arahne 30 YEARS

# ArahWeave® 10

## User's manual


RAL Design System, © 1997 RAL, Sant Augustin

# Table of Contents

# 1 Introduction

## 1.1 Prerequisites

This manual is not a general introduction to weaving. If you have no idea on how fabrics are manufactured, it is unlikely that you will learn it from here. You should study a textile textbook to learn the textile basics.

The user guide assumes you have a working knowledge of your computer and its operating conventions, including how to use a mouse and standard menus and commands. It also assumes you know how to load, save, and locate files.

You can read this manual wherever you want, but it will be beneficial if you have the *ArahWeave* system up and running on your computer, so you can immediately try out the things you learn.

## 1.2 Thanks & warning

Thank you for having chosen Arahne's product. Arahne is weaving its programs day and night so that it would be easier for you to make quality fabrics. Therefore it can happen that this manual and the program you will be using are inconsistent. This means that you will find some more features, or some functions will be implemented in a different (we hope: better) way. We are trying to make our programs as simple as possible and also provide online help, so these changes should not disturb you too much. If they do, we apologize and we will get better in the next version.

We also appreciate comments and suggestions from our users, as well as reports of malfunctions. The sooner you fax/email them to us, the sooner your suggestions will be implemented or bugs removed. Sometimes we will not be able to implement all your suggestions, but we will be able to make good decisions on what to do next, based on your feedback.

## 1.3 Overview of weaving CAD/CAM

If you are new to CAD, you may find it difficult at the beginning. Still, the basic operations are similar to using a word processor. You run the program, enter some data, control it on screen so that it looks correct, you print it out and save it to disk for future reference or reuse.

*ArahWeave* distinguishes itself from the competition by the fact that it was written from scratch for the multitasking windowing platform. Because of this, it fully exploits the windowing possibilities:

- Most windows can be resized to provide a bigger view of data, if necessary.
- Windows can be freely moved on the desktop.
- Printing will not block your work.
- You can work with many tools at once.
- Program will always try to give you a coherent view of your data, no matter which part you perform the change.

The fact that you can have more tools on the screen may be confusing at the beginning, but it permits you to have a personal style of work. You can close down the tools, which you do not need at the moment, or keep them open, make changes and immediately observe the effect on the fabric.

There is no general Undo function in *ArahWeave*, but most functions have their own Undo.

It is relatively easy to construct a fabric. The whole art is to combine these elements:

- Weave (the way the threads interlace) – dobby weaves are mostly small and can be drawn by hand, while jacquard weaves are big, and are constructed from a color image, where each color is replaced by one weave.
- Warp and weft sequences.
- Yarn, count, and structure.
- Colors.

- Density of weaving.

Still, sometimes you will be surprised by what a simple interplay of these factors will produce. This is the very reason why you should use *ArahWeave*:

- To play with these settings without constraints and with minimal expenses.
- To communicate the result of your creative work to non-textile people, by printing out the simulation.
- To provide your production departments with printouts of production tickets or CAM data for production.

In this way, expensive design errors will be avoided, and the CAD system will soon pay itself back. You will also gain a lot in response time, since you will be able to give an answer to customer inquiries in just a few minutes. As worldwide digital communication is a reality available to everyone, you can email a fabric simulation to the client. You can use the CAD data on your home page with your current collection, images of fabrics, pricing, availability, etc. Or your design system can be configured as an Intranet web server, which delivers technical data sheets to anyone in the company, using any computer or any operating system, as long as it is networked and it has an Internet browser.

Now we must also tell what ArahWeave will not do for you: it does not create a weave structure based on the fabric digital image. Some users expect that they will simply scan a fabric in a computer and get a printout of the production ticket out of the computer. This is not possible, because the current level of automatic image recognition does not (yet) enable us to distinguish the weave from different yarn colors used in the fabric. Still, *ArahWeave* is a great tool in getting a fabric's weave structure: you can enter data as you analyze the fabric, and verify it on the fly. You will be able to enter the data both as a number of threads or as a length in millimeters. The simulation view also enables you to match fabric against screen fabric simulation, since they should be of the same size if data was entered correctly. The program will also help you with automatic adaptation to different "qualities", that is different density settings without changing the overall size of the pattern.

For jacquard users, *ArahWeave* can also be useful to change/adapt a jacquard card file prepared for weaving in one format/loom layout into another format/loom layout.

The majority of the readers of this manual will only be interested in the dobby capability of *ArahWeave* since they greatly outnumber jacquard weavers. The chapters or sections, which are useful almost exclusively to jacquard or dobby weavers, will be marked by word *jacquard* or *dobby* in the title. We want to avoid confusion of readers with additional information, which they do not need.

And finally, we must tell you what the logic behind the organization of this manual is. We have decided to group chapters and sections into logical problem groups. For each group of functions, we first try to explain why they are needed, and then how and why they work in this way. So we have avoided the classical programmer's manual, which just lists the menu entries from left to right and from top to bottom. We have also included some tips for weaving, which we have learned thanks to our customers. Unfortunately, weaving itself is a tightly interwoven topic, so if you read the manual from beginning to the end, you will find references to topics that will be fully explained in later sections. So you should really read it in a forward/backward manner, or maybe re-read a previous section once you learn new topics that were mentioned before. The negative side of our approach is that it may be difficult to find just an explanation of a certain function. Fortunately, PDF viewers have the search function, so it is easy to find all places which mention a certain topic.

## 1.4 How to get *ArahWeave* up and running

You know, press the power button on your computer. Wait until the computer finishes its power-on diagnostics. If you have several operating systems installed on your computer, you will be prompted by a list of installed systems. Select by highlighting it with up / down arrows on the list of available systems. If you wait too long, it will automatically boot the one that was last loaded or the default one. If you have installed only one operating system, it will boot automatically without asking any questions.

On modern Linux desktops, *ArahWeave* is available as one of the program icons  on the Desktop.

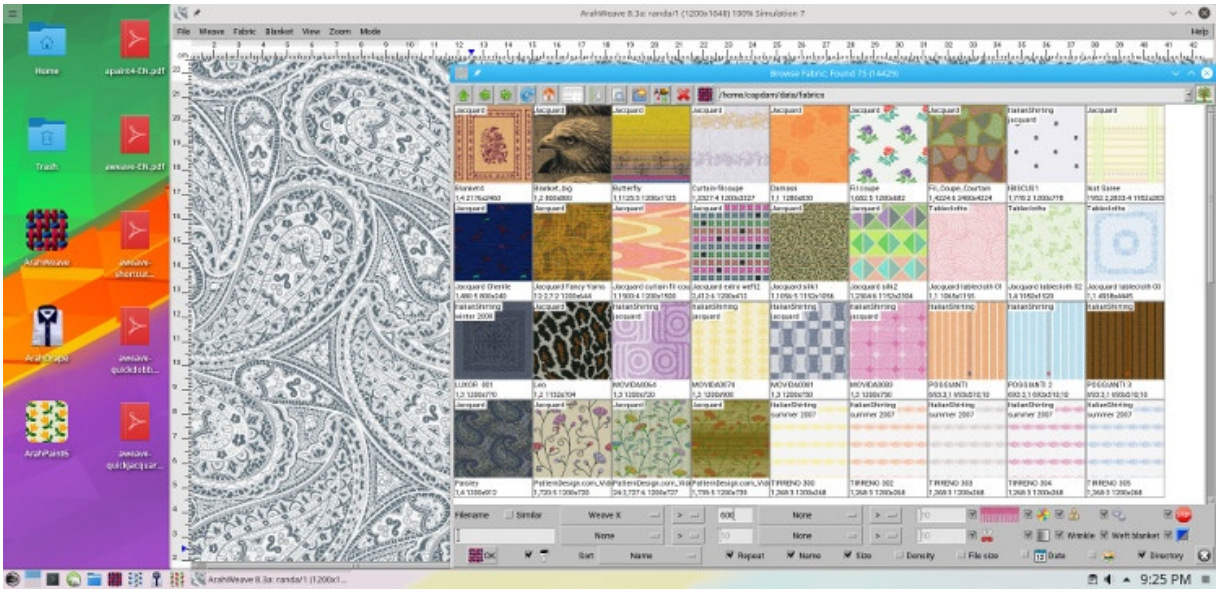


*Figure 1: ArahWeave on OpenSUSE Linux using KDE Desktop*

## 1.5 Program installation

You will need three files for installation on Linux: aw64.tar.bz2, aw2.tar.bz2 and INSTALL_AW64 (for ArahWeave Personal Edition the files are awpe64.tar.bz2, awpe2.tar.bz2 and INSTALL_PE64). Copy them to the Desktop and click on the file INSTALL_AW64 (or INSTALL_PE64). This will launch the installation utility (Figure 2). Click the **OK** button to start the installation.

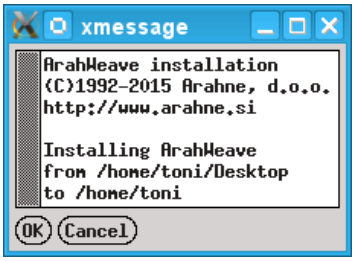



*Figure 2: ArahWeave installation*

When the installation is finished, a message indicating successful completion will appear. Click on the **Exit** button. After that, you can delete the program's installation files.

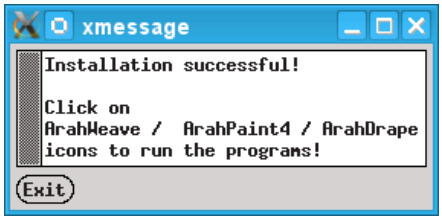



*Figure 3: Message after successful installation*

## 1.6 Running the program for the first time

There are some user settings, which you should set through **Help** > **Save setup** to make *ArahWeave* really usable. These settings are:

- Program activation
- Language
- Measurement system
- Screen size

Click *Arahweave's* icon on the desktop. Because you are running it for the first time, and it is not activated yet, the program automatically opens the **Save setup** window.

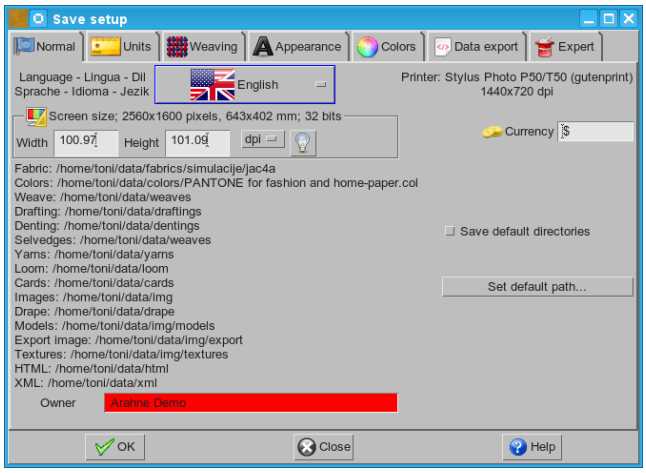



*Figure 4: Save setup window*

### 1.6.1 Setting the language

English is the default language. You can change the language in the **Save setup** window, which is accessible from the main *ArahWeave* window through the **Help** > **Save setup**. You can choose one of nine languages. In languages other than English, the menu entry Save setup is written in English and in the current language, so it will be easier to change the language back if you make a mistake. Language change is immediate for *ArahWeave*, but you must restart other programs (*ArahPaint*, *ArahDrape*) if they are already running.


*Figure 5: Language selection*

### 1.6.2 Program activation

The **Owner** field contains the **Arahne DEMO** text. Type in the owner's name, which was assigned to you.

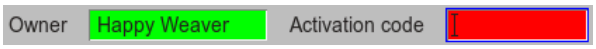



*Figure 6: Activation code field*

After clicking **OK** the **Information** window with your personal registration code pops up.

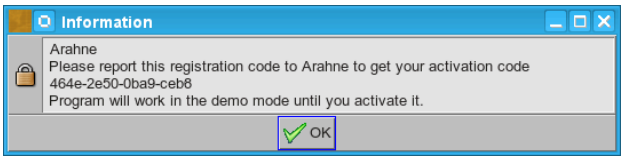



*Figure 7: Registration code*

Send the registration code to Arahne's e-mail address arahne@arahne.si We will send you back the activation code. Type your activation code into the red field. The program will give notice of successful activation.

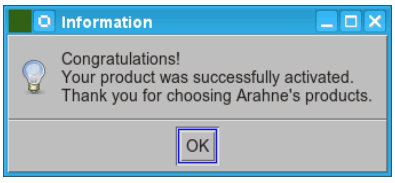



*Figure 8: Information about activation*

### 1.6.3 User interface profiles

Arahne makes the program simple for beginners, with all the basic functions without much distraction, but also offers all the advanced functions for customers, who can handle them.
The **Mode** menu offers you the choice between **Simplified**, **Normal**, **Expert**, and **Server** mode.

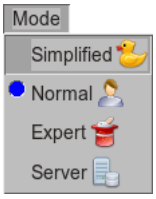


*Figure 9: The Mode menu*

- Simplified mode is for beginners, it is the default mode in the demo version of the program. It will hide most of the complex, hard-to-understand features, and keep the essential. For example, a beginner probably won't make fabric with dual weft insertion, two warp beams, and does not care about the fabric price calculation. A weaving course in school should use simplified mode.
- Normal mode is the default for ArahWeave Personal Edition or Pro versions. It shows all functions, options, buttons, and menus.
- Expert mode offers some exotic, potentially dangerous functions, and should be used for those who know what they are doing. One such function in this mode allows users to convert jacquard cards into fabric files by using a loom layout. Or converting all the weaves from BMP, TIFF, GIF... to Arahne weave file format.
- Server mode blocks the program's GUI functions, and the program actions are triggered by XML files, created and delivered by the ERP system.

### 1.6.4 Measurement system

Click the **Measurement system** in the **Save setup** window. You can choose between **Metric** (m, cm, kg), **Imperial** (yards, inches, pounds), or **Mixed**.

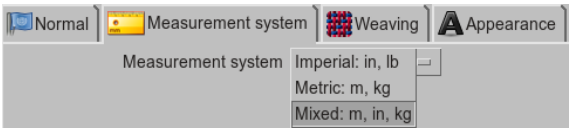


*Figure 10: Measurement system*

The **Mixed** system enables you to set imperial or metric systems for fifteen different parameters if you live in a country where you use both systems contemporary. If you need to use both the imperial and metric system, but one at a time, and you wish to quickly switch between the two, you can press keyboard shortcut **U** to toggle unit from metric to imperial and back.

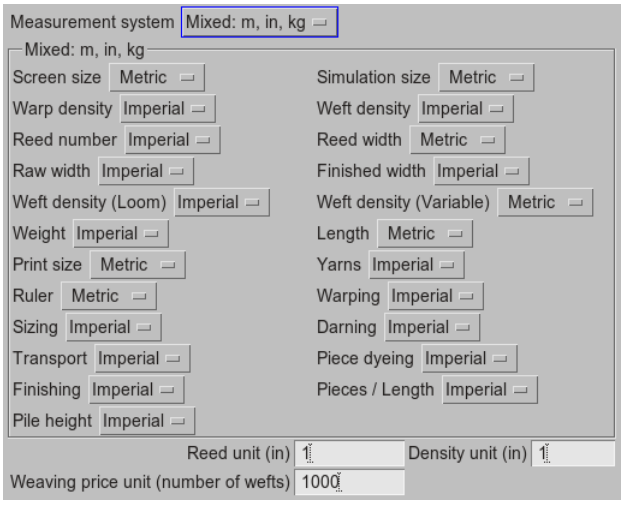


*Figure 11: Mixed measurement system*

### 1.6.5 Display size

The display size (or viewable image size) of your monitor is the next important setting. Based on the display's width and height information (the unit could be millimeters (or inches) or dpi (dots per inch), the program adjusts the fabric simulation to match 1:1 size, and the rulers (bars with numbers) on the upper and left-hand sides of the main *ArahWeave* window will match a physical ruler. The program detects the correct values automatically if the display and graphics card are properly configured. In case you have changed a monitor, the old values are wrong – to get new values, click the bulb icon next to the unit button (mm or dpi). If the system reports the wrong screen size,

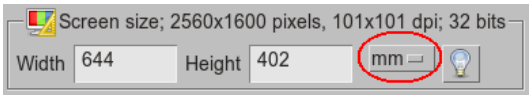


*Figure 12: Screen size*

measure a display with a physical ruler and type in the size values. To save the screen size values, click **OK** in the Save setup dialog window.

### 1.6.6 Setting the number of CPU cores

The speed of many ArahWeave's operations, like a simulation's rendering and file browsing, depends on the speed of the processor (CPU). During the installation, *ArahWeave* detects the number of CPU cores and adjusts the setting according to this number. However, if you change the number of processors with installing a new CPU or most likely if you run the *ArahWeave* virtual machine on VMware Player or other virtualization software, ArahWeave will not detect the change automatically. To update ArahWeave's settings, open **Help** > **Save setup**, choose the Expert tab, and click the bulb icon next to the **Number of CPU cores** field. After a few seconds in which the program has found the correct number of cores, ArahWeave pops-up the **Information** window with the Number of cores and the Speedup factor information. It also writes the new number into the **Number of CPU cores** field, and closes the Information window. You just need to click the OK button the Save setup dialog window to save the new CPU cores number in ArahWeave's setting.

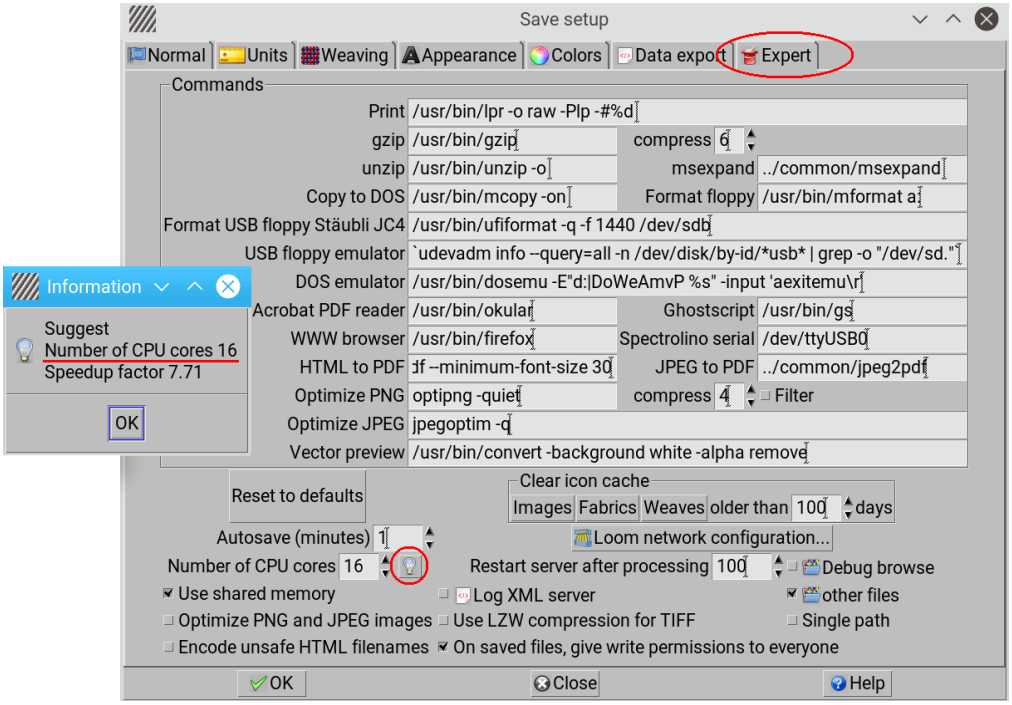



*Figure 13: Finding the number of CPU cores*

### 1.6.7 Default window size

The current size of the ArahWeave windows and dialog boxes is saved when you save the setup (**Help** > **Save setup**; click **OK**). When you open ArahWeave again, the size of the following windows will remain exactly the same as when you saved the setup: Weave editor, Decomposed weave editor, Print preview, Main window, Multi-image jacquard conversion, Multi-fabric print setup, Weave browser, Image browser, Fabric browser, Image area of the jacquard conversion window, Consumption calculation HTML area, Warp sections HTML.

*If you don't want to save the current window sizes when you save the setup, uncheck the Save default size option in the Save setup window's Appearance tab.*

The other way of saving the size of the windows is to access the **Save default window size** function directly from the **Help** menu. Choose **Help** > **Save default window size**, and the size of the windows will be set to the current size.

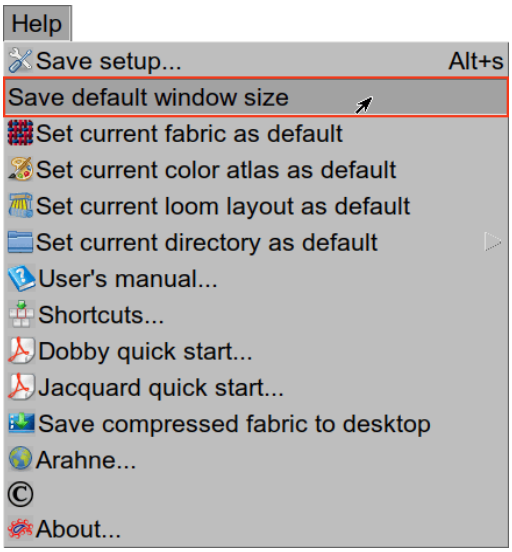



*Figure 14: Saving the program's windows size*

### 1.6.8 Default window positions on the Desktop

You can save the location of ArahWeave's windows on the Desktop by selecting the **Save default position** option in the **Appearance** tab of the **Save setup** dialog and then saving the configuration. When you launch ArahWeave again, it will appear on the Desktop in the same location as it was when you saved the settings with the Default position option enabled.

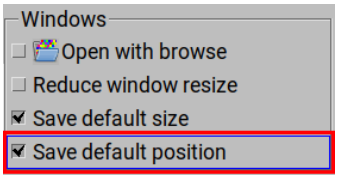



*Figure 15: Saving the default window position*

# 2 Working with files

## 2.1 Directories and file types

Since *ArahWeave* is a versatile program, it needs to read and write many files for different purposes. So before going into details of the many capabilities of this program, we should have a clear idea about what *ArahWeave* can read and write, and where should the necessary files be located.
All the user data files are stored in directory **/home/user_name/data** and it contains the following subdirectories:

- **img** (color images in jacquard conversion; standard formats; suffix PNG, GIF, PCX, JPG, TIF, BMP, webP).
  - **textures** (fabric simulation images for usage with ArahDrape; standard image formats).
  - **models** (model images for usage with ArahDrape; standard image formats).
- **colors** (color database with color specified in CIELab space, Arahne's custom format), suffix .col (color measurement for CIELab data read with a spectrophotometer, ASCII, Arahne's custom format) suffix .cm
- **fabrics** (contains all information relevant to fabric: colors, yarns, weave, density and other technical details; Arahne's custom format), no suffix.
  - **demo** (100 samples so you see what you can do once you learn the program).
  - **tartans** (300 samples of Scottish tartans).
- **yarns** (yarn containing yarn colors, count, twist, etc., Arahne's custom format) no suffix
- **weaves** (weave containing drafting and card; can also be a full jacquard weave up to 65520x65520, Arahne's custom format) no suffix
  - **demo** (100 sample weaves with English names)

  - **Fressinet** (2900 weaves from an old weave library/book)
  - **Gunetti** (1700 weaves from an old weave library/book)
  - **Poma** (2200 weaves from an old weave library/book)
  - **Posselt** (1900 weaves from an old weave library/book)
  - **Serrure** (3200 weaves from an old weave library/book)
  - **selvedges** (place where you should put your weaves for selvedges)
  - **shading** (some satin and serge weaves, which are suitable for grayscale jacquard shading)
- **cards** (jacquard files ready for weaving; in loom specific jacquard formats, like Stäubli JC5, Grosse, Bonas)
- **conversion** (jacquard conversion, contains associations of colors and weaves, and the selected conversion type; Arahne's custom format), no suffix
- **loom** (loom layout, weft layout; machine specific allocation of hooks and weft change; Arahne's custom format), no suffix. This directory also contains the **.looms** file, used for jacquard loom networking.
- **warp pattern** (warp patterns in Arahne's custom format)
- **weft pattern** (weft patterns in Arahne's custom format)
- **drafting** (drafting data in Arahne's custom format)
- **denting** (denting data in Arahne's custom format)
- **HTML** (fabric technical calculations in HMTL format)
- **XML** (fabric technical data exported in XML format), also location of XML import files
- **drape** (drape projects; Arahne's custom format), suffix .drape.

The above division of directories is Arahne's suggestion; you are free to make your own or to create subdirectories, wherever necessary – make them by clients, years of collection, or whatever you are comfortable with.

### 2.1.1 Fabric file format

When you save a fabric file, it is saved in its own Arahne format. It contains all information relevant to fabric: colors, yarns, weave, density, and other technical details. If you generate a fabric by replacing colors in the image with weaves (Jacquard conversion), then also the image and corresponding weaves are saved in the file.

By default, *ArahWeave* saves only yarns, which are used in the fabric, in a fabric file. Next time, when you load that file, only saved (used) yarns are loaded, the other yarns in the Edit warp and weft pattern dialog (25 yarns for each) are default yarns. But, if you enable the **Save unused warp/weft** in the Weaving option of the Save setup dialog, then all currently yarns from the Edit warp and weft pattern dialog are saved in fabric file, and thus loaded when you open the fabric file next time.

## 2.2 Setting a default fabric

When you open ArahWeave, it displays the default fabric. If you want that another fabric becomes a default one, load it into the program, and choose **Help** > **Set current fabric as default** from the main menu bar.

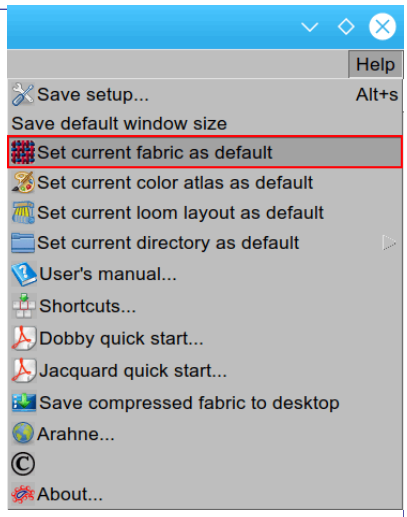



*Figure 16: Setting current fabric as default*

## 2.3 Changing default location (folders) for saving

To change the default location, from where the files are loaded or saved, you have to load the desired file from a specific location into *ArahWeave* (a fabric file in the main *ArahWeave* window, a weave file in the Weave editor, a yarn file in the **Edit yarns** window, an image file in the **Jacquard conversion** window, a loom layout file in the **Save cards from production** window, etc...). Then choose **Help** > **Save setup**. Check the **Set default directories** button, and click the **OK** button in the **Save setup** window.

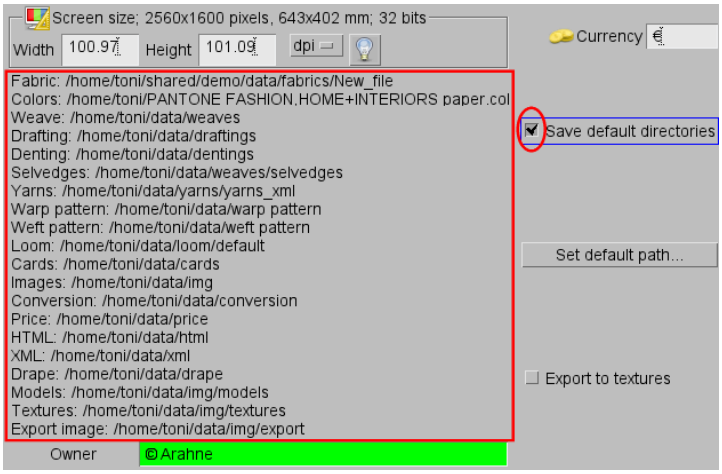



*Figure 17: Currently active folders are displayed in the Save setup window. If you save the setup now, these folders will become the default folders for loading or saving files.*

There is also an option to save the position of the default opening location for a particular directory directly from the **Help** menu:

- Fabrics: **Help** > **Set current fabric as default**.
- Colors: **Help** > **Set current color atlas as default**.
- Loom layouts: **Help** > **Set current layout as default**.
- Yarns, Weaves, Images, Cards, HTML, XML: **Help** > **Set current directory as default**, and select a type of files, for which you want to keep a current opening location.

