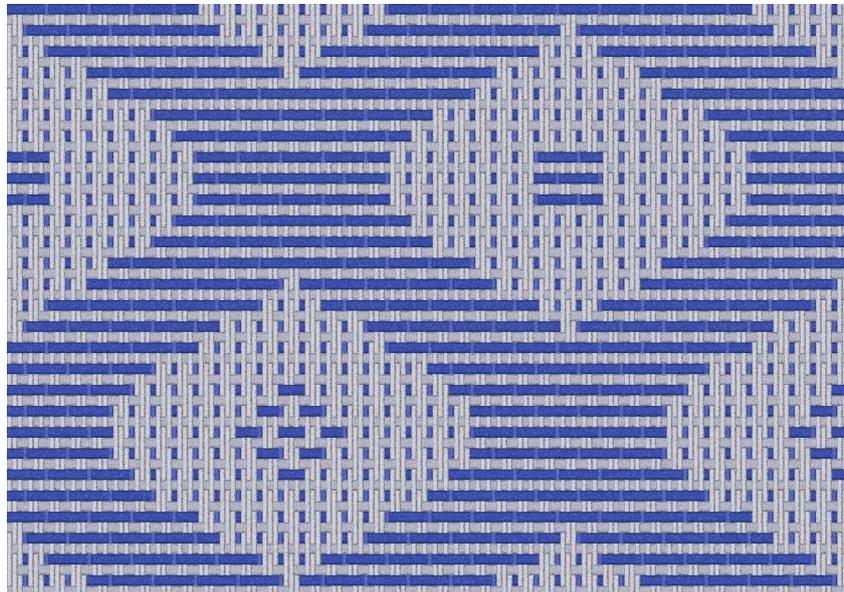
2. Transform|Expand Pattern: 3 ends and 2 picks.
3. To add the binding warp end which is not entered in the pattern shafts, select Transform|Insert in Pattern Threading. Interval 3 and check After Interval. OK.
4. Select number of ground shafts in Options: 3 shafts A, 3 treadles A, 2 shafts B and 2 treadles B.
5. Fill|Tie-up AB, Point marks – BA, Point marks.
6. Fill in threading/treadling A for the ground weave and threading/treadling B for the binding warp and pattern weft (see image below).
7. Add colors to warp and weft:  
Warp - Ground warp: 3 gray (index 2), Binding thread: 1 dark blue, (index 3).  
Weft - Ground weft: 1 light gray (index 0), Pattern weft: 1 blue (index 1).  
See illustration on next page.

The final result in *Lampas Galler 1*:



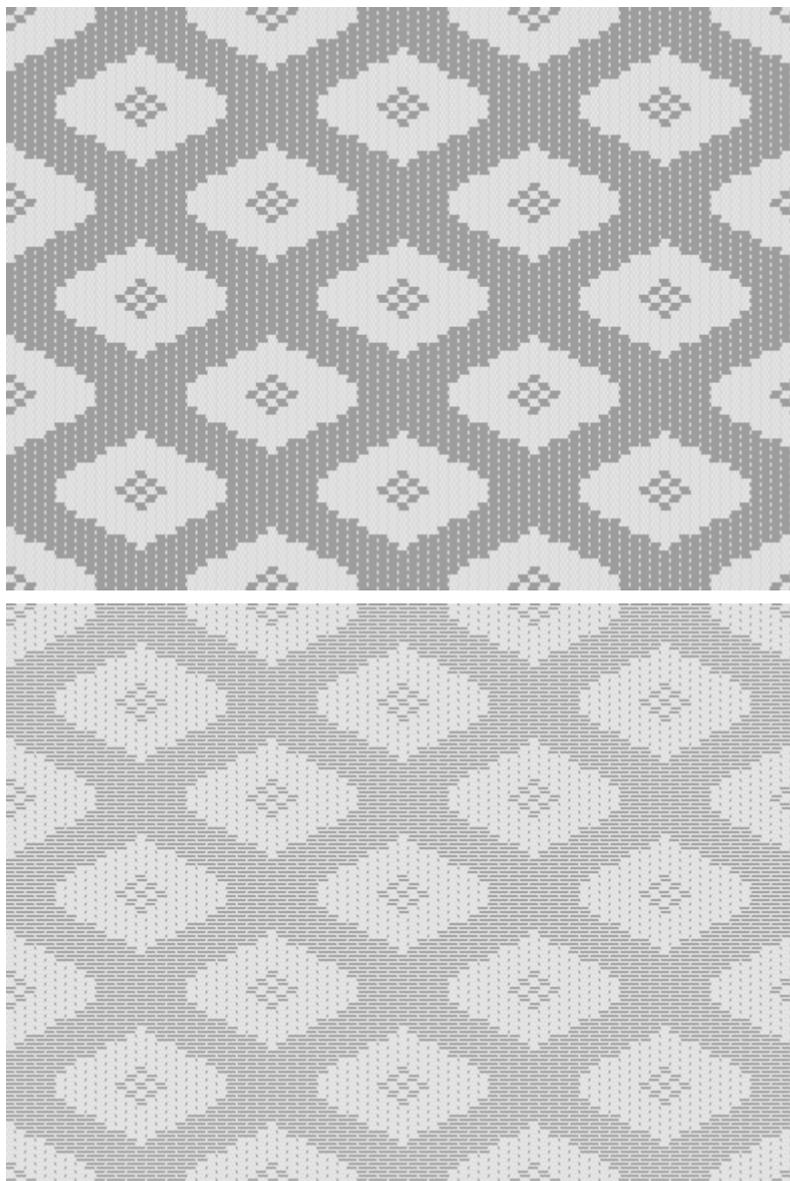
The ground is gray with blue pattern. Warp and weft have a small difference in value, to make the structure visible. The weft is more open than the warp. Use the command View/Fabric to see the pattern in the right warp/weft proportion.