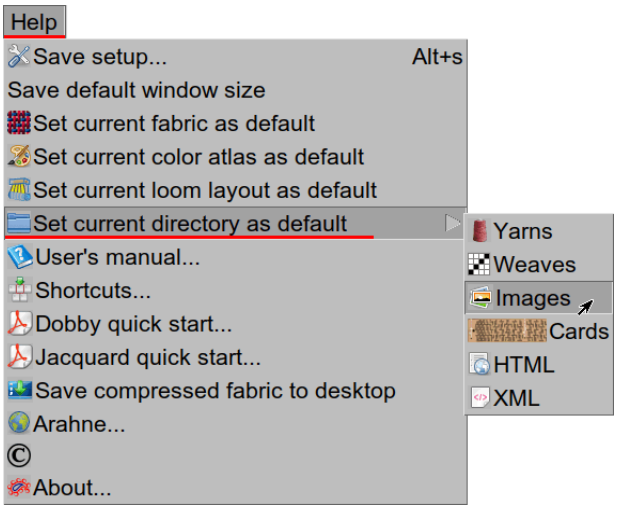



*Figure 18: Setting the current directory as default*

## 2.4 Changing the default location of the Arahne data folder

Another way to change the default location is to change and save it in one step. The default location of the data folder is **/home/user_name/data** (in case of ArahWeave Personal Edition it is **/home/user_name/arahne/data).** If you want to change location, open the Save setup window and click the **Set default path** button. Type the desired path to a location in the dialog and click **OK**.

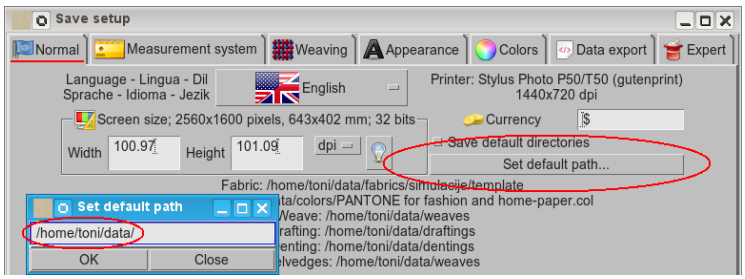



*Figure 19: Set default path dialog*

## 2.5 How to solve problems with permissions

When several users are working on the same data files, and files are shared via the network, it can happen that one user cannot modify or read files written by another user. By default, all the files written by Arahne's programs are saved with read/write permissions to everybody, so that this problem would not occur. If you don't like this behavior, you can switch it off in the **Expert** section of **Save setup**. But in the case, you copy the files from an external source, for example from email attachments, CD-ROM, or USB memory key, the permissions will be set to system defaults. This usually means that others cannot modify your files. You should remember to use the right mouse button on the newly copied files, and change access permissions so that everybody can read and modify them. If you forgot to do this, and you get a lot of permission errors, you can use one command to get all the permissions right.

Open a terminal and type:

```
su root
```

---enter your password---

```
chmod -R a+rw /home/user_name/data
exit
```

# 3 Fabric files

Fabric files related menus are under the **File** menu in the main *ArahWeave* window.

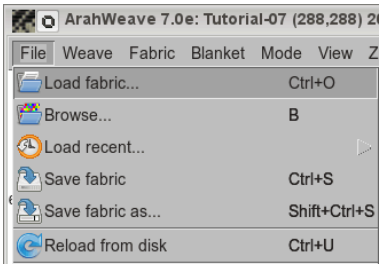



*Figure 20: Fabric file menu*

## 3.1 Loading files from Fabric browser

To load a fabric file using **Fabric Browser** choose **File** > **Load fabric** (keyboard shortcut **B**). Thumbnails of fabrics are displayed to identify each fabric.

Do one of the following to open the fabric in *ArahWeave*: double click a fabric icon, or select a fabric icon and then click **OK** or press **Enter**.

*If you set that both, File selection dialog and Fabric browser, are available, then use File > Browse to open the fabric browser.*

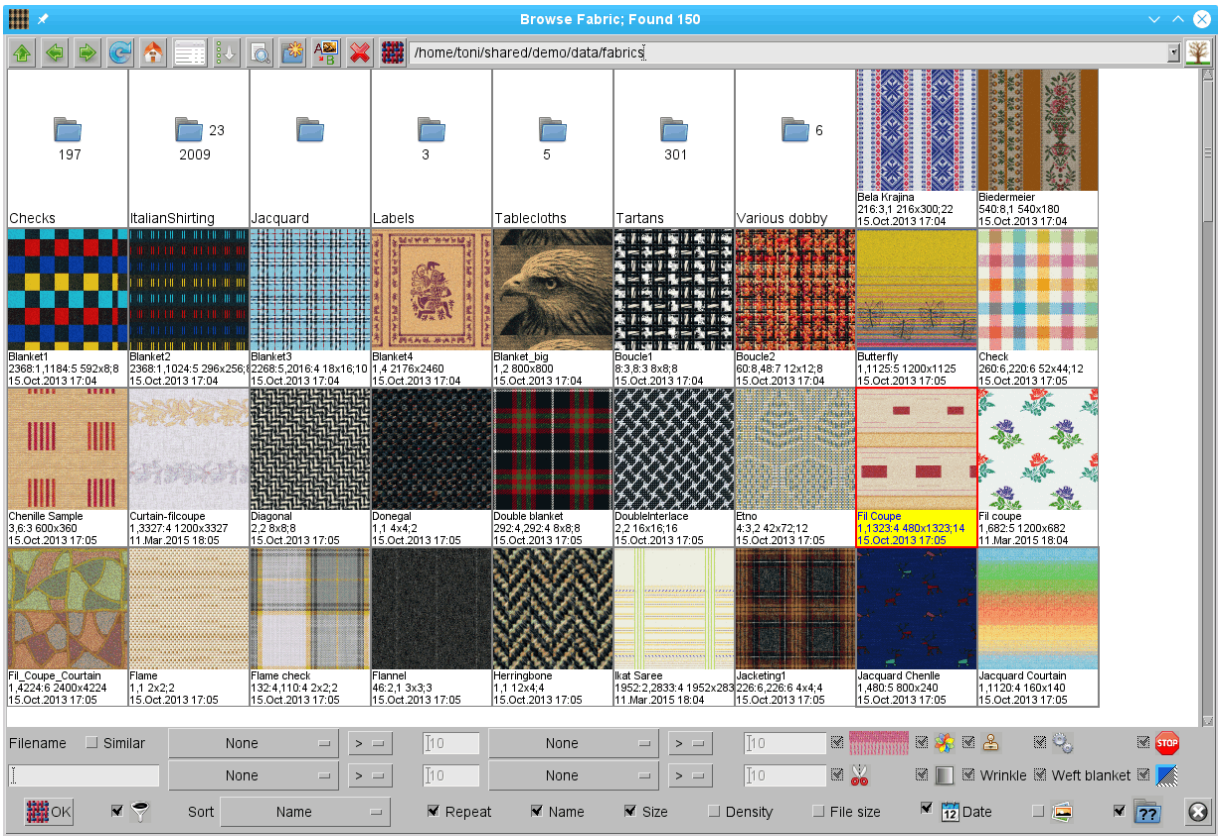



*Figure 21: Icon fabric browser*

The meaning of icons in the toolbar is described in the table below.

| | |
|---|---|
|  | one directory up |
|  | back |
|  | forward |
|  | reload |
|  | default directory |
|   | switch to detailed view; switch to icon view |
|   | sort order |
|  | find fabric |
|  | create new directory |
|  | rename fabric |
|  | delete fabric |
|  | open selected fabric with *ArahWeave* in a new window (middle-click on a fabric icon does the same) |

The options icon menu and filter options are positioned at the bottom of the window.

- **Filters** (icon  ) allow you to narrow down the number of displayed fabric icons by entering the limits of **weave size x**, **weave size y**, **date of creation**, **number of shafts**, **warp and weft yarns**, **number of threads in fabric width**, **warp and weft density**, **denting and regulator**, and **file name**. If you use the file name filter, the program will interactively change the display to show you only the fabrics, which match the search filter. In this way you will find your fabric very quickly.

- The sort drop-down option button allows you to choose a criterion, by which you want to sort the fabric files. The default criterion is the name, followed by file size, date, weave size in the horizontal direction, weave size in the vertical direction, weave size in both directions, number of shafts, number of different yarns used in the warp, number of different yarns used in the weft, size of warp pattern repeat (number of threats), size of weft pattern repeat (number of threats), number of threads in fabric width, warp density, weft density, number of reed dents in fabric width, and number of advances (regulator) in weave repeat.

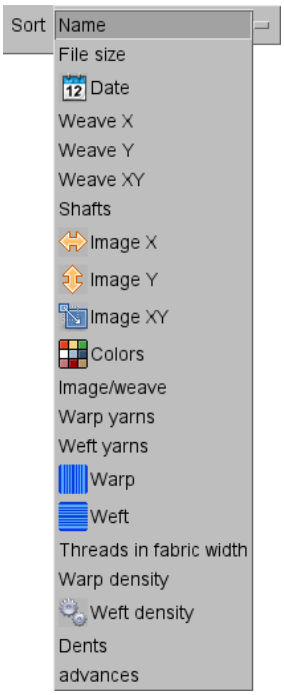



*Figure 22: Menu of sorting criteria*

- The Repeat option is enabled by default. It means that the fabric icon is displayed in continuous repeat; if disabled, then only one repeat of the fabric is shown.

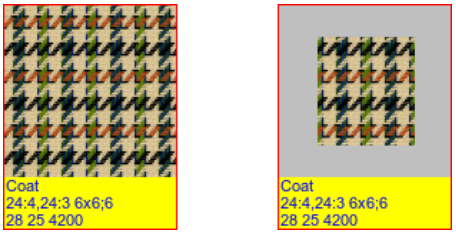



*Figure 23: Same icon with a repeat option enabled (left), and disabled.*

- Then there are some options to change what is shown in the information below fabric icon: **Name**, **Size** (repeat size of warp and number of yarns in warp; repeat size of weft and number of yarns in weft; the weave size), **Density** (warp density; weft density; number of threads in fabric width), **Image** ( it displays the size of the image used in Jacquard conversion and used number of colors), **File size**, **Date**.
- If you want to check the number of files and sub-directories in the directories displayed in the Browse window, do enable the **Show number of files** option . The number of files in the directory is displayed below the directory icon, the number of sub-directories is displayed next to the directory icon.

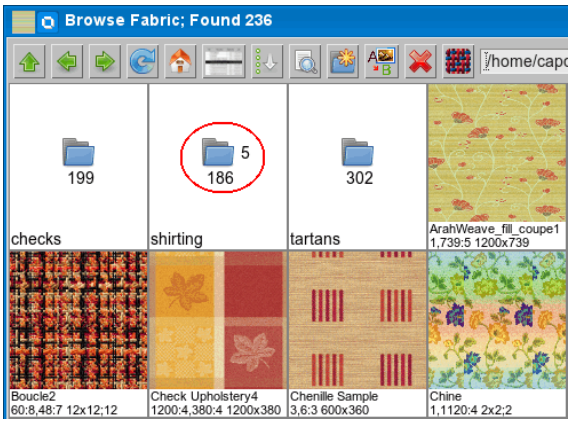



*Figure 24: The number of files in directory and the number of sub-directories*

### 3.1.1 Filtering by fabric features

You can narrow down the number of displayed fabric icons by selecting multiple fabric features, temporarily hiding any fabrics that don't match the criteria. These features are:

- **Fringe**
- **Variants**
- **Overprint**
- **Variable density**
- **Regulator**
- **Fil coupe**
- **Shading**
- **Wrinkle**
- **Weft blanket**
- **Jacquard conversion**

To change the state of the feature icon, you want to filter by, click on it. Icons can have three states:

- *Inactive* (grayed out): as a gray checkbox indicates, the icon in this state does nothing.
- *Unchecked*: fabrics that don't contain the feature will be displayed in the fabric browser.
- *Checked*: fabrics that contain the feature will be displayed in the fabric browser.

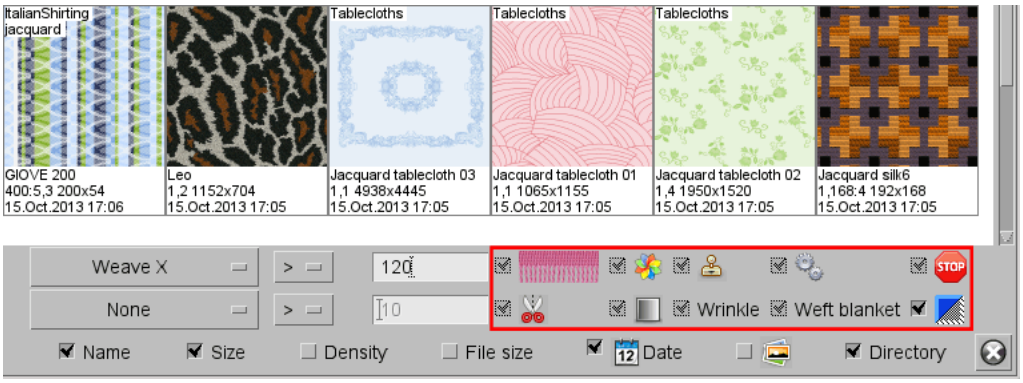



*Figure 25: Filter by fabric features: an option may be inactive (grayed out), unchecked or checked.*

### 3.1.2 Using tooltips

Position the pointer over an icon, and pause. A tooltip appears, showing Name, Date of modification, Weave size warp, Weave size weft, Number of shafts, Density warp, Density weft, Number of threads in fabric width, Warp repeat, Number of different yarns in the warp, Weft repeat, Number of different yarns in the weft, Dents in denting repeat, Advances (regulator), and File size.

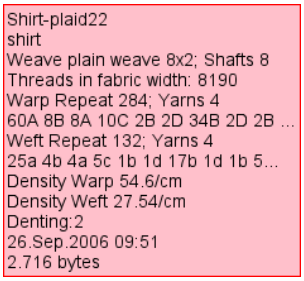



*Figure 26: Fabric's tooltip*

### 3.1.3 Browsing subdirectories

Arahweave's browsers have the capability of showing files in subdirectories. It is very useful when you search for a file, but you don't know in which directory you have saved it. If there are subdirectories in your parent directory, then the Fabric browser displays the "leafless tree" icon in the upper-right corner of the window (in the same line as a directory path). To display all files from subdirectories, click

the tree icon. It changes to the “tree with leaves and fruits” icon  , which means that the Fabric browser shows all files from the parent directory and its subdirectories. If a fabric was found in a subdirectory, then the name of the subdirectory appears in the fabric’s icon.
*You should be careful in the use of this option, since it may take a very long time to finish and display the fabrics if you enable it at the start of your disk (/). The program will not crash, but it must read all the files on your hard disk, and this takes some time. So only use subdirectory browsing of directories which actually contain the fabrics.*

### 3.1.4 Recently used directories

In *Arahweave’s* browsers, the program shows a small arrow with a drop-down menu of recently used directories in the editable location bar. You can use this to quickly switch from one directory to another.

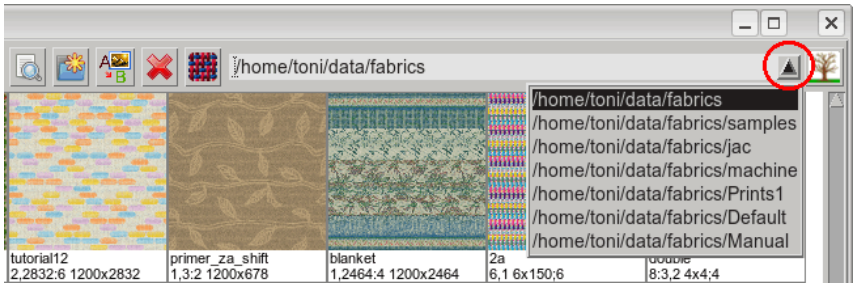



*Figure 27: Selecting recently used directory*

### 3.1.5 Browser in details view

In Details view mode, a fabric list is represented by a grid containing information about fabrics: Name, Warp’s name (code), Date of modification, Weave size warp, Weave size weft, Number of shafts, Density warp, Density weft, Number of threads in fabric width, Warp repeat, Number of different yarns in warp, Weft repeat, Number of different yarns in weft, Dents in denting repeat, Advances (regulator), and File size. You can sort fabrics by any of these criteria. A column of this property is highlighted in yellow.

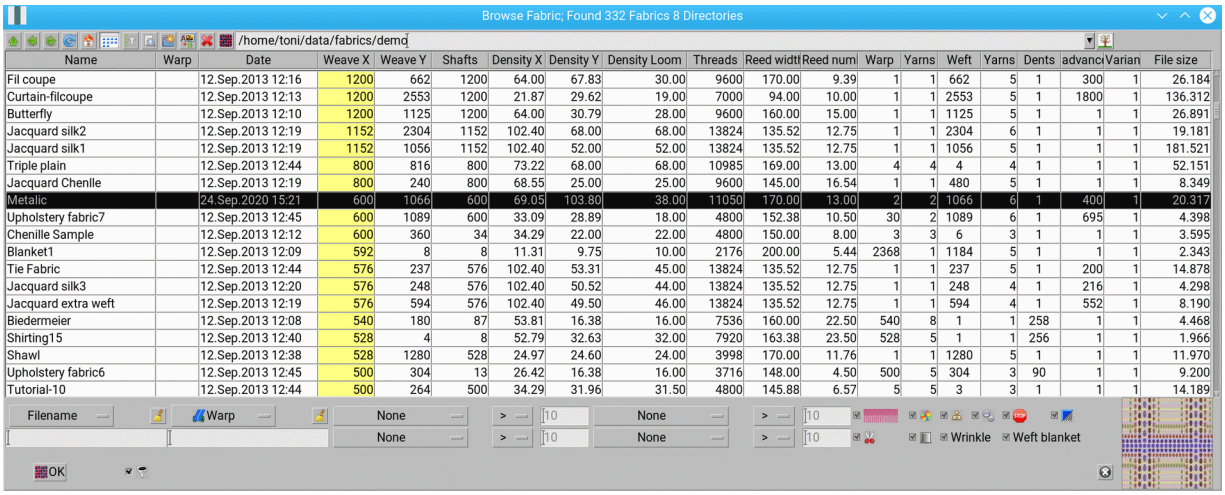



*Figure 28: Details fabric browser view*

### 3.1.6 Deleting files from *ArahWeave* system

If you want to delete a fabric file, weave file, or image file, choose **File** > **Browse** from *ArahWeave*, **Edit weave**, or the **Jacquard conversion** window, select a file you want to delete, and press the Delete button on your keyboard, or click  icon in the toolbar. You will be warned before the file is actually deleted, but once you do it, there is no way back.

### 3.1.7 Renaming files

You can also rename fabric files from the **Browse** window: press the left mouse button on the name below the fabric's icon, or  icon in the toolbar. A small window appears and you just type the new name and press Enter. For the rest of the files, use the file manager.

## 3.2 Loading recently used fabrics

*ArahWeave* remembers recently used files and directories. To open one of the recently used files, choose **File** > **Load recent**. Set the number of recently used files in the **Number of recent files** field in **Save setup** > **Appearance**. You can also set the icon size, and either you want detailed fabric information or not.

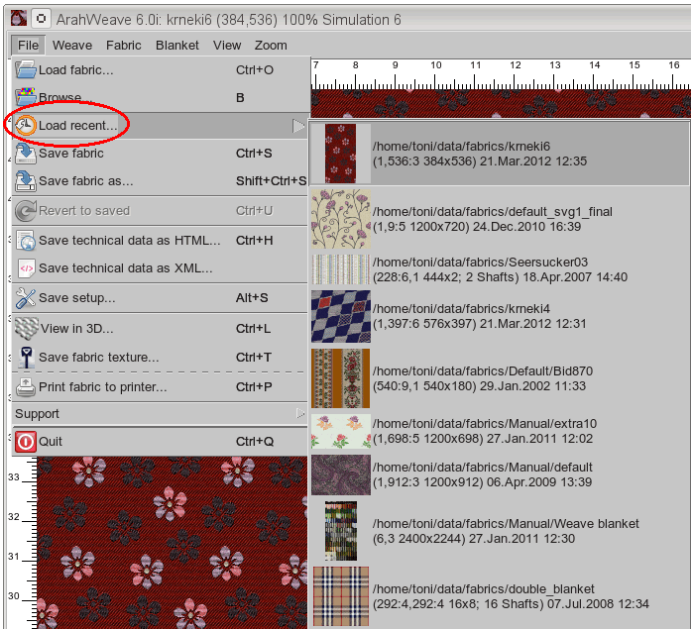



*Figure 29: Loading recently used files*

## 3.3 Saving the fabric

To save a fabric file, select the **Save fabric** function from the **File** menu if you want to save it under an existing name, or the **Save fabric as** function if you want to make a fabric with a new name. All the data relevant to this fabric will be saved, including density, weave, warp and weft pattern, colors, etc.

The **Save fabric** dialog also enables you to create a new directory: click  and enter the name of the new directory.

To generate a filename from the information that you have stored in the fabric properties dialog, click  icon. Please read more about the automatic filename creation in Chapter 20.3.1.

To replace the last character or number in the existing filename with an ascending one, click  icon. For instance, if you click on it in the **Save fabric** dialog in Figure 30, the filename will change to Paisley3.

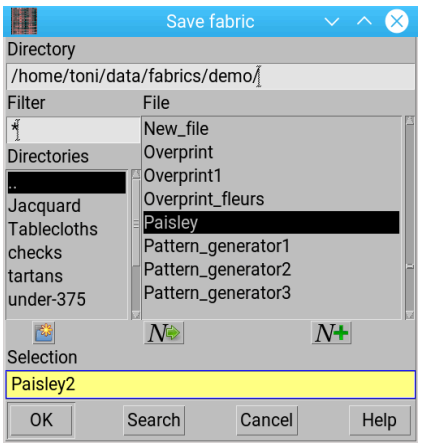



*Figure 30: The Save fabric dialog*

### 3.3.1 Hiding the Save menu

Some customers work really fast, and sometimes hit **Save** instead of **Save as**. There is no way back when a file is overwritten. But, if you hide the **Save option** from the menu list, then this will never happen to you again.
To hide the **Save** menu, open the **Save setup** window, click the **Appearance** tab, and mark the **Hide save menu** button.

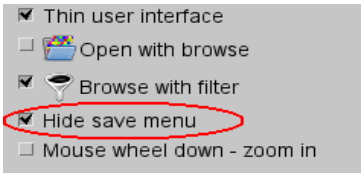



*Figure 31: Hiding the Save menu*

## 3.4 Reload from disk

Function **Reload from disk** reloads the current fabric from the disk and loses all recent changes. The keyboard accelerator is [`Ctrl+U`]. It is useful when you are experimenting, mess up a file beyond undoing, and just want to quickly get the latest valid state of the file.

## 3.5 Saving a fabric in .WIF format

The WIF format is a simple plain ASCII file format intended for the exchange of weaving files among different programs. To save fabric in a wif format, you have to write `.wif` extension to the file name in the **Save fabric as** dialog.
Things that WIF lacks (and *ArahWeave* supports):

- Fabric background color
- Colorimetry with CIE Lab specified colors (only RGB colors are supported, and only one color - no distinction between screen and print colors)
- The concept of repeat
- Denting
- Regulator
- Yarn composition
- Multicolor yarns
- Mouliné / mélange / chenille / printed / slub yarns
- Data necessary for fabric calculation of fabric consumption (total number of ends in the warp, selvedges, reed width, finished width, ...)
- Yarn count

What WIF has (in Arahweave's implementation)

- Weave up to 99 shafts
- Warp and weft pattern
- Warp and weft colors
- Warp and weft density (in the form of yarn space)
- Yarn diameter; each yarn can have its own diameter

# 4 Viewing the fabric

The main window of *ArahWeave* program will always display fabric in a particular view mode and zoom factor. View mode will determine the quality (and speed) of the simulation, while zoom will permit you to work with more precision or inspect greater detail of a very dense fabric.
The display area of the fabric always matches the total number of warp threads in the fabric. So it is quite important to enter this number correctly. You set the number of threads in the **Consumption** window (**Fabric** > **Consumption**).

## 4.1 Zoom level

There are six ways to change the zoom level in *ArahWeave*:

1. Choose the **Zoom** menu, and click desired zoom level from the list. There are 39 entries from **1:20** to 20:**1**. **1:8** means 12,5%, **1:1** means 100%, and **1:15** means 1500%.
2. Press key **+** to zoom in, or press key **–** to zoom out.
3. Click Zoom-in or Zoom-out in the main menu bar. If you click Zoom 1 program goes straight to zoom 100%. If Zoom1 is grayed out (inactive), then the zoom is already set to 100%.
4. Press the **Ctrl** key on the keyboard and roll the mouse wheel up or down.
5. If you press any number from 0-9 on the keyboard, you will change zoom directly to that level (1 means 100%, 6 means 600%, 0 means 1000%).
6. If you press any number from 0-9 + CTRL on the keyboard, you will zoom out fabric view (CTRL + 1 means 10%, CTRL + 5 means 50%). This only works in the simulation view.

## 4.2 View mode

There are four possible view modes, and they are always available from the **View** menu: **Weave [w]**, **Integer [a]**, **Shaded integer [s]**, and **Simulation [s]**. Simulation comes in several quality levels—from 1 to 9. As you increase the level of simulation, the program calculates more points for each screen point and calculates average color, and you get more accurate simulations. In this way, you can vary the speed and quality of the simulation according to your computer speed, type of design, and stage of designing (creative modifications or final preview).

### 4.2.1 Weave view

This view mode shows the weave repeat in black and white. It is useful when you are drawing a new weave since it is easier to see the errors in the weave repeat. If you enable the **Fringe** option you can also see the warp and weft pattern on the bottom and left of the weave.

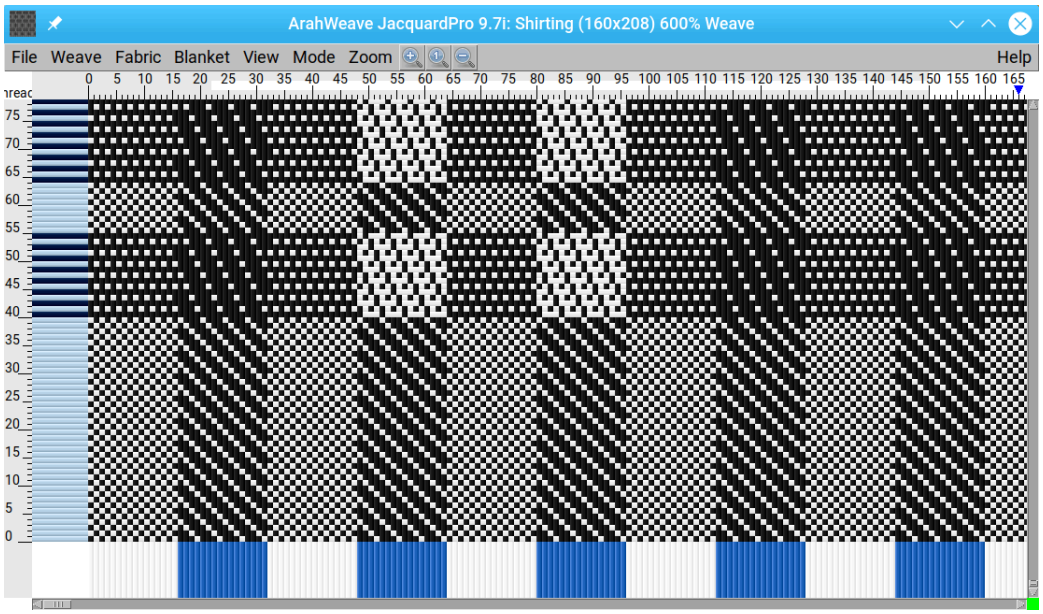



*Figure 32: The weave view of the fabric with fringe*

### 4.2.2 Integer view

This view mode just shows the fabric in repeat. One pixel (point on the screen) will be used to simulate one thread. If you choose bigger zoom (200%, 300%) two or more pixels will be used for one thread. This is the fastest mode and is usually used in the design phase. In all view modes, the fabric simulation starts from the bottom, in full respect of textile tradition. In the title of the main ArahWeave window,

you will also find the name of the currently loaded fabric and the size of the repeat in warp and weft, expressed in the number of threads. If the sizes of weave and warp/weft pattern are not divisible, this number will be the smallest common denominator of these values. However, the upper limit of repeat size in threads is 65520 × 65520 threads. If you see this value in the title of the main window, check the size of the weave and the size of the pattern repeat. Something is probably wrong since they do not divide each other.

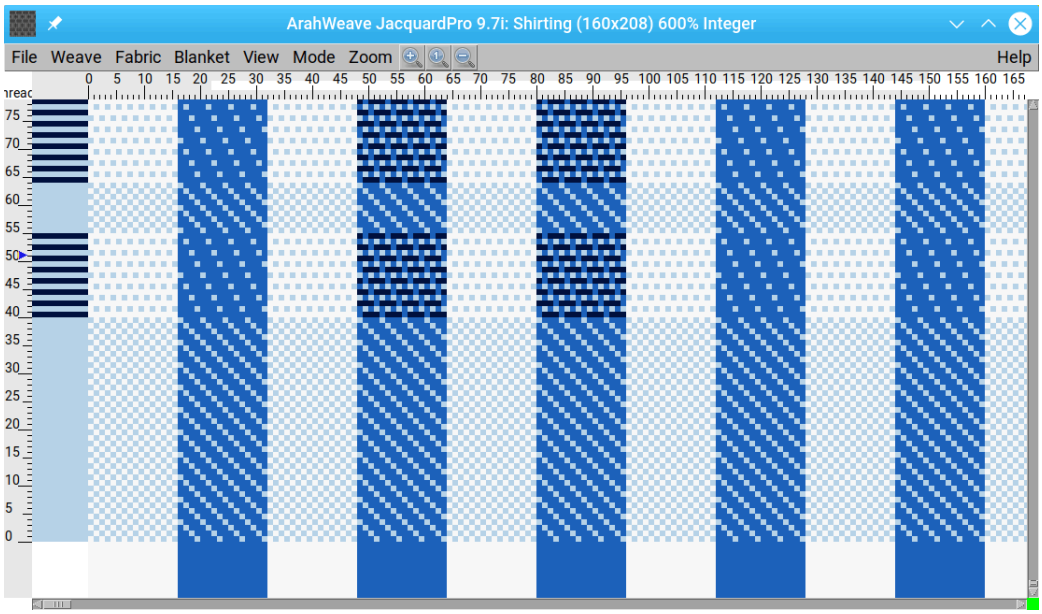



*Figure 33: Integer view of the fabric with fringe*

### 4.2.3 Shaded integer view

This mode shows the fabric in the repeat, but on zoom levels higher than 300 % adds shadows to threads, so you can easier see interlacing and distinguish between warp and weft.

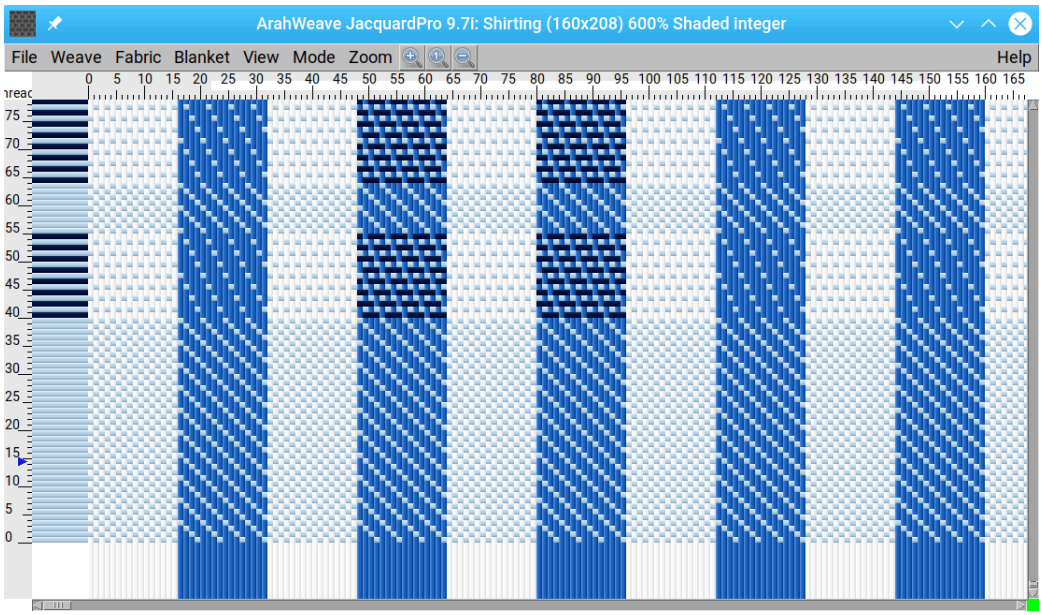



*Figure 34: Shaded integer view of the fabric with fringe*

### 4.2.4 Simulation view – setting the density

The **Simulation** mode shows the fabric in real density with respect to finished fabric. You must enter the density for warp and weft, expressed as the number of threads per centimeter (or inch). To set density, choose **Fabric** > **Density**.

You can set the density as the number of threads per centimeter (inch), or as the size of repeat in cm (inches), for both warp and weft. Note that only the number of threads per one cm is saved in a file; the repeat size is calculated from the other data. You can also set Zoom (%) to any value between 5% and 2000%. The Simulation view shows the fabric in real 1:1 size, including yarn diameter with holes (in background color, which can be defined in the **Edit colors** window), if the yarns are thin with respect to density.

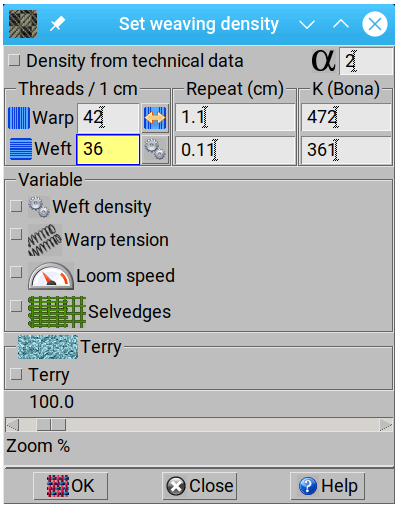



*Figure 35: Setting the weaving density*

If you activate the **Density from technical data button** in the upper part of the dialog, then the density is automatically calculated from other data, which you enter in the **Calculation of thread consumption** window (**Fabric** > **Consumption**; more about setting the technical data in Chapter 14). The density entry numeric fields are grayed out to indicate, that you cannot change them in this window. **Density from technical data** must be activated, if you want to have a simulation of variable denting or variable weft density effect. Otherwise, the fabric will be simulated with single density across the whole fabric. The reason for this behavior is that a big majority of fabrics will be simple, and all you will need is the warp and weft densities. Besides, in the design phase, you will not have all the technical details necessary for the correct automatic calculation of density.

You will be able to see the shades, which are caused by the thread interlace. It is the most accurate and also the slowest view mode. You have 9 simulation quality levels, each being approximately two times slower than the previous one. Do not use simulation quality 9, unless you really need it, since it is very slow. Try simulation quality level 5, and then increase it, until you get a simulation of proper quality.

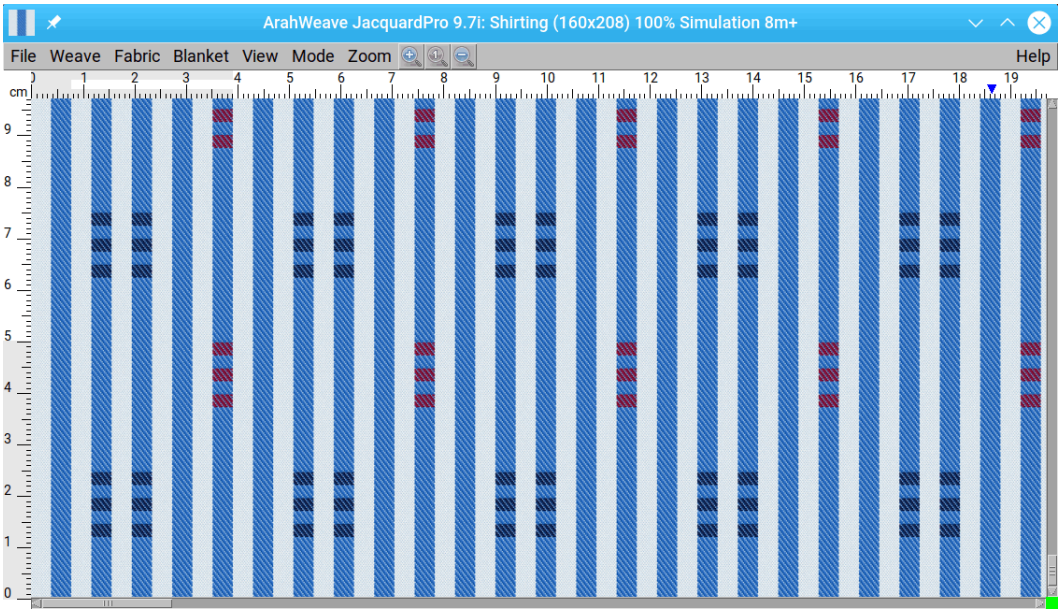



*Figure 36: Simulation view of the fabric*

### 4.2.5 Setting the fabric density unit


*Figure 37: Setting a density unit*

*ArahWeave* has an option in the **Measurement system** section of the **Save setup** dialog, to set the **Density unit**. For example, many customers like to express density per 10 cm, not in 1 cm, which is *Arahweave's* default. Once you set it, the program will display all densities in that unit. The **Density unit** is also saved in the `.arahne` configuration file.

## 4.3 Raised finish simulation

If you want to simulate the raised finish, activate the **Simulation** function from the **Fabric** menu. You will be able to enter the length of raising in tenths of mm for warp and weft, as well as direction (up / down / left / right) and intensity (0-10). You should play a little with these parameters to find values that best represent the finishing that you are actually using. The raised finish window displays the preview of the selected effect. Once you are satisfied with the result, click the **OK** button, and it will be applied to the fabric in the main display window.

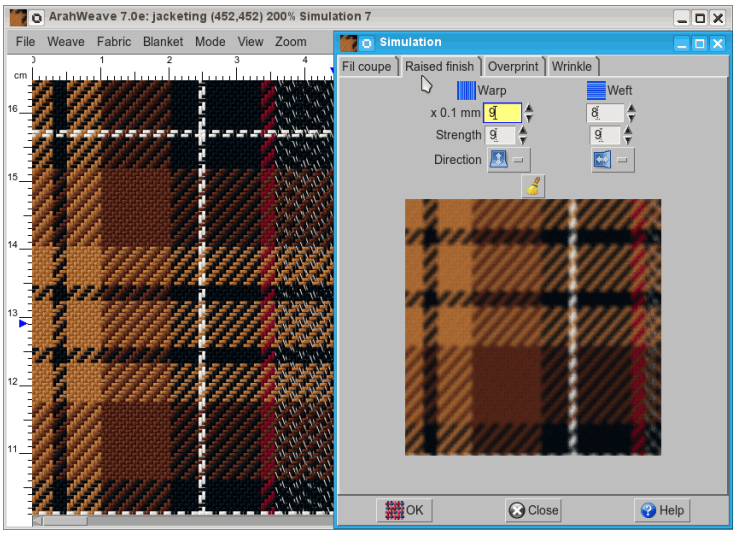



*Figure 38: Raised finish simulation*

## 4.4 Fringe view

This option will enable you to view the warp and weft patterns on the left and bottom of the main *ArahWeave* window. The **Fringe** option is a toggle button in the **View** menu, but you can also enable it from the keyboard by pressing **f**. It works in all views, but you must scroll the fabric to the left edge and to the bottom to see it. Using this feature, it is easier to graphically see the emerging warp or weft pattern, as you type it in or draw it with the mouse.

## 4.5 Ruler

When visible, a ruler appears along the top and left sides of the main window. Markers on the ruler display the pointer's position when you move it. To show or hide the ruler, choose **View** > **Ruler** or press **Ctrl+R** on the keyboard. It displays the length and position in threads or in centimeters. To switch between the two units, click on the ruler unit indication (points, cm) (see Figure 39). If you want to have the ruler in inches instead of centimeters, you must change the measurement unit from metric to imperial in *ArahWeave's* **Help** > **Save setup**. The ruler has also two functions which help you find positions in warp or weft pattern (**right-click on ruler** positions cursor on that place in **thread pattern editor**) and denting or regulator (middle click on ruler position cursor in weave editor in the **denting** or **regulator fields** at that place).

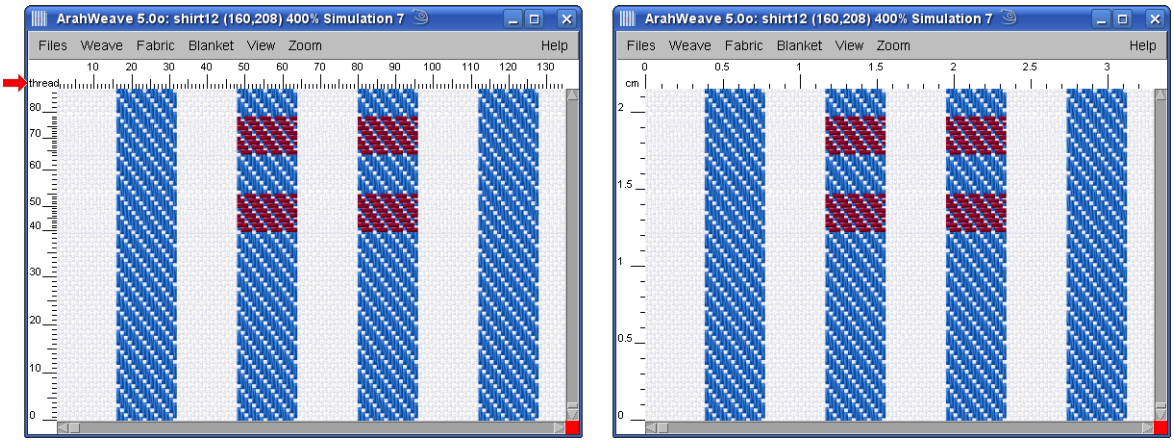



*Figure 39: Ruler with unit in threads and centimeters*

*If there is an image loaded in the Jacquard conversion window, then the ruler has an additional, third mode: the image preview, which is displayed instead of a ruler. Using this function, it is easy to copy warp/weft patterns from scanned samples.*

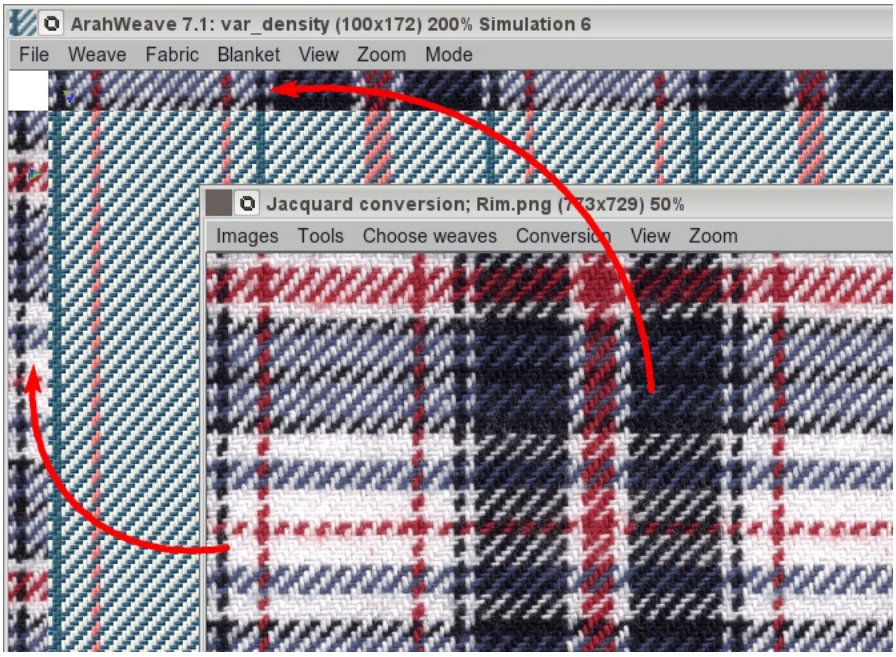



*Figure 40: Image (scanned fabric) displayed in ruler*

## 4.6 One Repeat

**One repeat** fabric view is available from the **View** menu of the main window. It is most useful when you are making a blanket, shawl, napkin, or any other one-piece type of fabric. You will clearly see where does the repeat end. One repeat means a repeat of all fabric parameters: weave size, warp and weft pattern, and denting/regulator. If one of them will not divide the other, the repeat may be larger than you expect. **One repeat** is both a view mode and a fabric property. It is saved in the fabric file. This feature is usually used for one-piece designs, like picture weaving, blankets, shawls, napkins, and tablecloths. You can also choose to view one repeat only in the warp, or in the weft direction. This is useful for narrow designs, where you want them to be repeated in one direction, but not in the other.


*Figure 41: One repeat view*

## 4.7 Pan tool

To pan the fabric, move it while holding the left mouse button down. During moving the cursor pointer changes from an open hand to a closed hand. You can modify the color of the hand in **Save setup** > **Colors** by changing the RGB values (click the Edit button to open the Color Editor to specify color). The pan tool is not working, when warp/weft editor, yarn editor, or color editor are open. In that case, the mouse pointer will be used to draw a warp or weft patterns. If you still want to use the pan tool with those windows open, select background color (#) at the end of the warp/weft letters in those editors.


*Figure 42: Changing the mouse pointer color*

## 4.8 Modified file status

The color of the square in the bottom right corner of the main *ArahWeave* window indicates the modified fabric file status. The square turns to red from green after applying some changes in the fabric (yarn, color, weave, technical data) to the fabric. When you save the fabric, the square becomes green again.

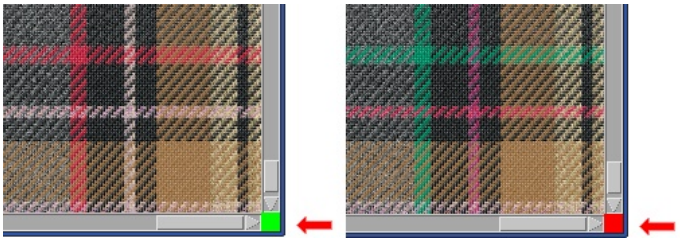


*Figure 43: After change, the square turns to red*

## 4.9 Closing all pop-up windows

The **Close windows** function from the **View** menu closes all pop-up windows, so you don't have to close them one by one. It serves for quickly cleaning up the desktop if you have too many windows open. You can also do it by pressing Ctrl+W, or by clicking on the modified file status indicator (doesn't matter if it is red or green).

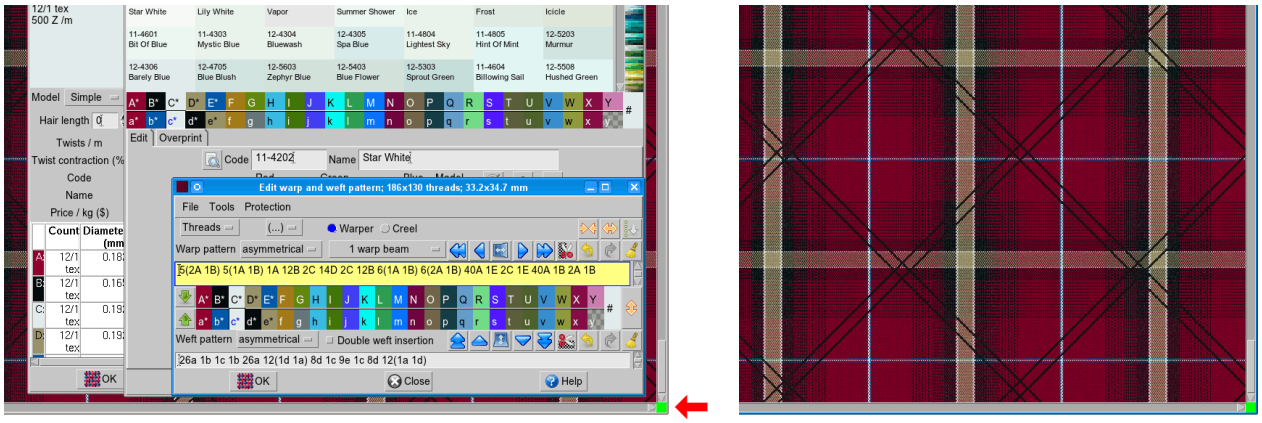



*Figure 44: After clicking the file status button only the main window remains open*

# 5 Editing the weave

The weave is the basic element of fabric construction, which controls the way in which threads will interlace. A black point means that the warp (vertical thread) will be on top, and a white point means the weft (horizontal thread) will be on top.

To create a new weave, go to the **Weave** menu and select **Edit**. The weave editor window will appear (right-clicking on the fabric also pops up the weave editor). Place the mouse over the desired point and use the left mouse button to draw a black point (warp over weft), while the right mouse button is used to draw white points (actually, to change the black points into white). Pressing and holding the mouse button enables you to draw interactively. While editing the weave, you can see what the new weave will look like in the fabric at any time.

## 5.1 Elements of the Weave editor

Figure 45 shows the elements of the **Edit weave** window (the **Dobby** view should be enabled, **View** > **Dobby**; otherwise, only the weave section of the weave editor is visible; see Chapter 5.8.4).

The weave starts in the lower left corner with the first warp and weft threads. The draft is found in the upper left corner, the dobby card is located on the right, and the tie-up occupies the upper right corner. On the leftmost part of the weave editor, you see the weft pattern (starting from the bottom), and on the bottom, the warp pattern (starting from the left).

A **denting** is displayed on top of the weave and below the drafting.

A **regulator** is displayed to the right of the dobby card.

The variable weft control functions have a place next to the regulator. You have to enable them in the **Density** window if you want to use them (see Chapter 14.7.1).

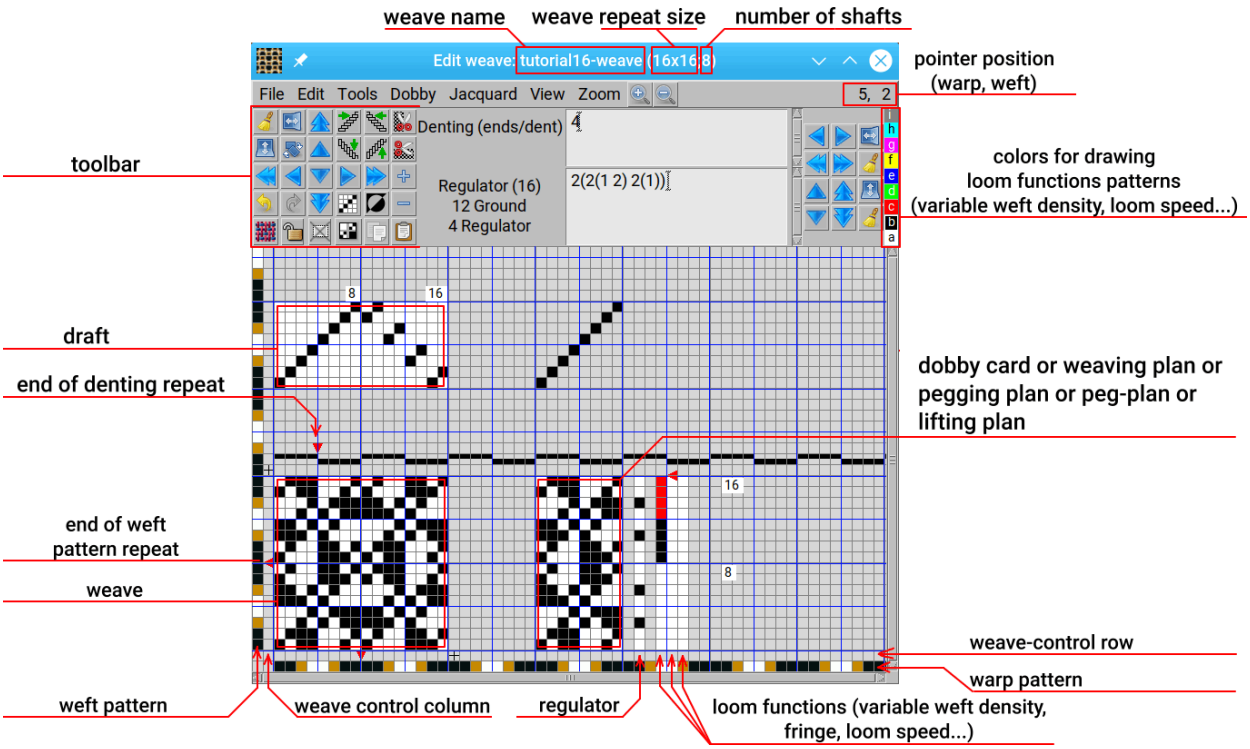



*Figure 45: Weave editor*

The small triangles (meant to be arrows) indicate the end of the repeat. They will be displayed for warp and weft pattern, denting, and regulator, if present.

The **Edit weave** window title displays some additional information: the weave filename, the weave repeat size in warp and weft, the number of shafts used in this weave (if it is a dobby weave), and the number of warp and weft thread systems (if different from 1).

If the number of shafts is not minimal, it will display them as 8/6, which means there are 8 shafts, but only 6 are really needed. A larger number of shafts is often used in weaving to balance the weight (numbers of warp ends per shaft) of the shafts.

The weave editor supports very large weaves; a full jacquard weave can be loaded in ArahWeave. In such cases, the program does not show  or drafting. It stops displaying these data when the number of shafts exceeds 99. Actually, nobody uses more than 36 shafts, but having up to 99 shafts can be useful for editing purposes.