*Lampas Plommon* shows the Lampas structure with a different pattern. Here the ground weave makes the pattern.



## *Beiderwand*

Beiderwand is a special variation of lampas. It always has four main warp ends to one binding warp end. Tabby is used both for main weave and for binding weave.



The sample pattern *Beiderwand Plommon* shown as Fabric with/without fabric compression (you can select this in Options/Pattern). With this, in combination with a suitable choice of warp and weft density (also in Options), you can get a more or less realistic view of the final fabric.

Compression packs two weft rows into one visible row. You may influence the result in this case by inserting or deleting the first pick in the liftplan or treadling. If one weft forms the main pattern, this should be placed on even numbered picks..

# Qi

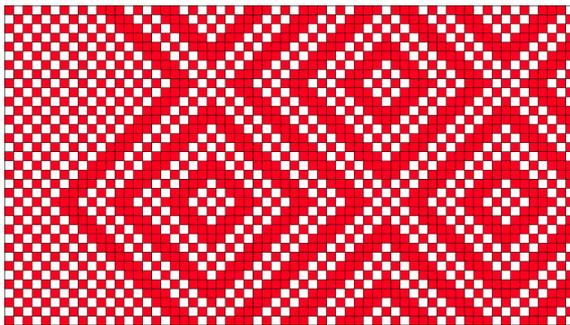
According to Ulla Cyrus-Zetterström, qi was monochrome patterned silk. The term 'qi' is found in old Chinese texts, but is not used for modern textiles. Qi is not a special weaving method. The structure is normally warp floats on tabby ground. The floats pass mostly over three to five threads directly or in intervals, and form small or large geometrical patterns.

John Becker analyzes several such fabrics, most of which are patterned by warp-faced twill on tabby ground. His fabrics are not woven on a drawloom, but it works well to draw them like this. The following samples are from Becker.

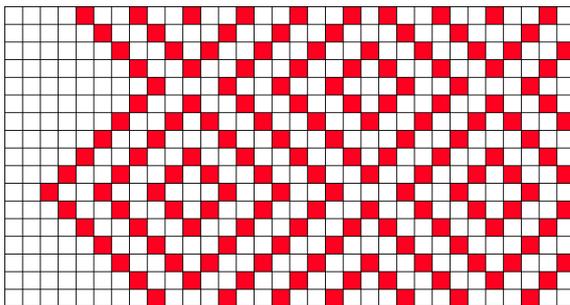
The three qi samples are drawn with similar colors in warp and weft, to obtain an impression of monochrome fabrics. To make the weave and pattern more visible, you can change colors in Yarn|Edit Colors.

## Qi 1

To make it easy to compare with Becker's drafts, I show the same sections of patterns and weaves like he does in the book.

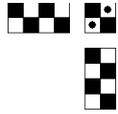


The drawdown as drawn by Becker.