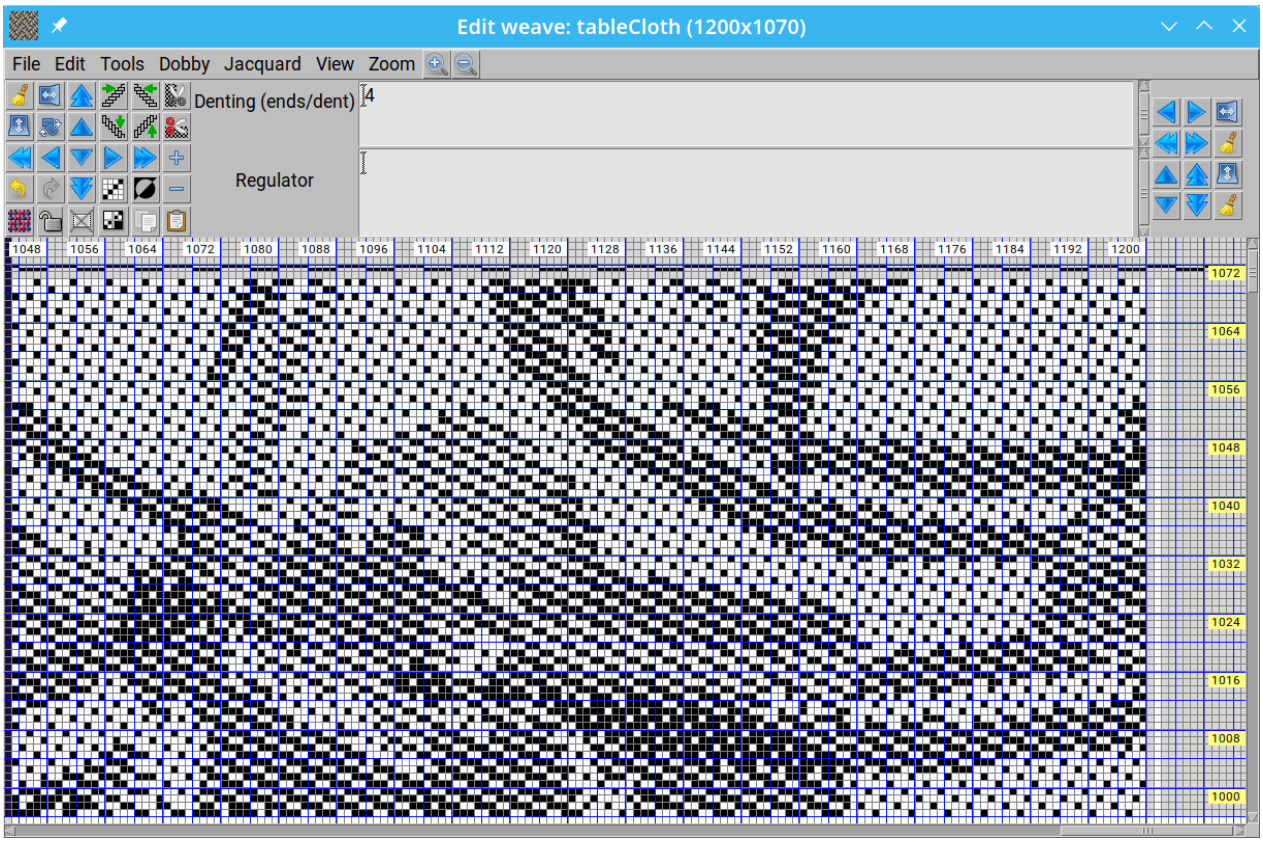



*Figure 46: A Jacquard weave in the weave editor*

## 5.2 Setting the weave size

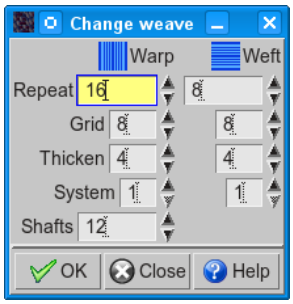



*Figure 47: Setting the dimensions of the weave*

To change the size of the weave, choose **Edit** > **Dimension**. You will be able to change:

- **Repeat**—size for warp and weft (maximum 65520 by 65520, minimum 1 by 1).
- **Grid**: the number of pixels used for one weave point (we can call it zoom as well, as you change it by zooming in and out).
- **Thicken**—after how many lines should one be thickened to facilitate counting (on screen and in print).
- **System**: the number of threads in the warp and weft (leave it at 1 for single-layer fabrics). They are meant only for documentation. It shows the user's intent for this weave and does not reflect the real effect of the weave on the fabric.
- **Shafts**—how many shafts you intend to use (do not be disturbed by the large value on jacquard weaves; just leave it as it is).

You can freely change these values; you will not lose the previously entered data if you diminish the weave to something smaller than what you have previously drawn. Just enlarge it again, and it will be where you left it. The size of the weave will change interactively if you use the arrow buttons. Otherwise, you have to click the **OK** button to apply the new settings.

### 5.2.1 Setting the weave size with the mouse

You can change the weave size using the middle mouse button by clicking on the weave control row and column at the desired position. For instance, if you want to set the size of the weave repeat to 16 by 8, just click with the middle button the 16th point of the weave control row and the 8th point of the weave control column (in Figure 48, arrows indicate the weave control row and column; the 8th and 16th points are marked with X).

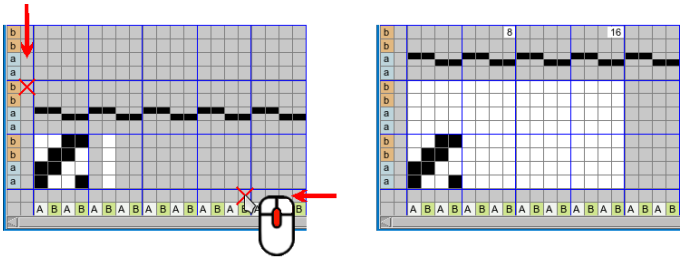


*Figure 48: Setting the weave size with mouse*

## 5.3 Weave editor toolbar

The toolbox is in the upper-left corner of the weave editor. It contains 28 icons, most of which are self-explanatory. When you make any change to the weave, either by drawing or by using these tools, the result will be immediately visible on fabric in the main window if you are in integer view. If you are in simulation view, you will have to apply the changes to the weave (click Redraw  ) to see the result. If there is a selection in the weave, tools work only on the selection.

*Figure 49: Tool-box of the weave editor*

 Clear weave

 Horizontal mirror

 Vertical mirror

 Rotate 90 degrees

 Shift left by 8

 Shift up by 8

 Shift down by 1

 Shift up by 1

 Add warp (black) points

 Remove warp (black) points

 Match weave size to warp pattern

 Match weave size to weft pattern

 Draw twill (diagonal)

 Lock drafting

 Copy

 Tilt right (transforms vertical line to right diagonal)

 Tilt left (transforms vertical line to left diagonal)

 Tilt up

 Tilt down

 Shift right by 8

 Shift down by 8

 Shift right by 1

 Shift left by 1

 Redraw (refresh) a fabric simulation

 Invert (shortcut is the Space key)

 Undo

 Redo

 Deactivate selection

 Edit decomposed

 Paste

### 5.3.1 Shifting the weave

As the name indicates, clicking one of the shifting icons shifts the weave in the desired directions for one (single arrow) or eight pixels (double arrow).


Shift left by 8


Shift right by 8


Shift up by 8


Shift down by 8


Shift down by 1


Shift right by 1


Shift up by 1


Shift left by 1


*Figure 50: Original weave, and weave shifted by two to the right*

### 5.3.2 Tilting the weave

The tilt tool shifts every next line (or column) of the weave for one thread in the desired direction. The most common use is for the fast creation of satin weaves.


Tilt right (transforms vertical line to right diagonal)


Tilt left (transforms vertical line to left diagonal)


Tilt up


Tilt down

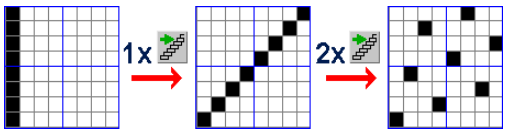



*Figure 51: Original image, tilting one time, and tilting three times to the right*

### 5.3.3 Adding and removing points

The Add tool adds one point to the right of the already-black point. You can keep pressing it until you get the desired result. The Remove tool works similarly; it removes the black (warp) point to the left of the white point. Both tools are useful for quickly converting warp weaves to weft weaves and vice versa.

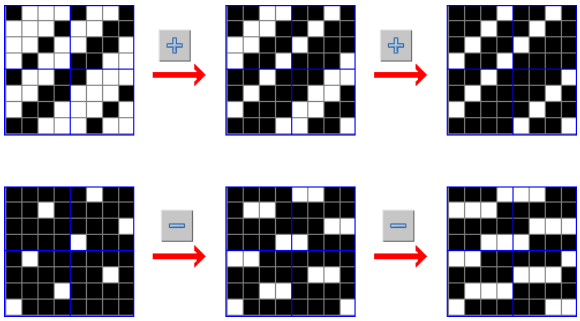


*Figure 52: Adding or removing points*

### 5.3.4 Drawing diagonal line (twill)

This tool enables you to draw a twill weave with one click. Actually, it negates the color of points, which form a diagonal line. If the initial weave size is not square, it continues to draw a diagonal line until it reaches the edge (last thread) of the weave. The tool works best in combination with the adding and removing points described in the previous chapter.

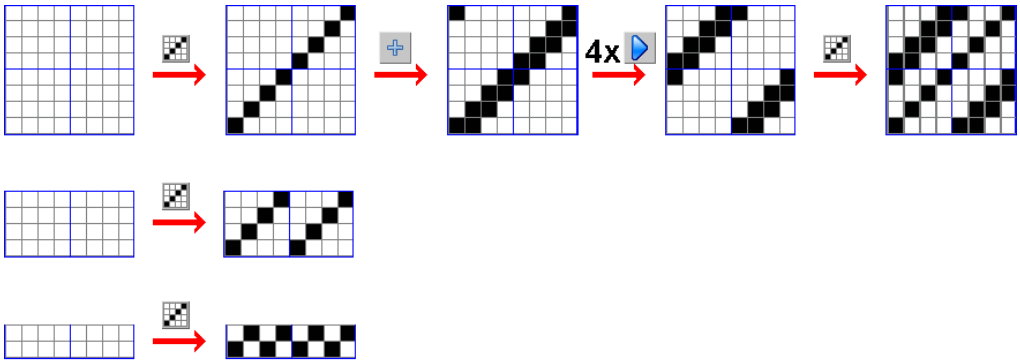



*Figure 53: Drawing a diagonal*

## 5.4 Opening weaves from the Load weave dialog

You can open a weave in weave editor from the Load weave dialog (**File** > **Load weave**). The dialog enables you sorting weaves by name, size or date. You can delete or rename a file by clicking with right mouse button the filename, which opens the menu, where you select either Delete or rename.
Besides Arahne's proprietary weave format, *ArahWeave* also loads GIF, PNG, JPG, PCX, BMP, and TIFF formats, as well as electronic jacquard formats (Bonas, Grosse, Schleicher, Stäubli, TIS/Actrom, Müller UPT) and some dobby formats. The exceptions are Stäubli JC3 and JC4, so we have implemented function **Read Jacquard floppy** in the **Weave** menu of main window, which copies them to Linux (to directory `/tmp/floppy`).

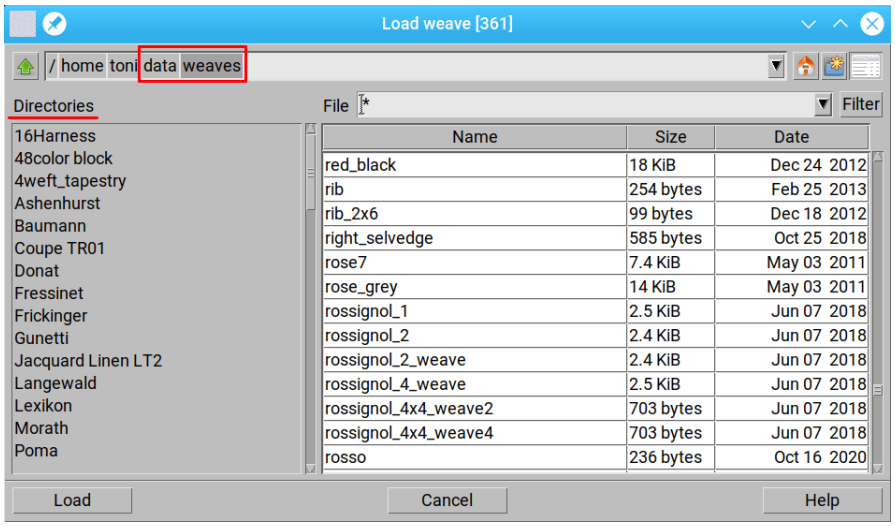



*Figure 54: The load weave dialog*

## 5.5 Opening weaves from the Weave browser

More convenient way to open a weave is using a graphical weave browser. To open the weave browser, choose **File** > **Browse** (keyboard ALT+B) in the **Edit weave** window's menu. The program will display all the weaves from the current weave directory. The window title shows the total number of weaves.

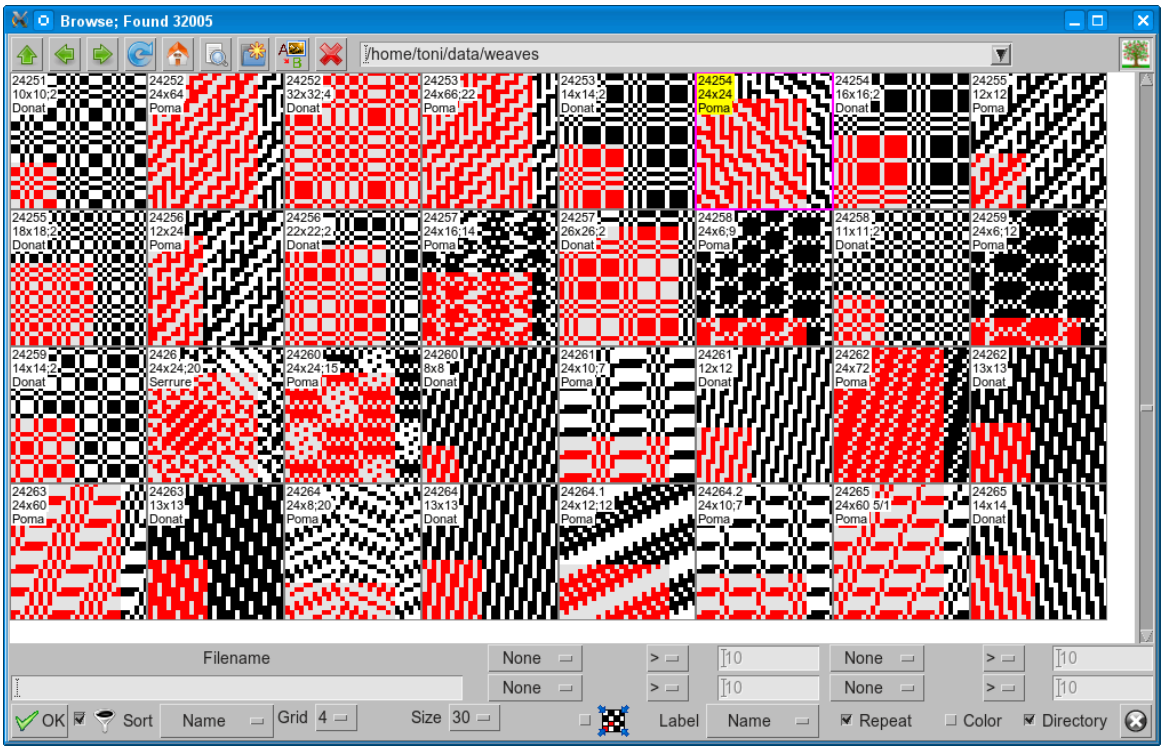



*Figure 55: Weave browser*

The meaning of icons in the toolbar is described in the table below.

one directory up
back
forward
reload
default directory
find weave
create new directory
rename weave
delete weave

The **Filter** option allows you to search for a particular weave by **weave size x**, **weave size y**, **number of shafts**, **effect** (warp or weft), **float x**, **float y**, **total float**, **K factor x**, **K factor y**, **K factor xy**. If you use the file name filter, the program will interactively change the display to show you only the weaves, which match the search filter.

You can toggle the **Grid** size (number of screen pixels) from 1 to 4. The **Size** of area reserved for display of one weave is also modifiable – you can choose between 30, 40, 50 and 60 weave points. Your view of weaves can have an indication of repeat, can be in black and white or in warp / weft colors, and can have the weave filename and size in the title (**Label**). To load a weave just double click on it or click the **OK** button.

### 5.5.1 Shrink oversized option

When weave is big the icon display area becomes too small for clear weave presentation. Weave browser has an additional display mode: the **Shrink oversized** mode. In this mode, browser scales big weaves, so you get a clearer idea about the weave. To enable the **Shrink oversized** mode, switch on  icon. Figure 56 shows the icon of the same weave in the default view mode, and in the **Shrink oversized** view mode.

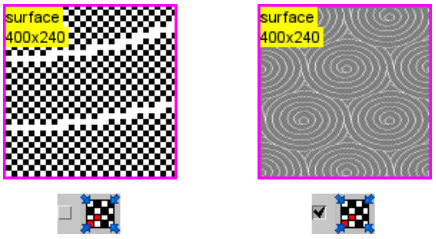



*Figure 56: Shrink oversized view disabled and enabled on a large weave*

### 5.5.2 Browsing subdirectories

*Arahweave's* browsers have the capability of showing files in subdirectories. It is very useful when you search for a file, but you don't know in which directory it is. If there are subdirectories in your parent directory, then the Weave browser displays the "leafless tree" icon  in the upper right corner of the window (in the same line as a directory path). To display all files from subdirectories, click the tree icon.

It changes to the "tree with leaves and fruits" icon  , which means, that the Weave browser shows all files from the parent directory and its subdirectories. If the weave is from the subdirectory, then the name of subdirectory appears in the weave icon.
*You should be careful in the use of this option, since it may take a very long time to finish and display the weaves, if you enable it at the start of your disk (/). The program will not crash, but it must read all the files on your hard disk, and this takes some time. So only use a subdirectory browsing on directories which actually contain the weaves.*

### 5.5.3 Recently used directories

In Arahweave's browsers, in the directory entry text field, the program shows a small arrow with a drop down menu of recently used directories. You can use this to quickly switch from one directory to another.

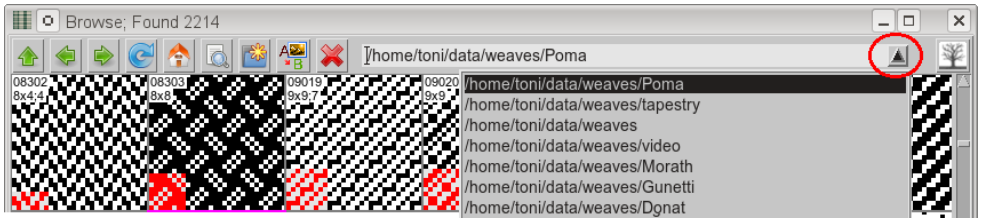



*Figure 57: Weave browser's recently used directories list*

### 5.5.4 Database of weaves

A huge database of about 35.000 weaves in the directories Ashenhurst, Donat, Serrure, Gunetti, Fressinet and Poma is included in the standard *ArahWeave* installation.

## 5.6 Saving a weave

Choose **File** > **Save weave as** to save a weave with a new filename.

Please note that a weave must be consistent if you want to save it. In the case of shaft weaves, this means that the weave, drafting, and card (peg-plan) must all be in place and correspond to each other. The program always checks the weave before saving and will draw a draft and card from the weave if they are incorrect or missing. But if you draw only a dobby card (peg-plan) while draft and weave are empty, it will clear the card during saving.

Normally you save the weave in **Arahne** format, but f you need to export the weave to some other program, you can use one of these formats: **WIF**, **PNG**, **TIFF**, **GIF**, **BMP, Bonas EP, Grosse WEA, St** **St** . Choose the format for saving in the Save weave window from a drop-down menu.

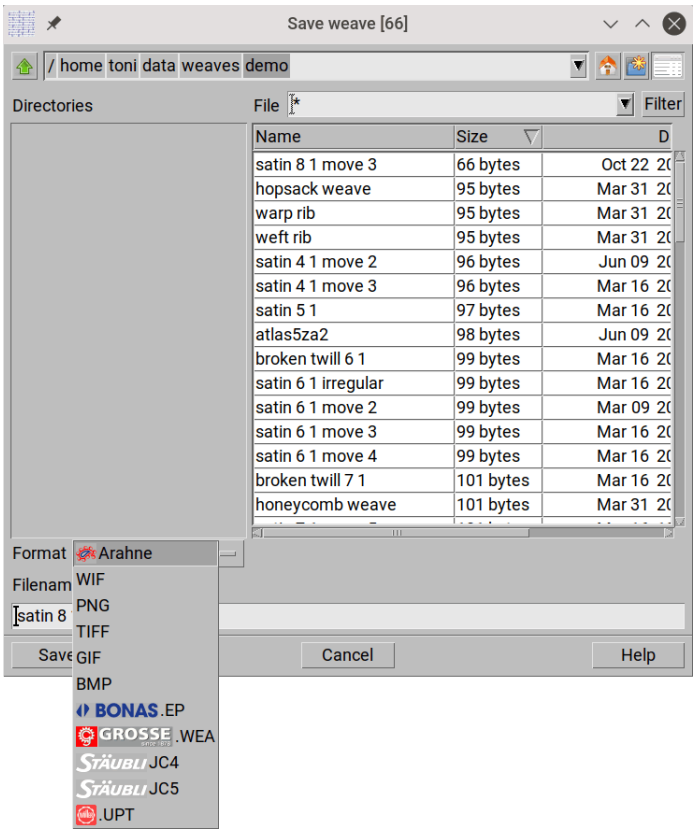



*Figure 58: Choosing a weave format*

## 5.6.1 Loading recently used weaves

*ArahWeave* keeps track of recently accessed files and directories. To open one of the recently used files, choose **File** > **Load recent**. Set the number of recently used files in the **Number of recent files** field in **Save setup** > **Appearance**. Additionally, you may choose the icon size and whether or not you want specific details about the weave.

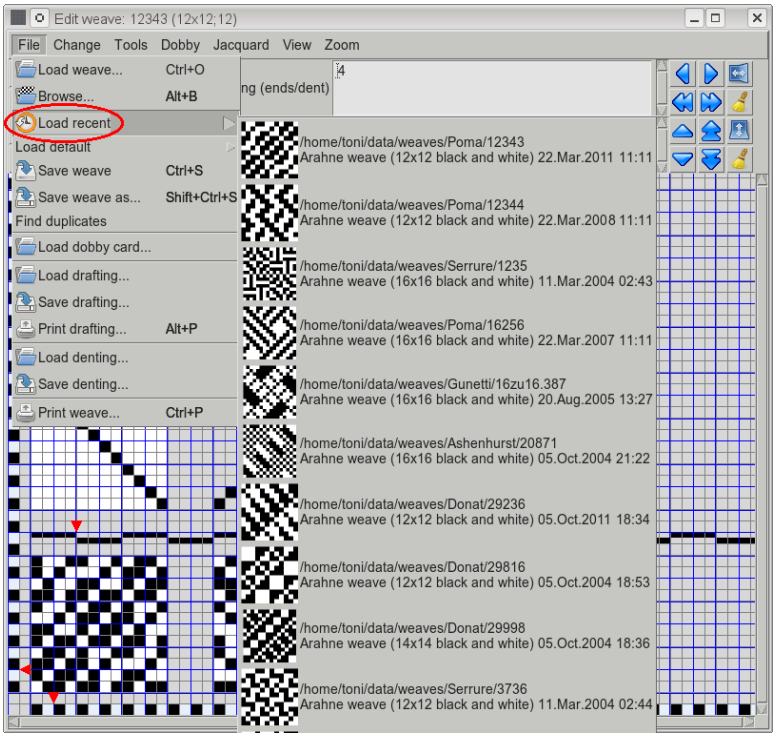



*Figure 59: Loading recently used files*

## 5.7 Default weaves

Some of the most common weaves can be found in a list under **File** > **Load Default**. However, using keyboard shortcuts, which are simply the number keys from 1 to 9, makes the function much more useful. For example, pressing 2 on a keyboard (while the weave editor window is focused) will change the weave to plain weave.
The same is true for:

- The weave editor's decomposed weave
- the weave entering area in the Jacquard conversion window.
- the weave (selvage) entering area in the Save cards for production window.

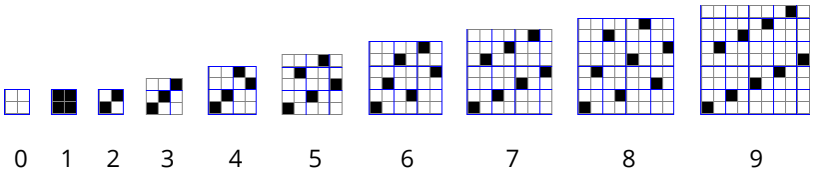



*Figure 60: Weaves and corresponding keyboard shortcuts*

Here's another keyboard shortcut to go along with the weaves keyboard shortcuts: the Space key inverts weave in the weave editor; for example, if you want the warp effect satin 5 weave, simply press 5 and then the Space key to invert the weft effect into the warp effect.

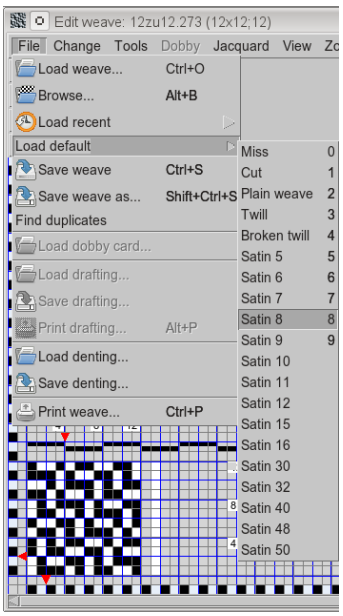



*Figure 61: Loading default weaves*

## 5.8 Weave editor view modes

### 5.8.1 Yarn

If you enable the **Yarn colors** toggle button from the **View** menu, the weave will be displayed in warp and weft colors. On the card, weft points are drawn in weft colors, while warp points remain black. Other elements of the weave remain unchanged.

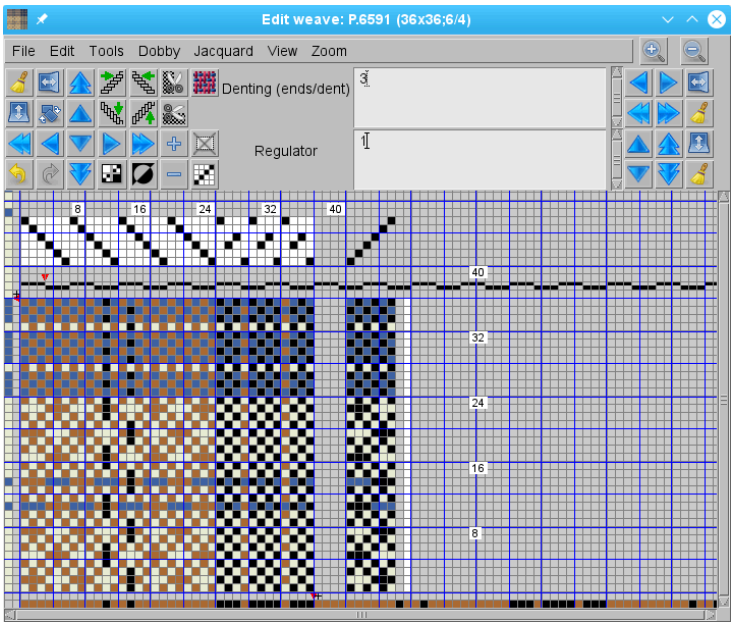



*Figure 62: Yarn colors view mode*

### 5.8.2 Jacquard

**Jacquard colors** is an additional view of weave in the weave editor. You can access it from the **View** menu of the weave editor. It is intended for use in jacquard design when you are fixing the long floats and want to be able to precisely see the transition between two colors. If you only see the weave in black and white, you cannot see the exact transition from one weave effect to another, since weaves

are sometimes similar. This view is enabled only if the jacquard weave size in jacquard conversion matches the weave size. This view mode also works with a decomposed weave view.

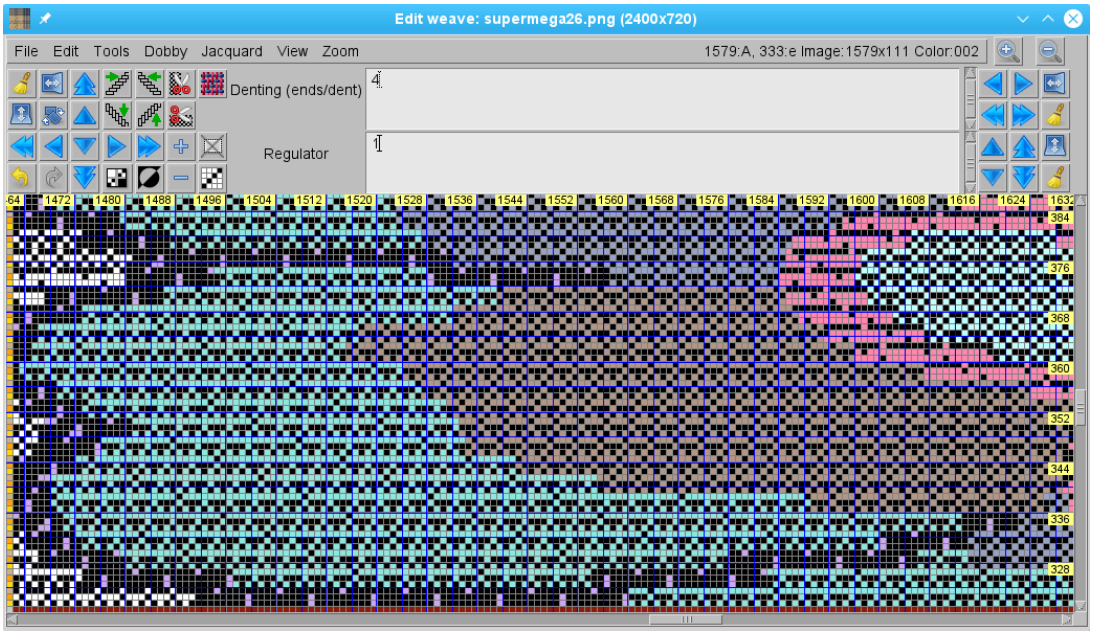



*Figure 63: Jacquard colors view mode; you can see the weave of each color*

### 5.8.3 Regulator view

The Regulator view helps you distinguish between “normal” and extra wefts. It is useful on large Jacquard weaves, especially if you want to draw some regulator control marks manually (with a mouse). Warp points of the extra weft are drawn in blue, while weft points are drawn in yellow.

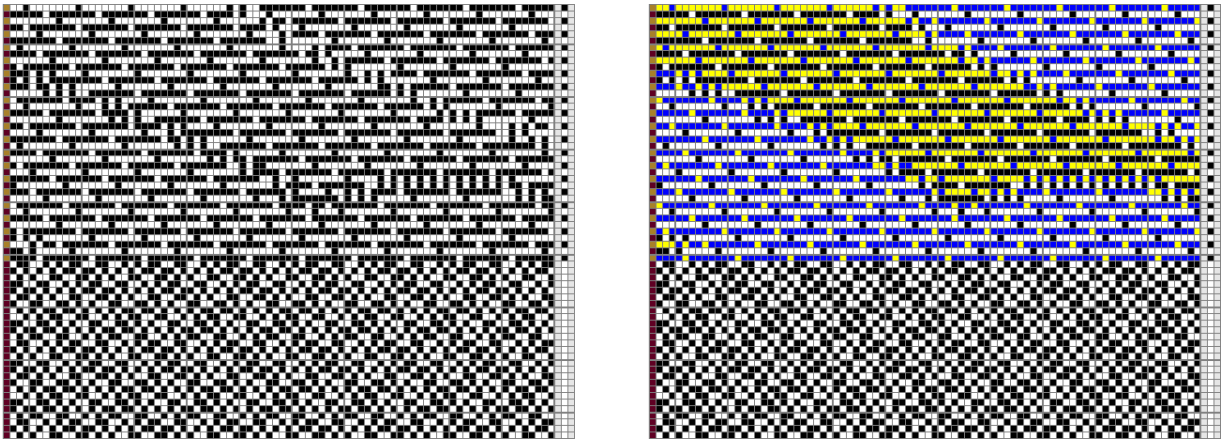


*Figure 64: Normal weave view and regulator view mode*

### 5.8.4 Dobby view

The **dobby** view enables you to switch the dobby card on or off, since sometimes you do not wish to be disturbed by it. For example, customers who only have jacquard looms don’t need to look at the dobby card and drafting.

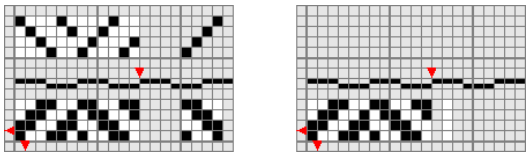


*Figure 65: Dobby view on and off*

### 5.8.5 Cross section view

You can also enable the display of horizontal and vertical cross sections. The cross section is interactive —it shows you the cut at the current mouse position. You can draw over the cross section with the mouse to change the position of threads, and the weave will be modified accordingly.

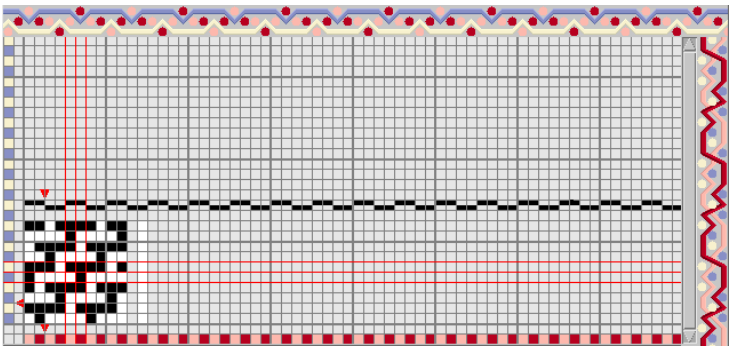


*Figure 66: Cross section in the weave editor*

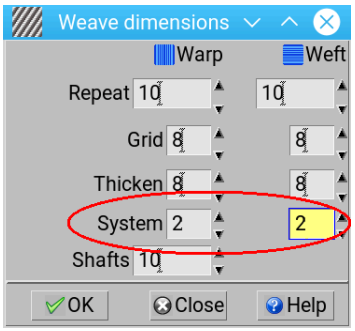



*Figure 67: Setting the weave System*

To control a number of threads in the cross section at a time, set the **System** parameter in the **Change weave dimension** window (Figure 67).

### 5.8.6 Decomposed colors view

The **Decomposed colors** view mode is a great tool for composing multilayer weaves, especially for placing the stitching points between the fabric layers. Each layer has a different color pair for presenting warp and weft points, which enables faster and more accurate placement of stitching points.

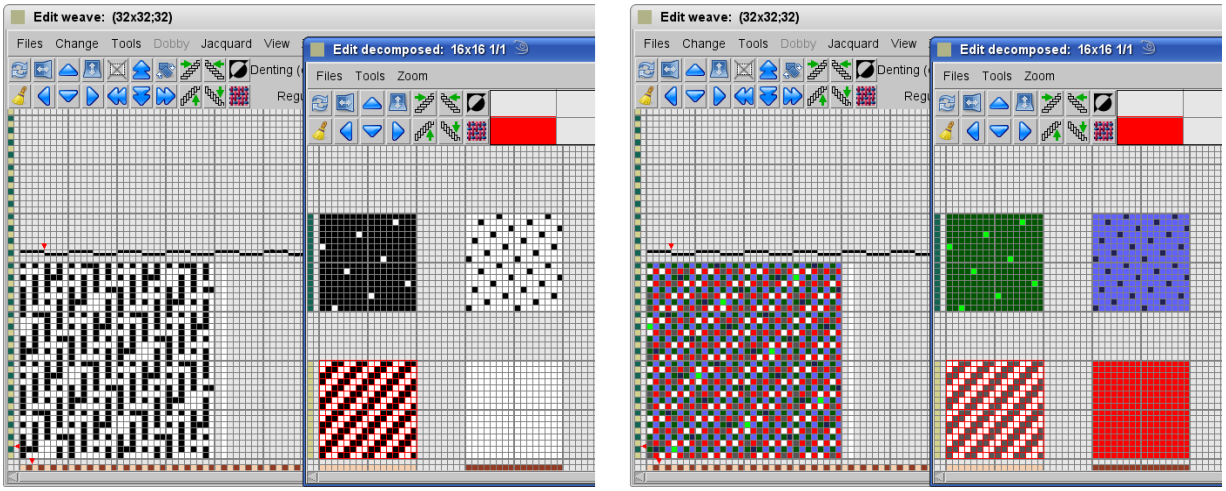



*Figure 68: Default view and Decomposed colors view*

## 5.9 The Edit menu

The edit menu contains some usual commands like **Undo**, **Redo**, **Select all**, **Crop**, **Copy**, **Paste**, and some nonstandard commands relating to the manipulation of weaves, like functions that change the weave size or fix floats.

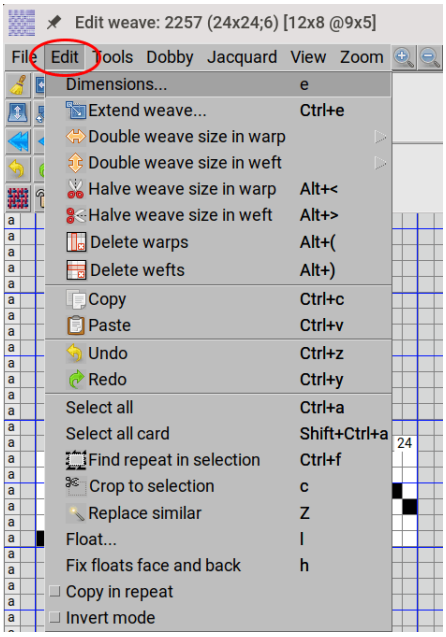



*Figure 69: The Edit menu*

### 5.9.1 Extending the weave

To repeat (extend) the whole weave, choose **Edit** > **Extend weave**. In the Extend weave dialog, set the number of repeats that you want to have in a new weave. As you change the number of repeats, the program extends the weave. You can observe the final repeat size in the title bar of the weave editor.

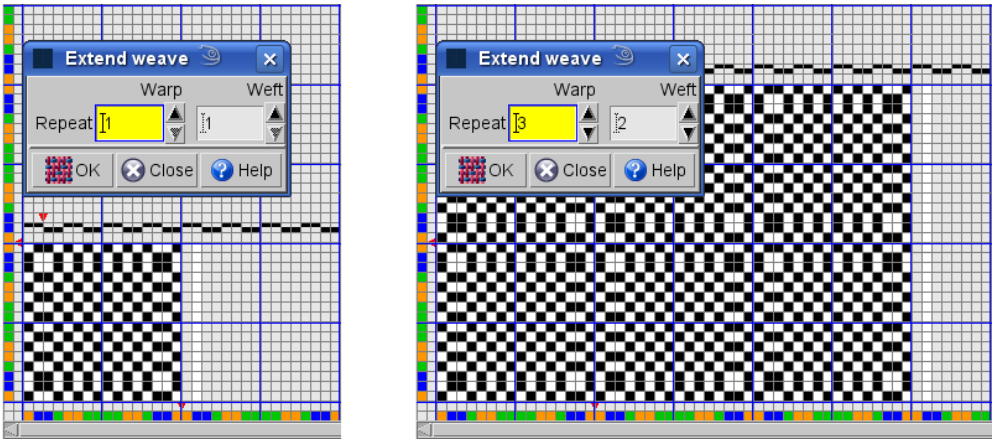



*Figure 70: Extending the weave in a quick way*

### 5.9.2 Doubling the weave size in warp / weft

The **Double weave size in warp** (or weft) function is another way to increase the size of the repeat. Each time you call it, the size will double the previous value.
The downside of doubling the weave size is, that it probably won't give you exactly the size you want so you must first make a bigger one and then reduce it to the desired one.

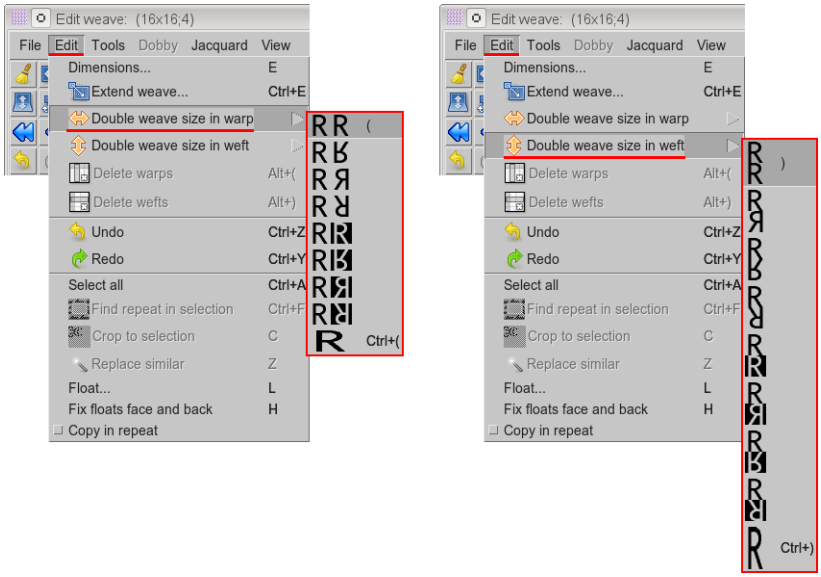



*Figure 71: The Double weave size in warp and Double weave size in weft menu*

### 5.9.3 Extend a weave across the weave editor area

This function allows you to extend the weave that you just drew in the weave editor's part across the entire area of the weave editor. To do so, hold down the Ctrl key and click the left mouse button in the upper left corner of the area you want to copy over.

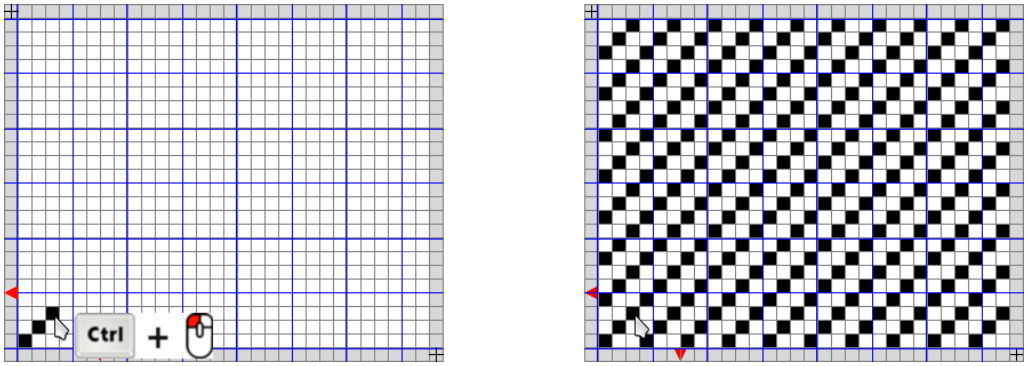



*Figure 72: Extending the weave with Ctrl+left click on the left upper point of the area, that you want to extend*

This function also works in the Edit decomposed weave editor.

### 5.9.4 Copy / Paste

You can use copy/paste of the weave inside one instance of the ArahWeave, or between multiple programs, including ArahPaint.

If you use the copy command (**Edit** > **Copy**; Ctrl+c; in the toolbox) and there is no selection in the weave editor, then the whole weave is put into the copy buffer (clipboard). Same happens with the paste: if there is no selection in the weave editor, then the paste (**Edit** > ; Ctrl+v; in the toolbox) replaces the whole content with a clipboard item; if there is a selection, then the program puts it only in the selected area of the weave.
The copy/paste also works between the weave editor and Jacquard conversion.

## 5.10 Long floats: statistics and correction (jacquard)

The maximal length of floats—that is, how many warp (weft) threads one weft (warp) thread passes without interruption (stitch point)—is one of the most important weave properties. There are no golden rules for these—it all depends on the density and the purpose of the fabric.
Usually you will only remove long floats in jacquard fabrics; dobby weaves are relatively simple, so long floats are not an issue. In any case, reviewing long float reports can be very instructive. Why do we have problems with long floats in jacquard but not in dobby? In jacquard, we are putting together many weaves; each of them is probably perfect, but at their junctions (the point where one weave will change into another), long floats are almost certain to pop up.
The quality of weave selection and the resulting number of long floats depend a lot on the experience of the designer. You can use the long float report as an early warning: something could be wrong with your weave selection if you have many long floats. You can also use the automatic float correction, but do not overuse it. If there are a significant number of long floats, you should reconsider your design and weaves.
To enable long float report, choose **Float** from the **Edit** menu. You will see a window with a separate graphical report of float length for the warp, weft, face, and back of the fabric. You may need to resize the window to see all the data. If there is enough space, the program will display the exact number of floats of length 1, length 2, length 3, etc. To see how many floats of warp are longer than 5, just click on column 5 or set the number 5 in the **Warp Face** field, and the program will sum up the total number of long floats and display them in red in the relative upper right corner. Besides, it will also display the length of float over 5 threads in mm, according to the current density setting.

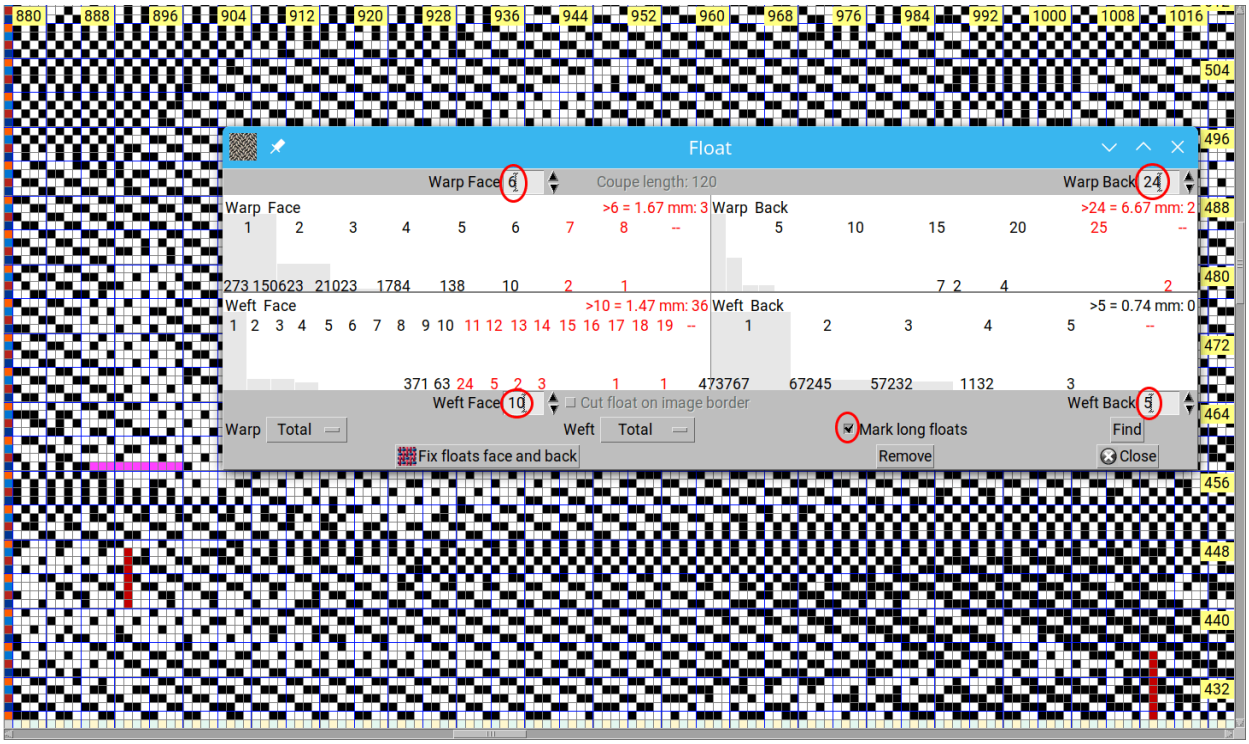



*Figure 73: Correcting long floats: warp floats longer than 6 are displayed in red, weft floats longer than 10 are displayed in pink.*

By selecting the float report, you can specify the acceptable float length. To see the location of errors, toggle the **Mark long floats** toggle button. Warp long float errors will be highlighted in magenta, while weft float errors will be highlighted in red.
Long-float errors are displayed in the Edit weave window and, if the view mode is Weave or Integer, in the main fabric display window as well. Negate the weave or reverse (**Fabric** > **Reverse X**) the fabric to see the long floats on the back side. You can intervene directly on the weave and correct the long

floats as if you were drawing a weave, or in the fabric main window, using the middle mouse button. The statistics of the long floats are updated interactively. Do not keep the float errors marked or the float report window mapped when you do not need it, since it will significantly slow down some interactive operations on large designs.
If the weave is very large and you cannot find the location of the float error(s), just click the **Find** button. It will scroll the weave window to the location of the first float error on the bottom left. To go to the next float error, correct the first one and click **Find** again.
A float report can be mapped even if the weave window is not mapped. It can be made in three variations (for both warp and weft): total, by threads, and by denting or regulator. This allows you to treat floats of different thread types separately. For example, you have some ground effect threads and some extra figuring wefts. You can allow longer floats for figuring wefts and short floats for ground weave.
To automatically remove long floats, click the Remove button. This function will only work if long floats are marked, and it will correct only errors on the face of the fabric. To correct them on the back of the fabric, you can reverse the fabric or choose **Fix float face and back** from the **Edit** menu in the Edit weave window. Sometimes, it can't correct all of the errors since, by correcting the error on the warp, it may create an error in the weft.

Last, but not least, if you make a mistake by clicking Remove when you did not mean it, click Undo  in the toolbox.

### 5.10.1 Correcting long floats in fil coupé fabrics

Fil coupé literally means "cut threads" in French. This weaving technique produces an interesting fringe effect on the surface of the fabric. Extra weft yarns are floating between motifs and will be later cut off. If we apply the long float correction to these wefts, the floated yarns will be connected to the ground fabric, and this would prevent cutting off the threads from woven fabric. So we have to tell the program that this is a fil coupé fabric and that these long floats between motifs shouldn’t be tied to the ground fabric. How do I do this? Select **Fabric** > **Simulation** and check the **Fil coupé** box. Set the **Coupe length**. The floats that are longer than the Coupe length number will not be corrected.

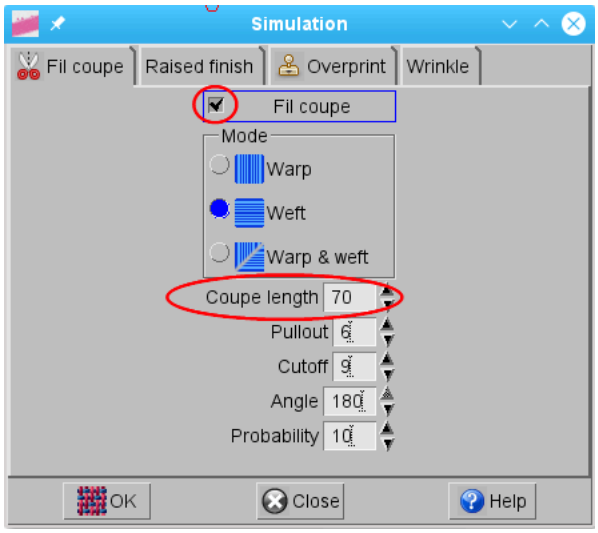



*Figure 74: Setting the coupe length; wefts floats, floating over 70 warp threads will not be corrected.*

## 5.11 Drafting

A draft determines which shaft controls which warp threads (the terms leaves, cambs, staves, and healds are synonymous with shafts). The number of shafts used depends on the complexity of the weave.

There are two modes of drawing drafting points:

- Left mouse button click draws a draft point and copies corresponding “shaft points” from the card into the weave.
- Middle mouse button click draws a draft point and copies corresponding “warp points” from the weave into the card.

You can access the draft-constructing functions through the **Dobby** menu of the Weave editor.

### 5.11.1 Optimizing the number of shafts

After you have drawn a weave, the fastest way to draw a draft is using **Change** > **Optimize the number of shafts** > **Left** (or **Right**). Left means that the program starts to draw shafts from left, right means that it starts to draw from the right side of the weave.

If you intend to save the weave with the least possible number of shafts, then you don’t need to apply the **Optimize the number of shafts**—the program does it automatically prior saving if there is no draft in the weaving plan.

### 5.11.2 Heavy shafts first (dobby)

This function is available from **Dobby** > **Check weave** menu. It puts the heavy shafts to first shafts. In this way, the selvedge shafts, if entered in the design manually, will appear last, as usual. On normal weave optimization, they would appear first, since they are at the left edge.

### 5.11.3 Loading and saving drafts

You can save or load any draft from the **File** menu in the **Edit weave** window. It is useful, when you want to apply a complex draft from one weave to another.

### 5.11.4 Balancing the weight of shafts

In practice, it is sometimes better to use more shafts than the least possible number, mainly because of the high number of warp threads.

Figure 75 shows weave with 6-shaft draft. The information in the **Consumption** window (**Fabric** > **Consumption)** tells us that first two shafts carry 1600 threads each. We think that this is too many, so we have to divide threads from first two shafts to two additional shafts. Choose **Check weave** > **Balance the weight of shafts**. Change **Desired number of shafts** to 8. The program draws a new draft and updates a number of heddles per shaft.

| shaft | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Heddles | 1600 | 1600 | 800 | 800 | 800 | 800 |
| g/m | 31.5 | 31.5 | 15.7 | 15.7 | 15.7 | 15.7 |

| shaft | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Heddles | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| g/m | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 |

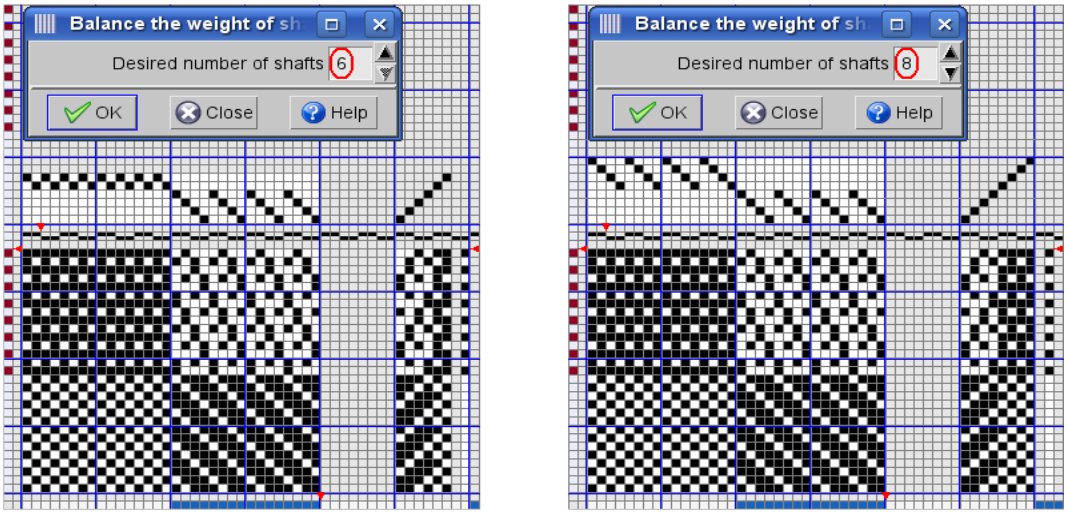



*Figure 75: Changing from 6 shaft draft to 8 shaft draft*

### 5.11.5 Pointed drafting

If your weave will be vertically mirrored, you can draw just half of the weave and apply the function **Drafting** > **Pointed** > **Add** from the **Dobby** menu. *ArahWeave* automatically expands and mirrors the weave in horizontal direction. The program will also draw the drafting, while the number of shafts remains unchanged. Note that first and last warps are not mirrored, to avoid two adjacent warps with equal weave. If the width of your weave is 10 prior to calling this function, it will become 18. If you change your mind, click **Drafting** > **Pointed** > **Remove**.