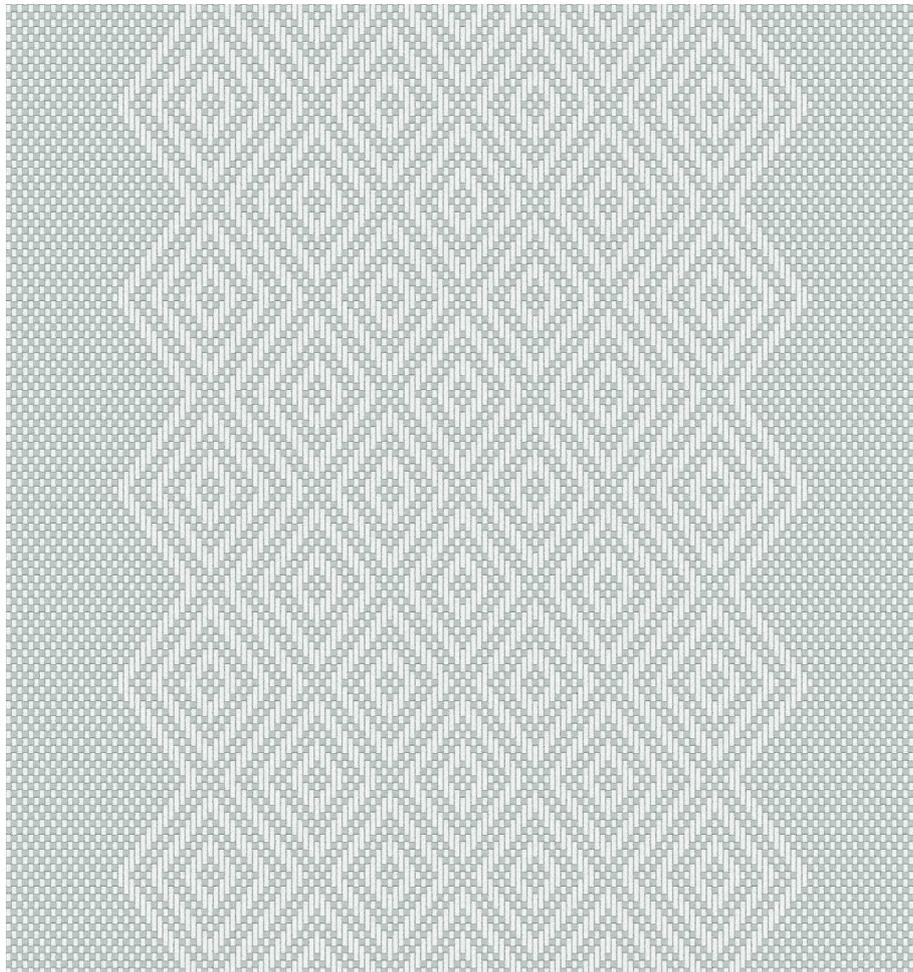
A pattern, to be developed into a full weave structure, can be represented like this.

1. Open *Qi 1 mönster (Qi 1 pattern)*.
2. Work in View|Draft mode.
3. Transform|Expand Pattern: 2 ends and 2 picks.
4. Select number of ground shafts in Options: 2 shafts A and 2 treadles A, deselect Threading B and Treading B.
5. Draw the tabby.



Note: The tabby must start as drawn here.

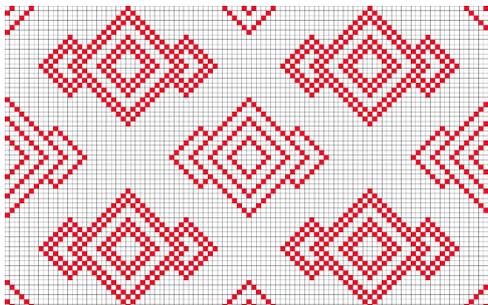
6. To change the direction of the twill diagonals, one can add or delete an end in the pattern threading at the turning points, and likewise in the liftplan. In this sample, there are one end and three picks at each turn.
7. Open *Qi 1 helt tyg (Qi 1 complete fabric)* and select View|Fabric to see the final result.



8. In WeavePoint Standard version, you can find View|Fabric with more yarn options and improved fabric simulation. To view a pattern from Complex Drafting this way, you can export the fabric as a PNG-image and as wpo-file (to import the colors), then open this in WeavePoint Standard.

## *Qi 2*

In the sample *Qi 1* above, the twill diagonals follow the outline of the pattern. In *Qi 2*, the units are 2 ends x 2 picks throughout, and an asymmetric effect will arise in an otherwise symmetrical pattern.



## Qi 3

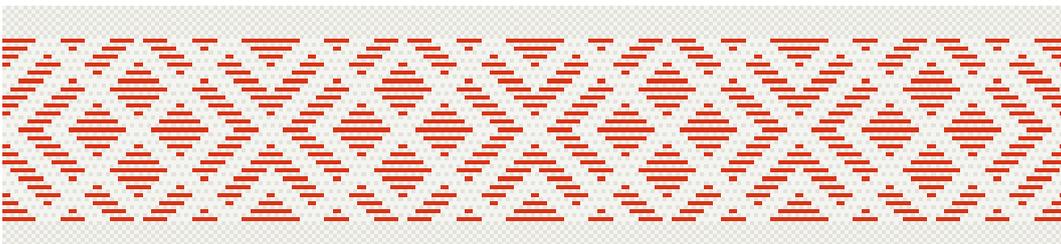
In C.F. Liljevalck's fabric collection, there are several silk fabrics from the 19<sup>th</sup> century using the old qi style. Patterns are now applied more freely. Here I have used a flower motif from Ekenmark's book of weaving for a qi fabric.



## Upphämta

### Upphämta på tvären

*Upphämta på tvären (Upphamta with weft floats)* is based on *Randmönster (Striped pattern)* with unit size 2 x 2. Try displaying the fabric with View|Fabric with both fabric compression set on and off in Options. In Yarn|Edit Colors, click on a different colorway to see the difference between light and dark ground. 'Upphamta' is a Swedish term, sometimes also written 'Opphamta'.



### Upphämta på längden

*Upphämta på längden (Upphamta with warp floats)* has pattern ends that are only entered in the pattern threading. Note that the pattern ends will cover the tabby in the real fabric.