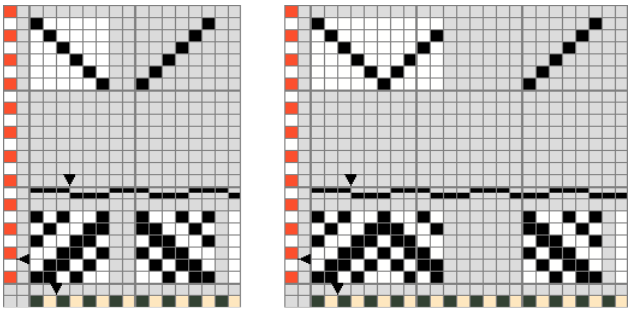


*Figure 76: Before and after applying Add pointed drafting*

This function is located in the **Dobby** menu, but can be of great use in a jacquard. To overcome the limited number of jacquard hooks, weavers will often use pointed harness arrangement, to effectively double the size the weave. To produce such a fabric, only half of the weave is necessary, and it is a good practice to draw only half of the color image, to reduce its size. But if we want to make a simulation of the fabric, we would like to see it mirrored in repeat, as it will be really woven. Using this function, it is a snap to switch between the two view modes for such fabrics.

### 5.11.6 Divided draft (dobby)

Automatic step 2,3,4,5 drafting is available from the **Dobby** > **Drafting** > **Step** menu. Step 2 would be normally called divided draft, and step 3 or 4 would be satin draft, depending on the size of the weave.

### 5.11.7 Reducing the number of shafts (dobby)

If the number of shafts in the particular draft exceeds the number of shafts on your loom, you have one more possibility—you can make a small change in the weave, which will enable further reduction of number of shafts. First you should optimize the number of shafts, and then choose **Dobby** > **Check weave** > **Suggest shaft merge**. Program finds the two shafts that are the most similar, and draws a red rectangle around these two shafts, and indicates the points of difference in the weave. If the changes which are necessary, to make the two shafts equal, are acceptable for you, just click them, and optimize the number of shafts again. If you have reached the desired number of shafts, you have solved the problem, otherwise repeat these two steps.

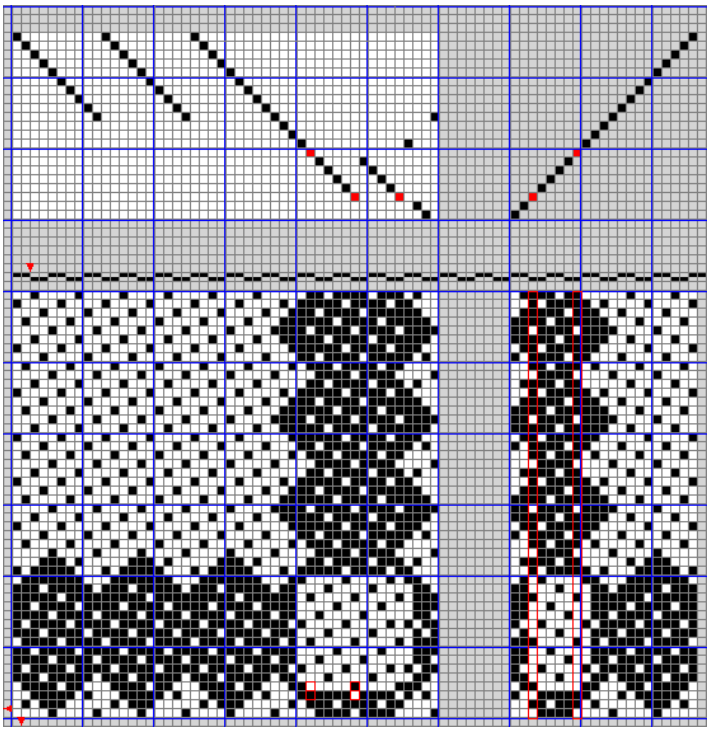


*Figure 77: Suggestion to merge two shafts*

### 5.11.8 Numeric drafting

Choose **Dobby** > **Numeric drafting** to enter drafting as numbers, write the drafting, and after pressing the **OK** button, the program draws drafting as you wrote it. The weave in Figure 78 has eight repeats of shafts 1, 2, 3, 4, then five repeats of shafts 5, 6, 7, 8, and again six repeats of shafts 1, 2, 3, 4.

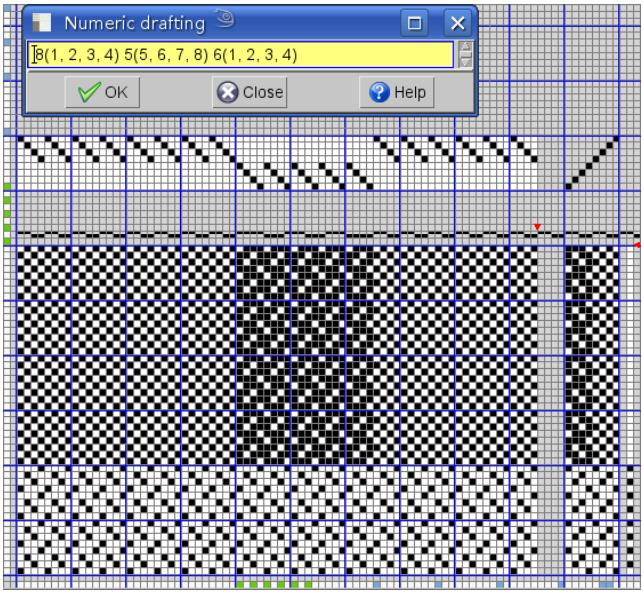



*Figure 78: Numeric drafting*

## 5.12 Denting

Both the wires and the slots in the reed are known as dents (namely, teeth). The warp threads pass through the dents after going through the heddles and before becoming woven cloth. The number of dents per centimeter or inch determines the fineness of the reed. The number of warp threads that go through each dent depends on the warp. Usually, there is the same number of threads in each dent, and denting is simply written 2 or 3 or 4 or 5..., where number means the number of threads per dent.
There are some types of fabrics, however, which require an irregular order of denting to emphasize a certain design feature. Irregular means that the number of threads in each dent is not constant for a whole warp. In such cases the order of arrangement of the ends in the reed becomes an essential part of the design and must be indicated carefully and in the correct relationship in respect of the weave and the draft.
To determine the denting data, enter them either in the **Denting (dents/cm)** field of the Weave Editor (**Weave** > **Edit**), or in the field of the same name, located in the **Calculation of the thread consumption** window (**Fabric** > **Consumption**). You can use parenthesis in the denting pattern like: 2 2 10(3) which will expand to: 2 2 3 3 3 3 3 3 3 3 3 3. You can have several different dents within repeat section, like 2 2 7(1 2 3). *ArahWeave* supports up to 125 threads in one dent.

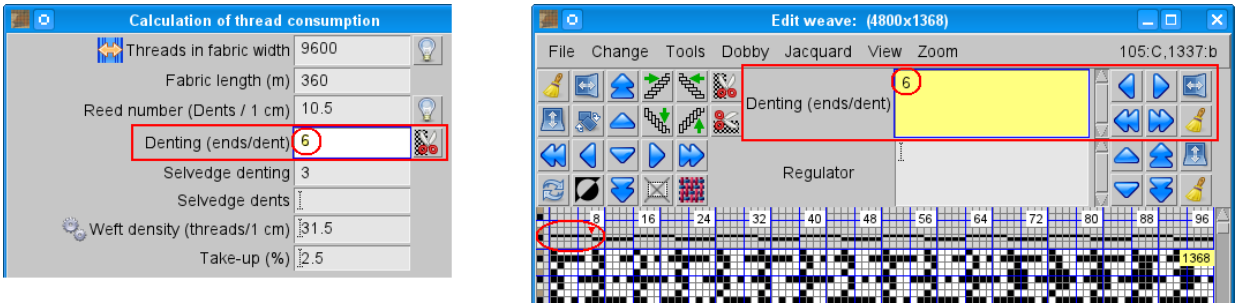



*Figure 79: Entering denting in the Calculation of thread consumption window or in the Edit weave window*

### 5.12.1 Empty dents

To mark an empty dent enter 0 in the denting pattern. A green line and a number in the Weave editor indicate a position of empty dent(s) (see Figure 80). **Important note: a fabric in *ArahWeave* cannot start on an empty dent (so the first dent should not be 0 (zero)).**

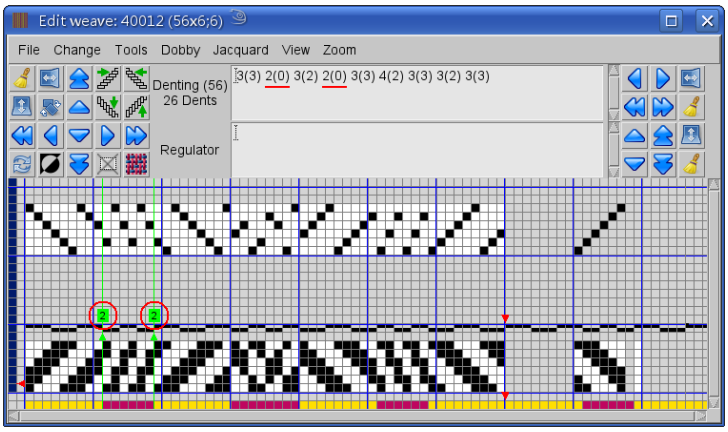



*Figure 80: Empty dents in the denting pattern*

A weave with empty dents in the denting pattern looks slightly different on a printout as it does in the Weave editor. Empty space in the weave area and dents in a green color indicate empty dents (Figure 81).

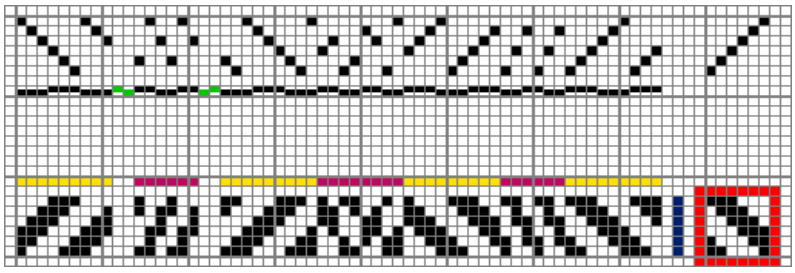


*Figure 81: Printout of a weave with empty dents*

To get a proper fabric simulation of fabric with empty dents, you need to set technical data (**Threads in fabric width**, **Reed width**, **Finished width**, **Denting**, **Weft density**) in the **Calculation of thread consumption** window (**Fabric** > **Consumption**), and mark the **Density from technical data** check box. For a detailed explanation about Consumption and setting the technical data see Chapter 14.

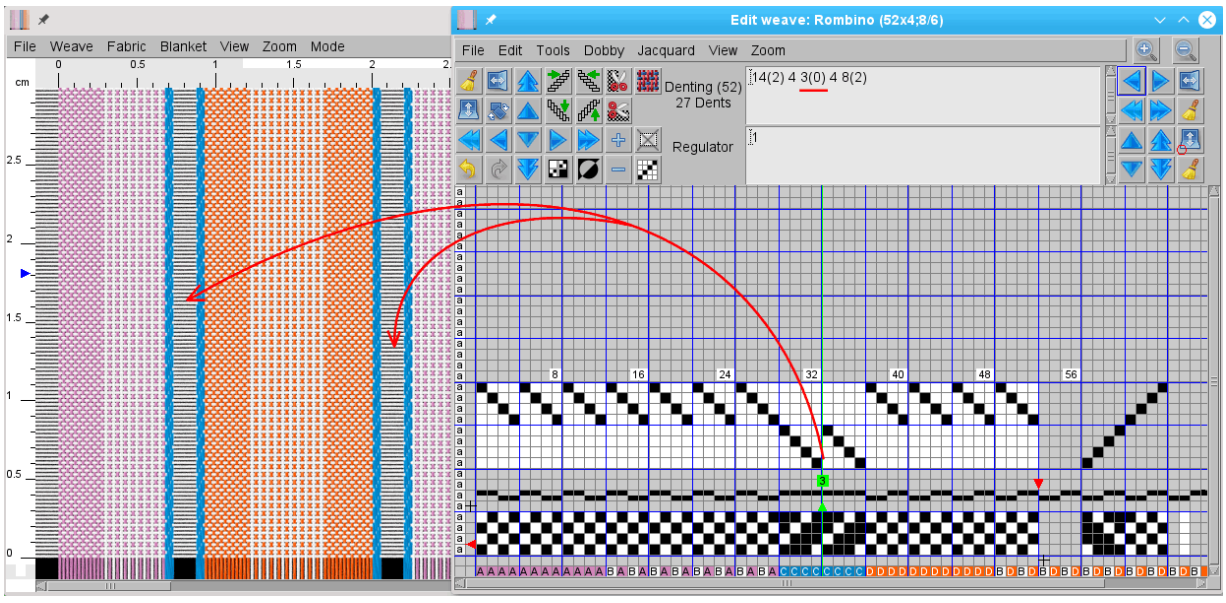



*Figure 82: Simulation of fabric with empty dents*

Denting and regulator are handled in a different way in weave editor, in spite of the fact that they can be both entered in the **Edit weave** window in the same way. The reason is, that a regulator is directly linked to the weave, since it must be present on the dobby (or jacquard) card or machine file.

The denting, on the other hand, is not directly linked to the weave. Its repeat can be longer, as demonstrated in Figure 83, where the weave repeat is 8 threads and the denting repeat is 50 threads in 30 dents.

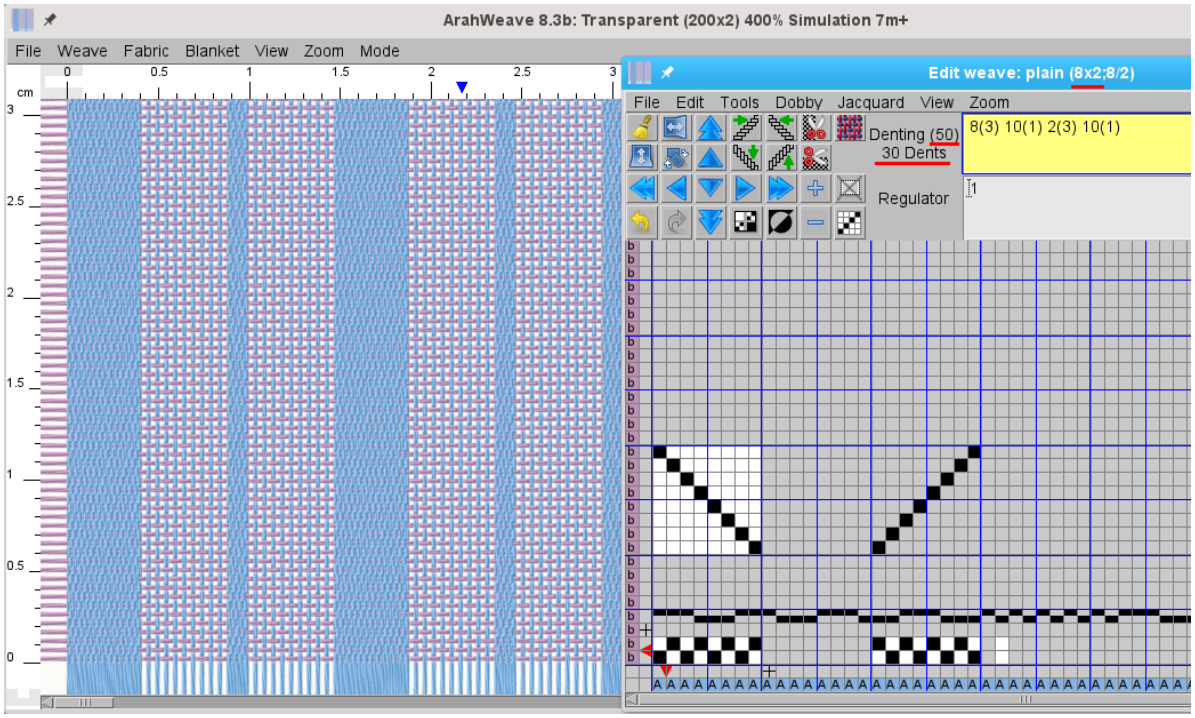



*Figure 83: Fabric with denting*

## 5.12.2 Drawing denting with a mouse

You can draw denting with mouse in the **Edit weave** window. As you draw, the denting in the **Denting** field is automatically rewritten.
To add a thread in a dent, left-click on the dent. To remove a thread from the dent, right-click on it (Figure 84).

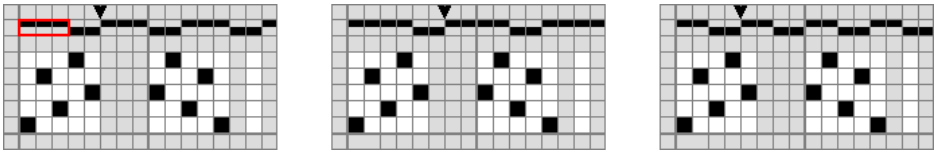


*Figure 84: Adding or deleting threads from dent: left click on a dent adds one thread in it (center image), right click takes out one thread (right image)*

To add a dent (actually duplicate existing one) in a denting pattern, left-click below it. To remove a dent from denting, right-click below it (Figure 85).

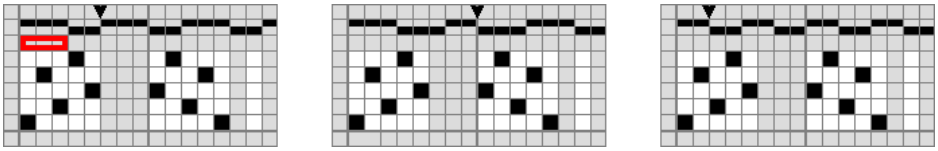


*Figure 85: Adding or deleting dents: left click below dent (red area) duplicates dent (center image), right click deletes dent (right image)*

## 5.12.3 Dobby and Jacquard

Some looms have both lifting mechanisms, dobby and jacquard. Dobby threads pass through heddles, which are held and lifted by shafts, Jacquard part of warp ends are lifted by hooks. To distinguish between threads, which are lifted by dobby (shafts), and threads, lifted by jacquard (hooks), mark the dents, where the jacquard warp ends are, with a **negative** number. “Jacquard dents” are indicated by gray color in the Weave editor (see Figure 82).

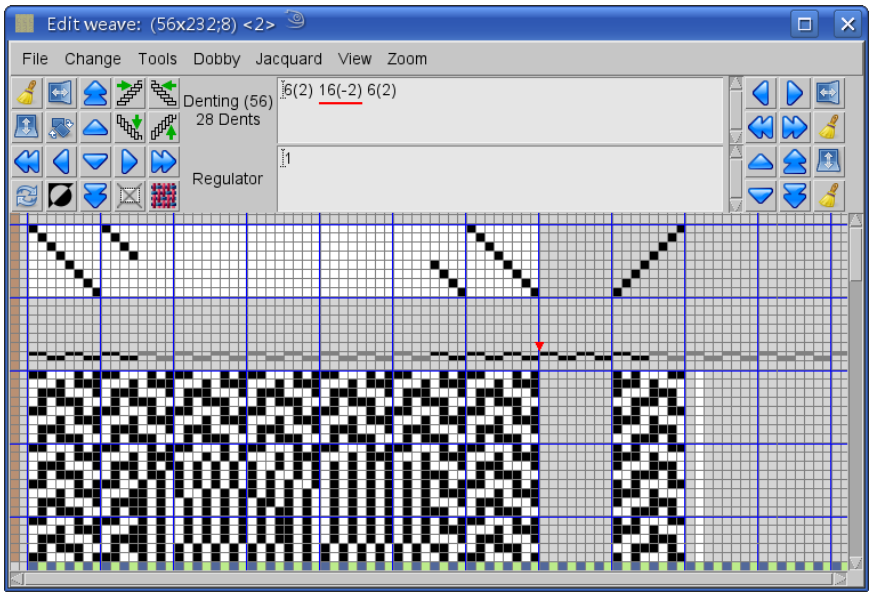



*Figure 86: "Dobby" and "Jacquard" dents*

## 5.13 Regulator

Looms advance (take-up) the fabric after each weft insertion. Sometimes we need to stop automatic advance on certain wefts, so that two or more weft threads can be inserted during one advance. When we do this, we use the regulation stop (regulator).

In *ArahWeave*, a regulator has the same format of entry as denting. If you do not use the regulator, just leave it at 1, or even empty. You can use parentheses in the regulator like: 2 2 10(3) which will expand to: 2 2 3 3 3 3 3 3 3 3 3. **Fabric cannot start with an active regulator on the first weft thread**. Maximal number consecutive wefts with regulator active is 125 (that is 1 normal thread plus 124 crammed, or in other words, 1 advance of warp beam and 124 wefts without advance).

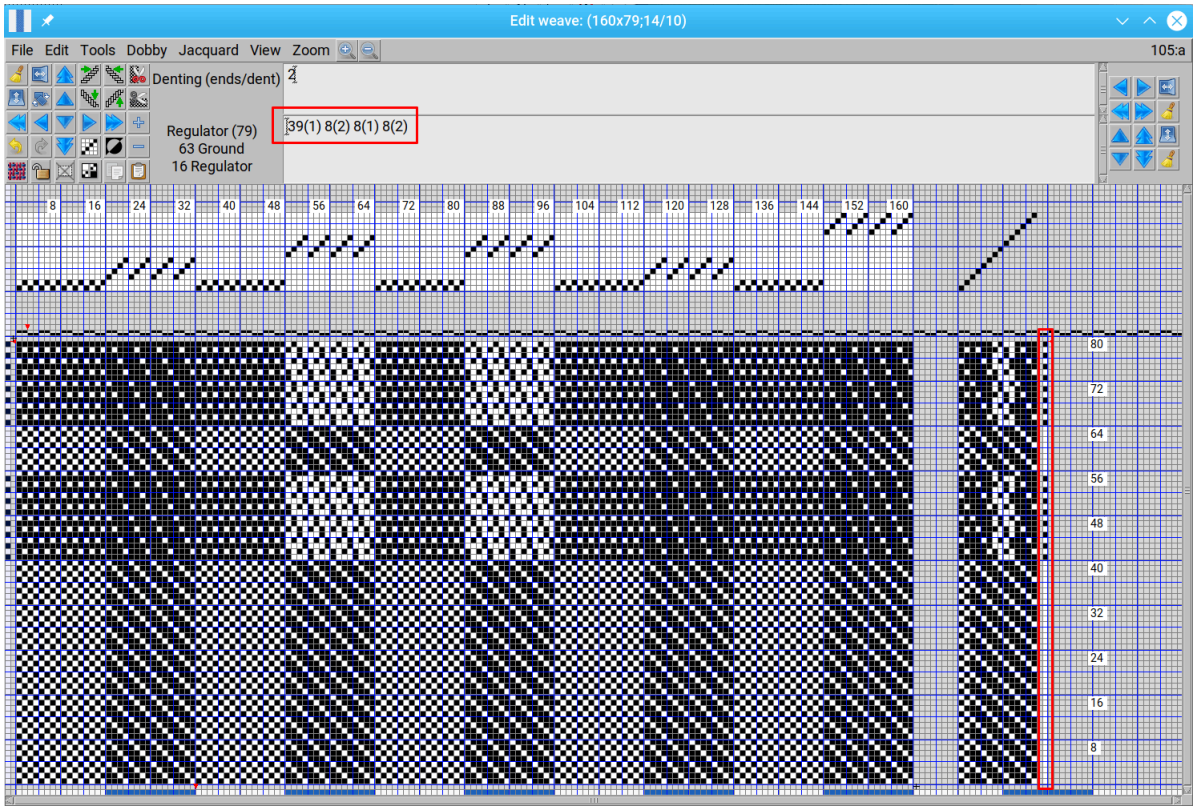



*Figure 87: You can edit the regulator (also called stop-motion, extra weft, or lancé) on the right side of the weave editor or parametrically at the top of the window in the regulator text field.*

*In the regulator we don't use 0 for marking weaving without weft (fringe). Instead we use y in the weft pattern.*

**The repeat size of the regulator should not be bigger than the weave height; if it is longer than the weave height, then the weave height must be enlarged accordingly**. The program gives you a warning if your regulator pattern does not divide the height of the weave – it draws the regulator field in red. If it divides, the regulator field is green. Figure 88 shows a weave, which has the repeat of 24 weft threads, but regulator repeat is 22 threads (sixteen plus six (16(1) 3(2)). The sizes are not the same, so the regulator field is displayed in red color.

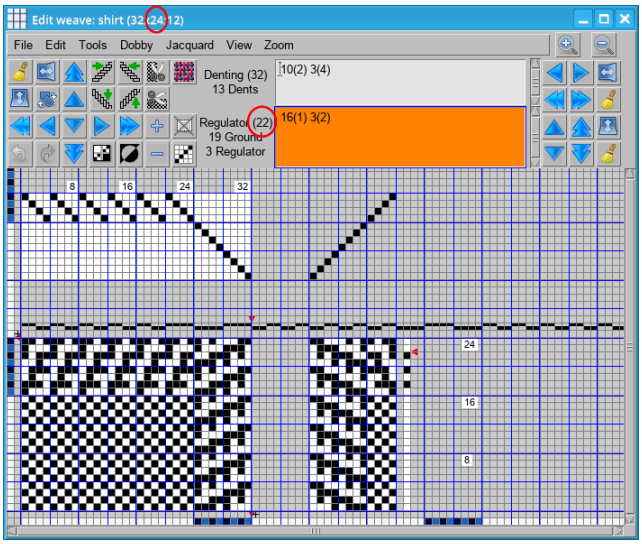



*Figure 88: Repeat size of the regulator may be different than size of weave - red field warning*

### 5.13.1 Drawing regulator with a mouse

You can also draw the regulator control points with mouse in the regulator control column in the weave editor (see Figure 89). Every time you draw a point in regulator, the program writes the regulator pattern for the full height of the weave. If you have written the regulator pattern which does not divide the height of the weave, just draw one point of regulator in the weave, and then delete it again. This will make the height of the regulator the same as the height of the weave.

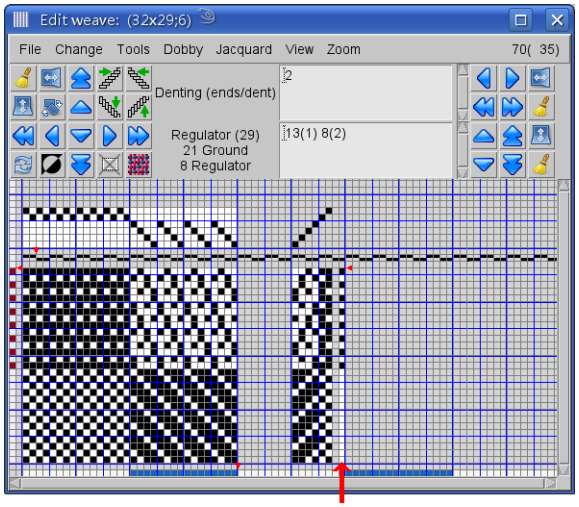



*Figure 89: The regulator control column*

## 5.14 The Tools menu

In the **Tools** menu you can find advanced weave editing functions, which can be used both on dobby or jacquard fabrics.

### 5.14.1 Editing decomposed

#### 5.14.1.1 Basics

*ArahWeave* has a special function for constructing multiple layer (double) weaves; you specify basic weaves for each warp against each weft and the program automatically constructs the composite weave. This function is available as a special pop-up window in the weave editor. To open it, choose **Tools** > **Edit decomposed**.

In the **Edit decomposed** window you have to specify the number of warps (**Warp layout**), and number of wefts (**Weft layout**). The default mode for both Warp and weft layout is the **Custom** mode, where you simply enter the number of warp and weft layers. The weave area is split into a “weave table”, where the number of columns is the number of warps, and the number of rows is the number of wefts. The table on the right side of the tool bar is just a smaller presentation of the “weave table”, and serves as a tool for selecting and copying weaves (very useful when the weave is bigger than screen size), and also indicates with a grid in red color, which weave is selected. Tools in the tool bar work on the selected weave. Same as in Weave editor you can load weaves to the **Edit decomposed** window: choose **File** > **Browse**, double click on the weave you want to use, and it will load into the selected area. To copy a weave into another area, select it with the left button, and click with the right button in the area where you want to copy it.

Figure 90 shows a weave created of five warps and three wefts. The currently selected weave is a combination of the third warp and first weft. The selected weave size and warp/weft combination are indicated on the window title bar.

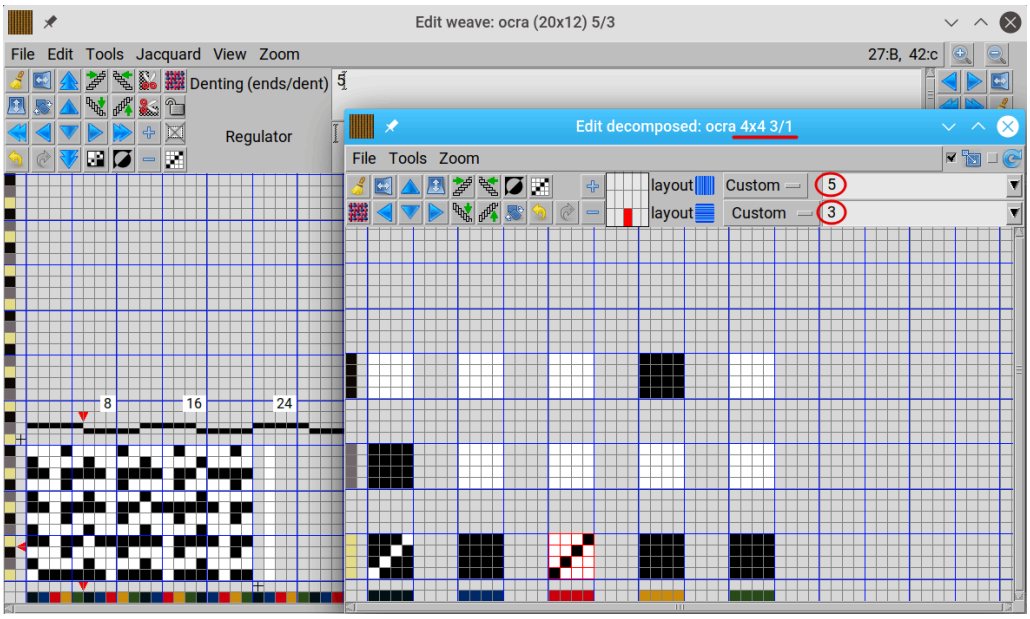



*Figure 90: Edit decomposed window*

Figure 91 shows a weave with 1 warp and 3 wefts, with 5-satin on top and 5-satin on back for attachment of the second weft, and 10-satin for attachment of third weft.

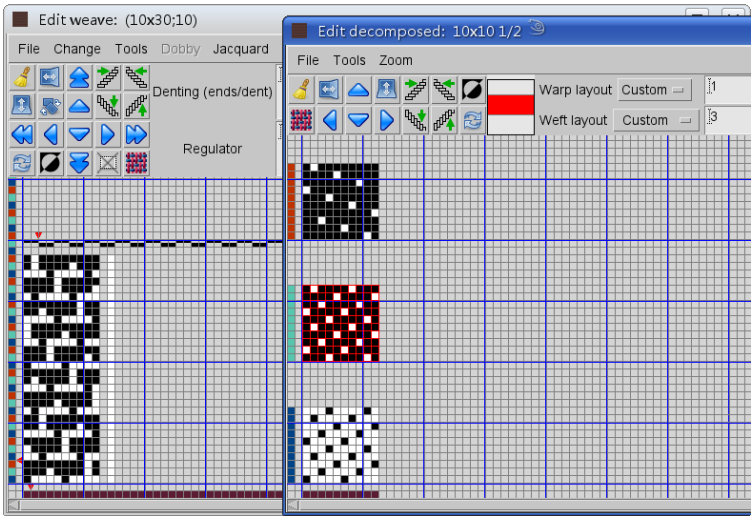



*Figure 91: Edit decomposed window and the resulting weave in the Weave editor*

### 5.14.1.2 Advanced warp and weft layouts

#### Custom

You can edit even more complicated composed weaves, for instance those with different densities of top and bottom fabrics. Figure 92 shows a special double fabric with uneven top and bottom density, plus an extra weft which is hidden in the middle and just links the two fabrics together. The warp layout is simple: 112—this means that the first two warp ends go in the first block, and the third warp end goes into the second block. In this way we have two times higher density in warp. Weft is similar, just that we need to repeat the layout until the end, so we can add the third block for extra hidden thread: `112112112112112112112123;` can also be written as `8(2a1b)1c`.
We enter elongated twill for the top fabric, and regular 2/2 twill for back fabric. The middle weft thread (shown in red) has just two points which link it to the top and to the bottom fabric. Note that the fabric simulation in the lower left angle does not show any threads from the back (gray) or middle (red), since they are completely covered by the top fabric (black weft and dark blue warp).

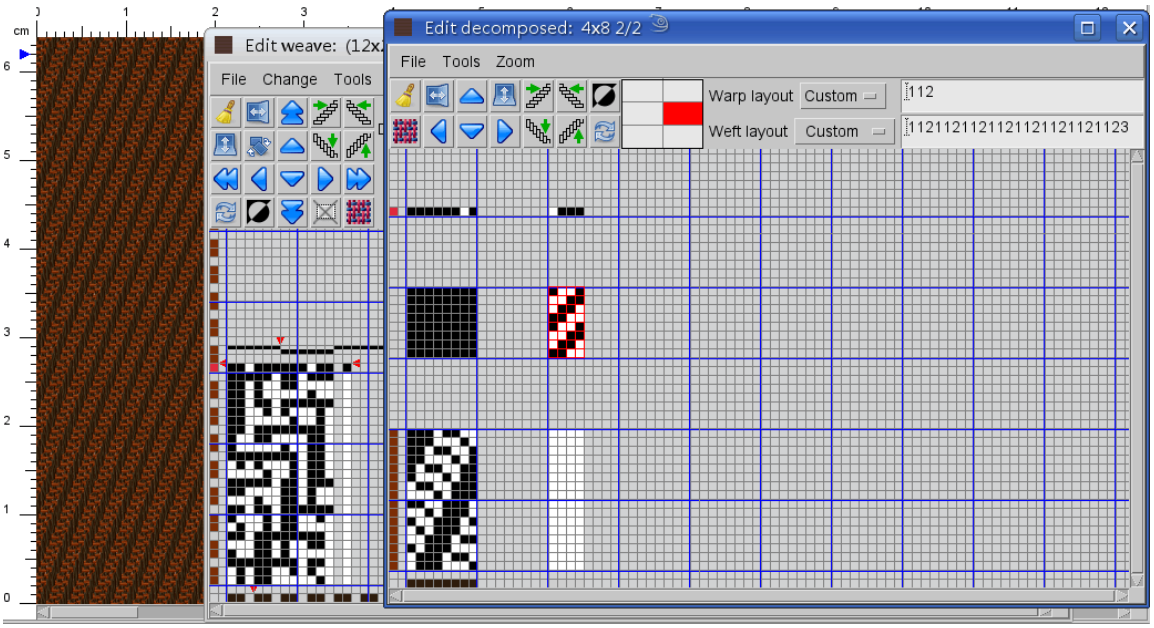



*Figure 92: Edit decomposed - different density in layers*

### Warp layout as a denting; weft layout as a regulator

Sometimes you want to change (or simply check) extra warp weave, extra weft weave or the ground weave. The task can be difficult since the extra weave is discontinued by ground weave (and vice versa). But if you choose **Denting** instead of **Custom** in the **Warp layout** (or **Regulator** in the **Weft layout** field) the program divides weave on the ground weave and extra threads weave.

### Layout as a Thread pattern

In many fabrics the warp and weft layout is equal to thread pattern. If this is your case instead of typing custom layout, just select **Yarns** from the drop-down menu.

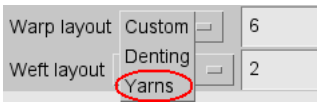



*Figure 93: Layout as a thread pattern*

### Using more than 9 blocks in weave construction

In the decomposed weave editor, some advanced users want to work with more than 9 weave blocks. This is not possible if you are using numbers 1-9 as a layer indication.
But there are two ways to enter more than nine layers:

- Using the layout by yarns, instead of custom. Then, you can use more than 9 yarns and in this way you achieve more than 9 weave blocks.
- Writing the custom layout as a pattern (for example **`2a2b2c`**), instead of with numbers (**`112233`**). If you use the pattern, you can again use more than 9 letters and thus get a bigger layout.

## 5.14.1.3 Resize to divisible

If you make the combinations of weaves, which have different repeat size, and you use different densities in layers (like two threads on the top and one thread at the back), it is quite complicated to calculate the correct repeat size of the composed weave, but there is ArahWeave tool which calculates the final size from the warp and weft layouts and sizes of each individual weave.
There are two different approaches on how to use the **Resize to divisible** tool:

- **Using Resize to divisible as one-time operation**

  Clicking the **Resize to divisible** entry in the Tools menu checks the size and if necessary, redraw the final weave to match the calculated size.

Figure 94 shows a double weave with twill on face and plain weave on back. For two threads on the face there is only one on the back (layout is **112**). Set the size of the final weave to 12 by 12, to be sure that we have enough space for twill and plain weave. Then draw or load the weaves into the decomposed weave editor. The area for twill weave is 8 by 8 points: this is obviously wrong, because the repeat size of twill is 3 by 3, and 8 is not divisible by 3.

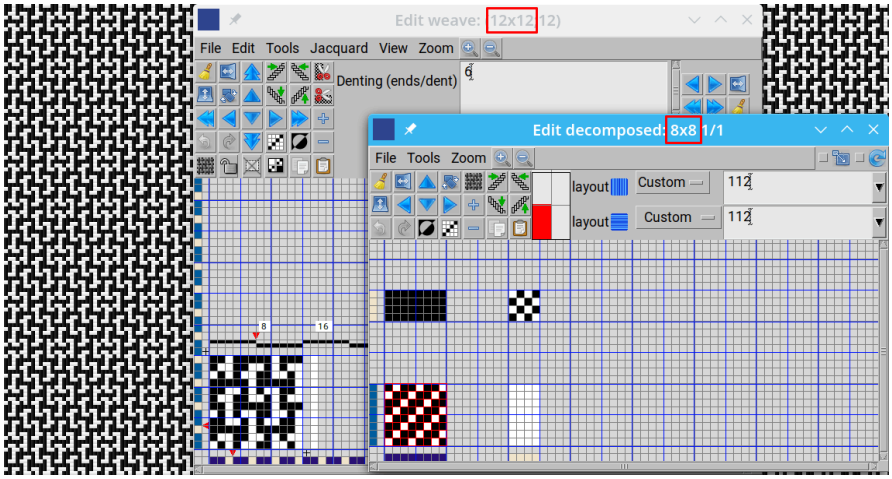



*Figure 94: Editing compound weave with twill on face and plain weave on back: notice the mistake in weave repeat in background*

At this point choose **Tools** > **Resize to divisible**. Program resizes and extends the weave automatically. We get a new total repeat size 18 by 18 points; the selected twill area is now 12 by 12 points. If a smaller repeat would be adequate, the program would also shrink the weave.

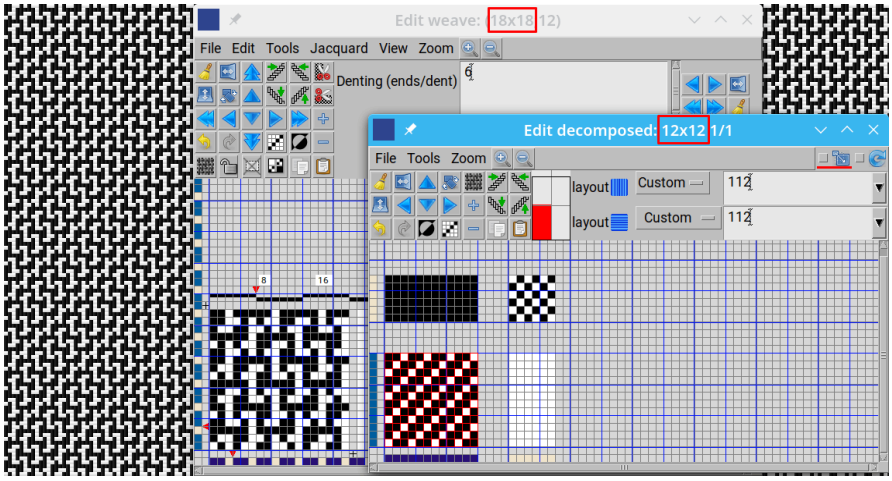



*Figure 95: Similar weave as above, but now it is divisible; the weave in the background is now correct*

- Using Resize to divisible function on the fly

  If you check the checkbox next to Resize to divisible on the right side of the menubar, the Resize to divisible function is automatically applied after every change in the edit decomposed window.

### 5.14.1.4 Extending weaves with Ctrl+left click (or middle mouse button click)

In decomposed weave editor, you cannot select and copy the area with middle mouse button (or Shift+left click) like in the main weave editor. But there is a function on a middle mouse button (or Ctrl+left click), which helps you copy (extend) the weave across the whole sub-section. Just draw one repeat of the weave, and click with the middle mouse button (or Ctrl+left click) on the upper right point of the drawn weave repeat, and this repeat will be copied across the whole weave sub-section in the decomposed weave editor.

Figures from 96 to 98 show how to draw a combination of satin-16 and twill-4, one warp and two wefts. Since the satin repeat is 16×16, and twill is 4×4, the composed size is 16×32. Set the size in weave editor to 16 by 32, open the Edit decomposed editor, set the **Weft layout** to 2 (or if you have two colors in weft you can select **Yarns** as a type of **Weft layout**). Draw the twill repeat in the upper section, and just one point in the lower section. Press Ctrl and click with the left mouse button in the upper right point of the area that you want to copy across the section.

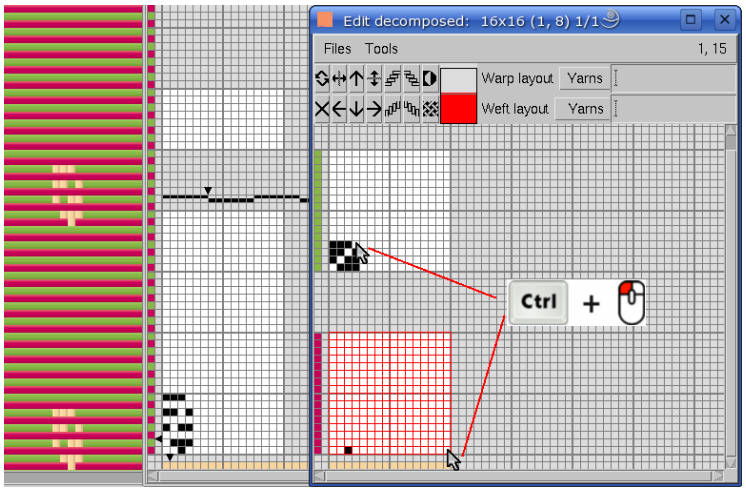



*Figure 96: Extending weaves wit middle mouse button click (or Ctrl+left click)*

Now you need to press  icon three times to tilt each point of the straight line for one point to the left to get satin 16 weave.

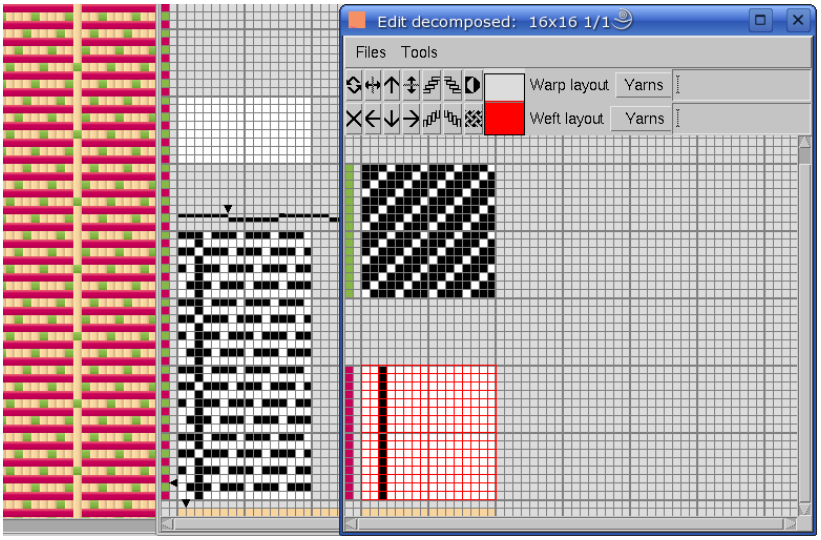



*Figure 97: Extended weaves*

Figure 98 shows compound weave with satin on the face, and twill on the back of the fabric.

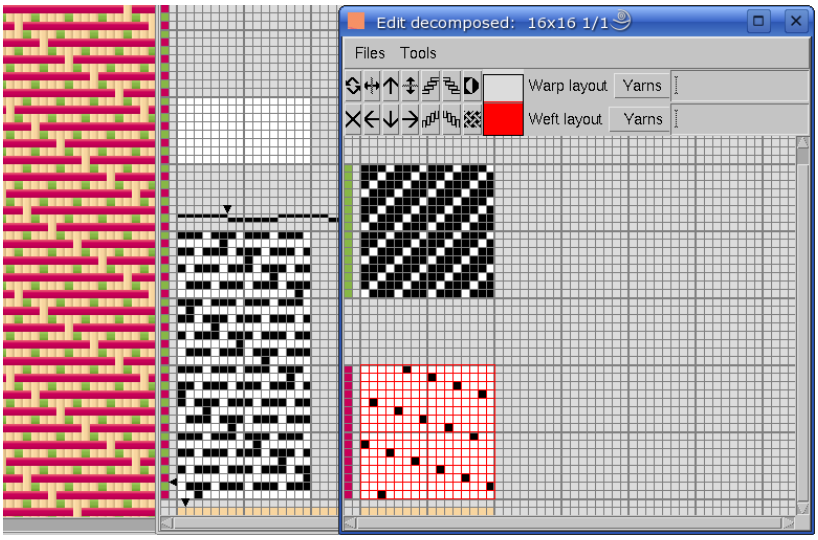



*Figure 98: Final weave*

### 5.14.2 Select/copy area

Often we want to limit the area of the operation to a specific part of the weave. By selecting a particular rectangular region, you set the boundaries of the operation. You can also save a selection as a weave, just use **File** > **Save weave**, and the saved weave will be the selection, and not the whole weave. It is very useful, when you want to get all the weaves from a complex Jacquard weave.
You can make selection in a two different ways:

- Press **Shift+left mouse button** (or only the middle mouse button) and move the mouse until the desired area is selected. As you drag a mouse, a grid color is changing to red.

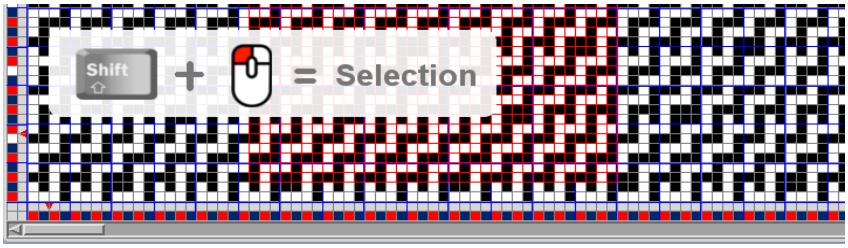



*Figure 99: Selecting with mouse*

- Choose **Tools** > **Select/copy area**. In the **Select/copy area** window enter the starting and ending points of the selections. Instead of ending points you can set **Size**.

The grid of the selected area is drawn in red. All tool operations work now only on a selected area.

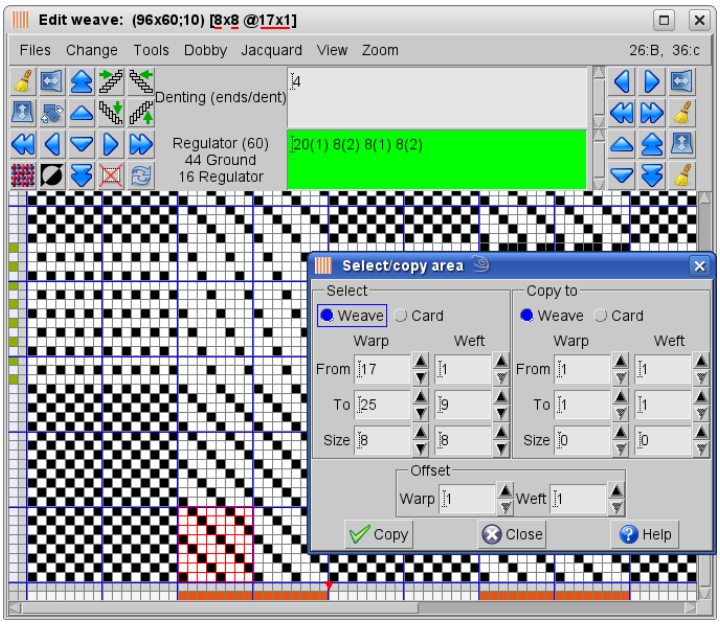



*Figure 100: Weave selection*

You can copy and multiply this selection again in two different ways:

- Press the left mouse button and drag it to draw the repeated area. The mouse pointer turns color to red, if you have a selection.
- In the **Copy to** part of the **Select/copy** window enter the coordinates of the starting point (**From**, **To**) and the size of the area, where you want to copy the selection.

If you want that the copied area has the same weave offset as the selection, mark the **Copy in repeat** toggle button in the **Edit** menu. The program copies the selected weave with offset from bottom left of the jacquard weave, not from the selected weave area. In this way, weave will start correctly.

To disable selection, click with the middle button somewhere in the weave area, or click the deselect icon ( ) in the Weave editor toolbar. The icon changes color to black.

*Copy area operations in weave editor, and editing in decomposed weave editor on dobby weave will leave drafting intact and will modify dobby card. This is important for users who want to design new weaves on a fixed drafting (so you can tie-up to the same warp). So if you don't want this effect, delete drafting by* **Dobby** > **Drafting** > **Clear drafting**.

### 5.14.2.1 Loading a weave (part of weave) into selection

You can load any weave into a selection, using the weave browser or the **Load weave** dialog.

If the selected area is bigger than the repeat of a loaded weave, then the weave is repeated until it fills a selection.

If the weave, which you want to load into selection, is bigger than selection, then *ArahWeave* takes just part of the weave big enough to fill a selection.

The **Offset** option in the **Select/Copy area** window enables you to set the starting point of area in the weave, which you want to load into selection. It is mostly useful when you copy a part of a jacquard weave into another jacquard weave.

Figure 101 shows two jacquard weaves. We want to copy the logo and numbers from one weave to another.

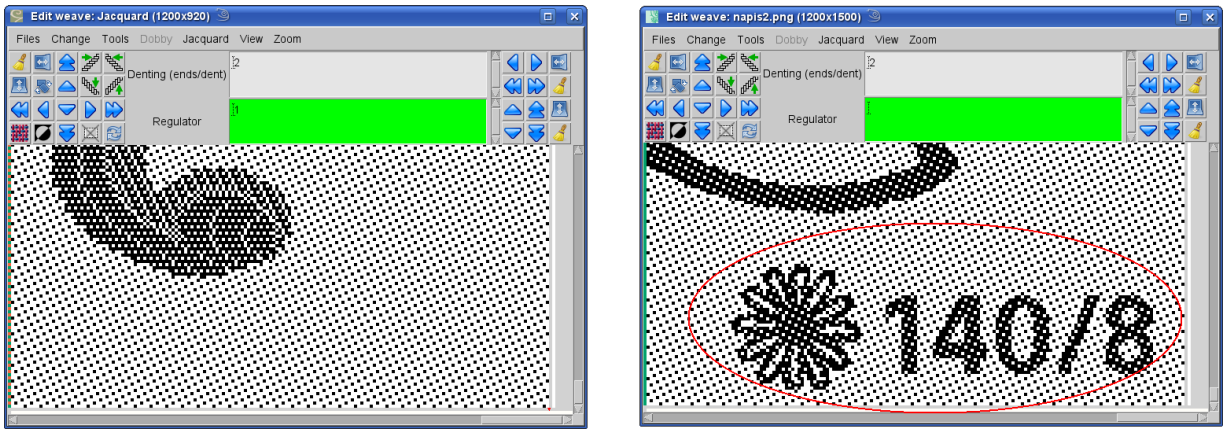



*Figure 101: We want to copy the logo and numbers from one weave to another*

Make a selection in the first weave. Set the offset parameter: logo starts on point 1056 (warp), 6 (weft). Load the second weave from the weave browser. Logo is placed exactly into selection in the first weave (Figure 102).

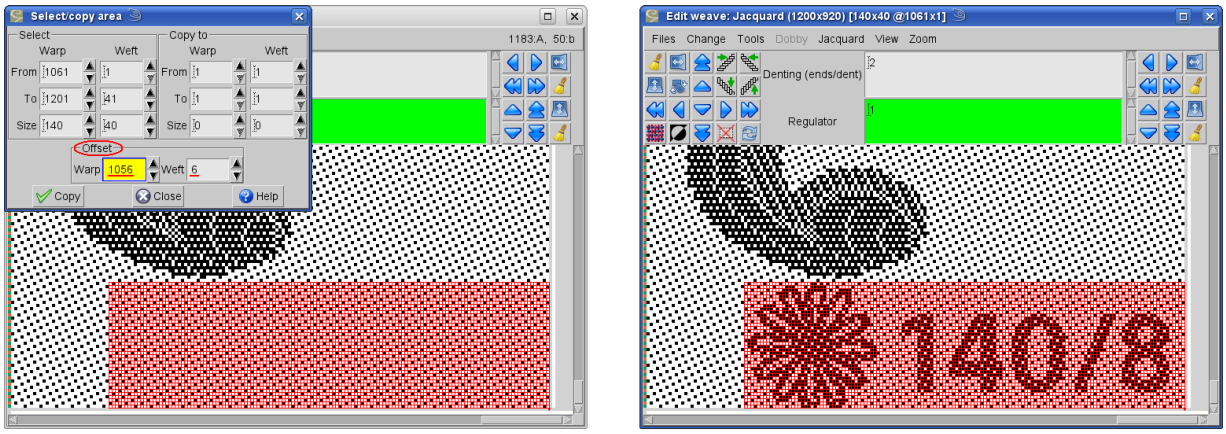



*Figure 102: Setting the offset option; weave after copying another weave into selection*

### 5.14.2.2 Weave pen

Weave pen function enables freehand drawing with selection across the weave editor. To use it you must have a selection in the weave; then click with right mouse button and drag a mouse. The program will draw with selection under mouse pointer. The size of drawing area is 3 by 3 points. If you keep the Shift key pressed during drawing, the size of drawing area is 5 by 5 points.

### 5.14.2.3 Finding repeat in selection

The function is very useful, when you want to get the single weaves from complex Jacquard weaves. First make a selection, which covers the area of only one weave. Then choose **Change** > **Find repeat in selection**. The program reduces the size of selection to one repeat of weave.

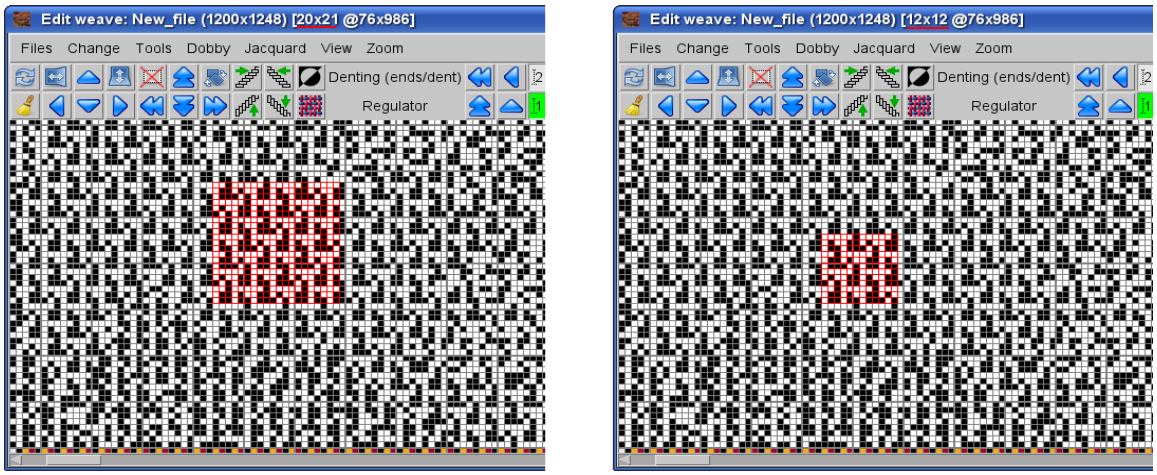



*Figure 103: Selection, and finding a repeat in selection*

To save a selection as a weave, just use **File** > **Save weave**, and the saved weave will be the selection, and not the whole weave.

### 5.14.2.4 Replacing weave (Jacquard)

**Replace weave** enables you to replace a single weave in a finished jacquard card design, or reconstruct the original color image (which we obviously don't have anymore) from a jacquard card. This function is mainly intended for jacquard mills with old designs in jacquard formats, which they would like to modify and re-use, to create new designs with different weaves inserted.

First, draw a selection in the weave using middle mouse button (or use parametric mode **Tools** > **Select/copy area**), which you want to replace. Selection must include at least one complete weave repeat. Then choose **Jacquard** > **Replace selected weave**.

The program will try to find all areas, which are covered by the selected weave, and mark it with magenta color. If the resulting mask includes undesired weave areas, modify the **Thin** parameters. If the resulting mask does not include all the weave areas, modify the **Grow** parameters. **Times** means the number of times thinning or growing is repeated. **Neighbors** means the minimum number of neighboring points (maximum is 8), which should be the equal to the selected weave for the operation to take place. You can use left mouse button (adding points to masked area) and right mouse buttons (deleting points from masked area) for drawing the masked area, if the parametric guessing does not give the desired results.

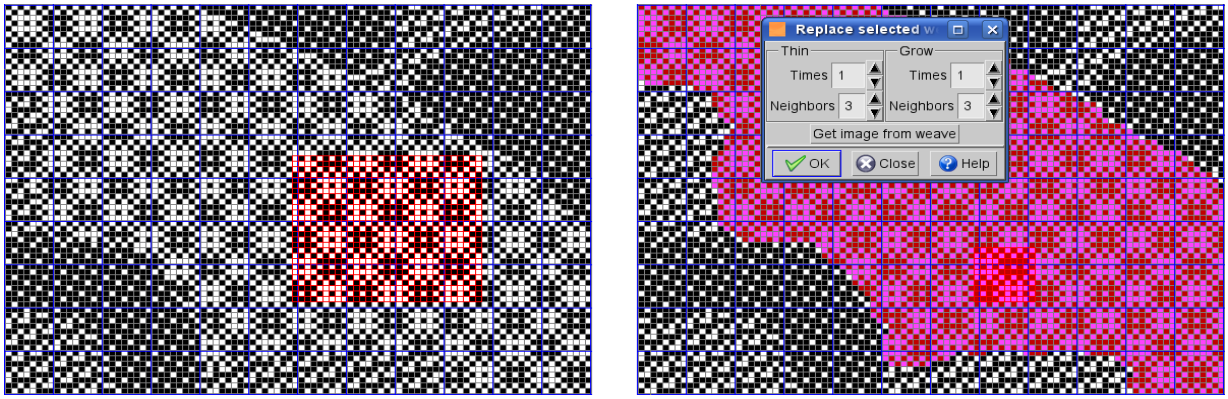



*Figure 104: Selection and masked area*

The masked area is also indicated in the main window (the view mode should be set to **Integer**).

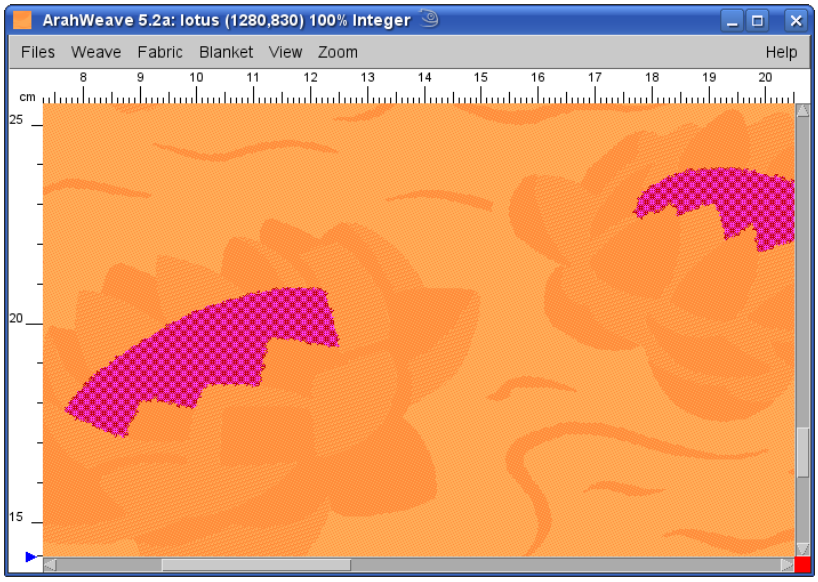



*Figure 105: The masked area in the main window*

Then simply load a different weave into the masked area (**File** > **Load weave**).

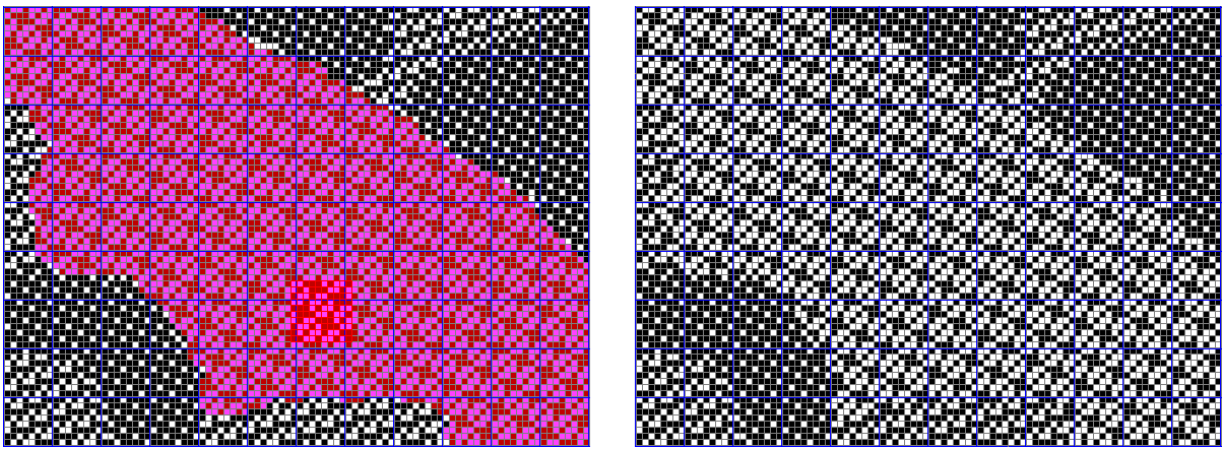


*Figure 106: Load a different weave into the masked area*

In some cases program finds portions of the selected weave in the areas, where you do not want it. Figure 107 shows a sample, where program masks additional area to selected plain weave. To prevent this, apply the **Thin** parameter, and increase the **Neighbors** parameter, and click the **OK** button. Program recalculates the masked area.

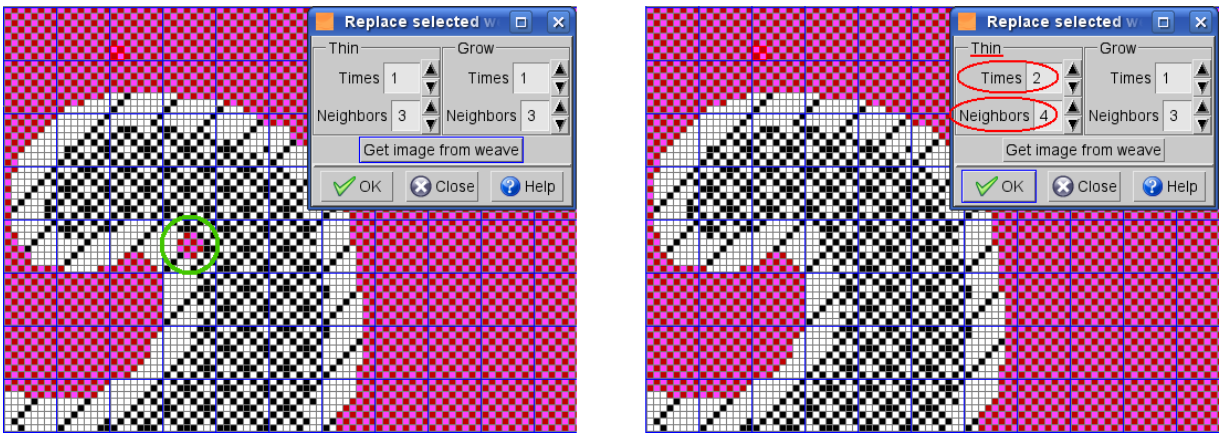



*Figure 107: Explanation of the Thin parameter*

*The meaning of the function **Get image from weave**, accessible from the **Replaced selected weave** window is described in the **Jacquard conversion** chapter (9.12.4). There is no need to use it for simple weave replacement.*

### 5.14.3 Replace similar (correcting long floats on a junction of two weave sections)

When you combine different basic weaves into one complex weave, it is very important to avoid the formation of long floats where the different sections of a design are in contact. Certain equal-sided twills, and weaves that are the reverse of each other, may be arranged to cut at the junctions—that is, with warp float against weft float. If possible, no longer float should be made at the junctions than there is in the weaves that are combined.
But sometimes this is impossible or would require a time consuming redesigning. Here the Replace similar function comes handy: you “teach” the program how to correct an error, and then it will correct (replace) all similar areas found in a weave in the same manner, as you did in the first place.
Procedure:

1. Make changes in the weave.
2. Make the selection of the area in the weave where you have made these changes. The changed weave points should not be on the border of the selection.
3. Choose **Edit** > **Replace similar**. There are two variables in the dialog: the **Border** means that the program will not alter the areas within the border; the **Maximum changes** means it will search for similar areas which have up to defined number of differences. When *ArahWeave* finds the areas which are similar to that of the selected area, it marks them with pink and red.
4. Confirm the changes with the **OK** button.

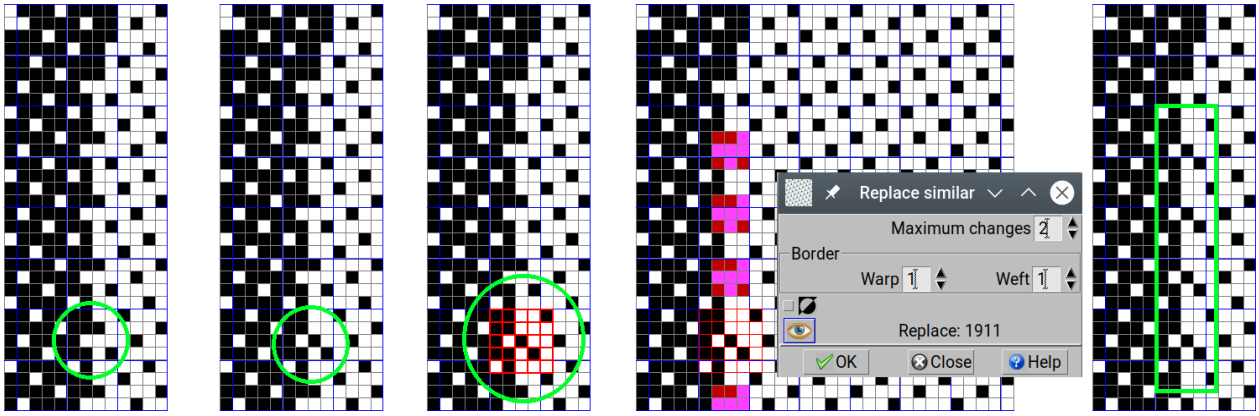



*Figure 108: Five stages of the Replace similar function.*

Figure 108 shows the use of the function in five stages. First one shows the original weave. The green circle indicates one of the mistakes in the weave. We correct the mistake by deleting one warp point, and drawing it again next to the weft point. These are two changes. Then we select the area where we have made a change. We open the Replace similar dialog (**Edit** > **Replace similar**). We set the **Maximum changes** to 2. Pressing the **OK** button applies the changes across the weave, and closes the dialog window.
*If you alter the Maximum changes or the Border parameter, click the Eye icon ( ) to redraw the selection similar area (red/pink) based on the new parameters.*

### 5.14.4 Inserting and deleting warps or wefts in weave

You can insert a warp thread or weft thread at any point of the weave. You can do it in two different ways:

- Left mouse click on the gray area to the left or below the weave (in Figure 45: **weave control row**, **weave control column**) duplicates (add identical) weave thread at the selected point, and right mouse click deletes it. To add **empty space** in the weave area, press Shift while inserting the warp/weft with mouse, and added area will be empty. Weave, card and drafting are shifted and resized accordingly. It is also possible to add / remove shafts in the same way – just click on the gray

area below the shaft. These functions can also be used to fast weave resize without opening the **Dimensions** window. There is a slight difference in the functioning of the two resize ways: normal resizing will not change the weave, so it is easy to revert to the previous value. But if you delete many warps / wefts, it will not be possible to get them back, because the weave is shifted / copied all the time. Note: Regulator and denting are not changed with this function.

- Choose **Tools** > **Insert/delete warps/wefts**. In the dialog, you have to select a mode (**insert** or **delete**) and directions (**warp** or **weft**). Then type the insertion/removal position in the **From** field and the number of threads inserted/deleted in the **Size** field. The program will draw a magenta line to indicate where the insertion begins. Note that an area is always inserted on the right or above this line. Similarly, if you delete warps/wefts, the area selected for removal will be crossed out with magenta lines.
  When you click on the **OK** button, ArahWeave inserts the area as a selection, so you can load a weave into it.

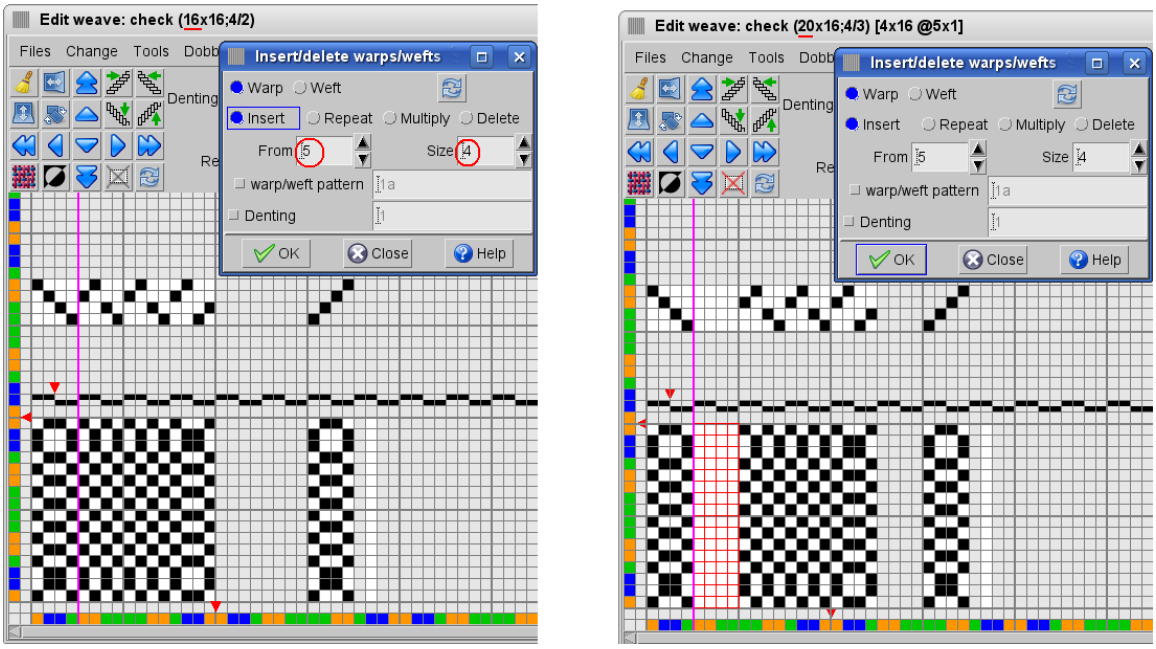



*Figure 109: Insert warps/wefts: set* **From** *and* **Size**, *then click on the* ***OK***

### 5.14.4.1 Inserting warps or wefts both in weave and thread pattern

If the **warp/weft pattern** toggle button in the **Insert/delete warps/wefts** window is on, then the program will also insert the thread pattern, which you write in the field to the right of toggle button, into the main thread pattern. Figure 110 shows an example, where we insert four threads in the weave, and the pattern of the threads inserted is `1a1b` (one orange, one blue).

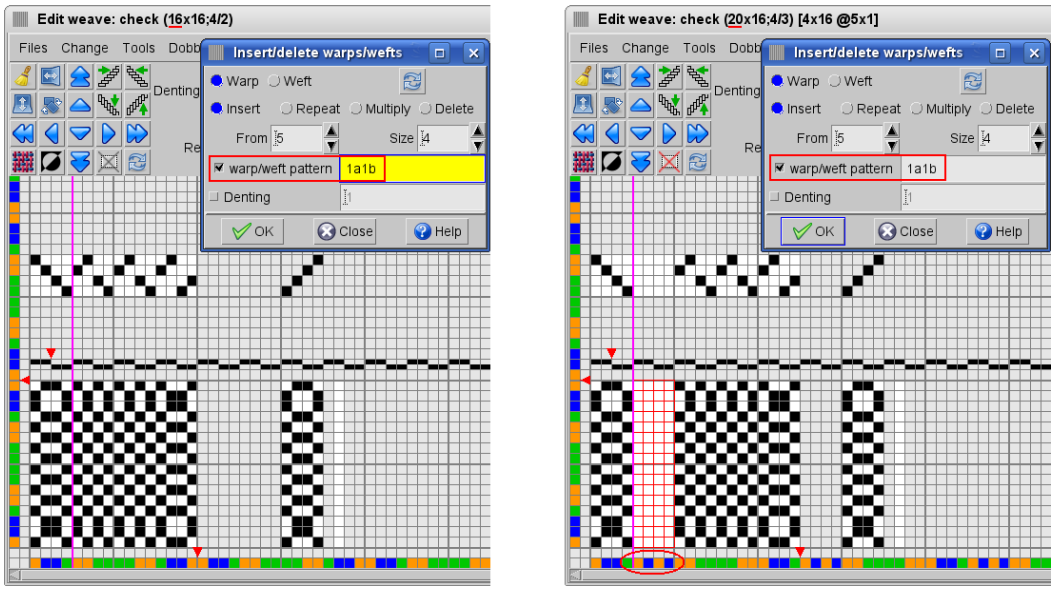



*Figure 110: Inserting warp in weave and thread pattern simultaneously*

### 5.14.4.2 Inserting warp threads both in weave and in thread pattern with mouse

With this feature you can add an extra warp. The warp pattern repeat and denting must be equal in length as the weave size in the horizontal direction. If the weave is 84 points wide, and you have alternating one thread color A, one thread color B, you should write pattern as `42(1a1b)`. Same is with denting: if you have 2 threads per dent, you should write denting as `42(2)`.

In the **Edit warp and weft pattern** window, select a yarn, that you want to insert. Hold down the Shift key while you draw with a mouse the warp pattern in the thread pattern editing row. The program will add an empty space in the weave area to the right of the clicked area, and insert the currently selected warp thread, and increase the number of threads in dent, all at once, with a single click. So it is very easy to add threads to the ground fabric. New threads are added to the right so that the ground threads stay at the beginning of the dent. This may be handy, if you later divide the warp pattern or the weave according to the number of threads in a dent. To delete a thread in this coordinated way, you can also press the shift and the right mouse button. This deletes the thread that you click, not the one to the right.

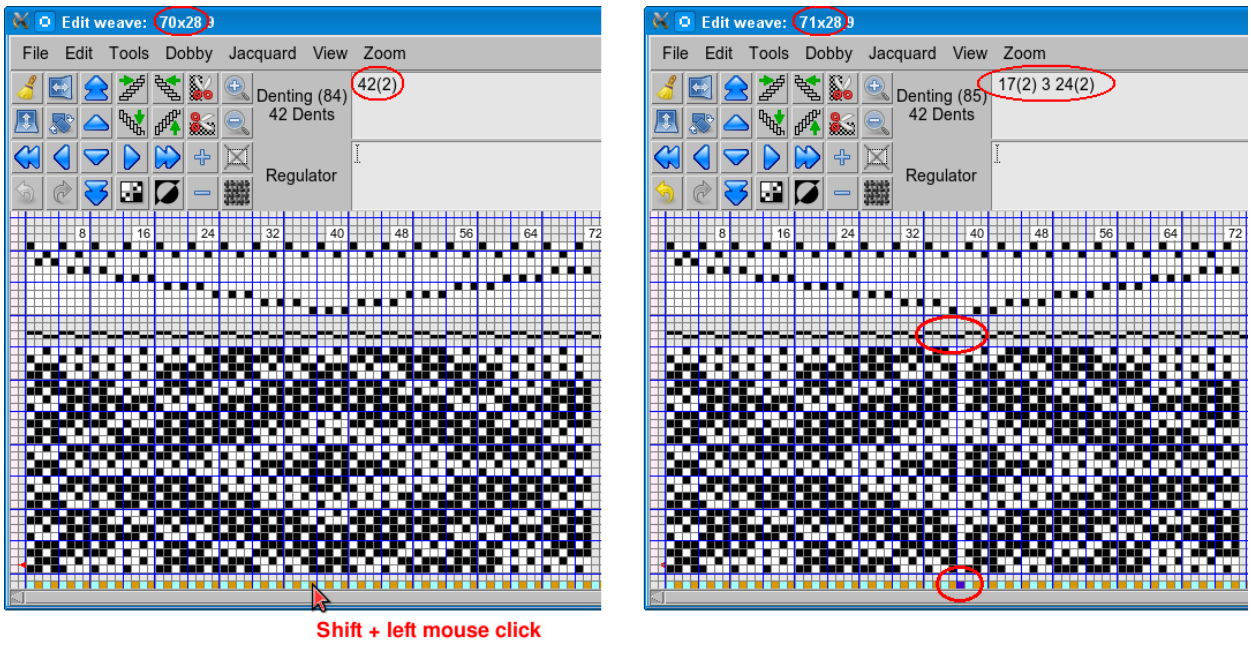



*Figure 111: Inserting warp in weave and thread pattern simultaneously with mouse*

### 5.14.4.3 Repeating part of the weave

You can repeat a part of the weave. Mark the **Repeat** button, and select part of the weave, which you want to repeat by setting **From** and **Size** number. Program draws two lines to show the area which will be repeated. If they are in green color, it means that size of the area is not divisible by denting repeat; if the size is divisible by denting repeat lines are in magenta color. Then set the number of repeats (**Times**). In Figure 112, we repeat three threads four times, so we increased the size of repeat for twelve threads.

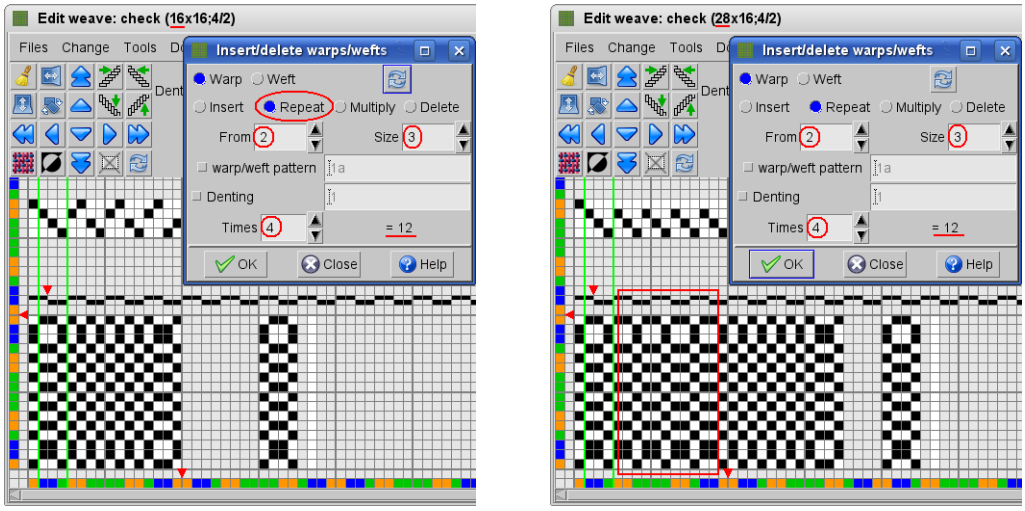



*Figure 112: Repeating part of the weave*

### 5.14.4.4 Multiplying part of the weave

Sometimes you need to multiply part of the weave. In Figure 113, we choose 6 threads, which should be multiplied 3 times.

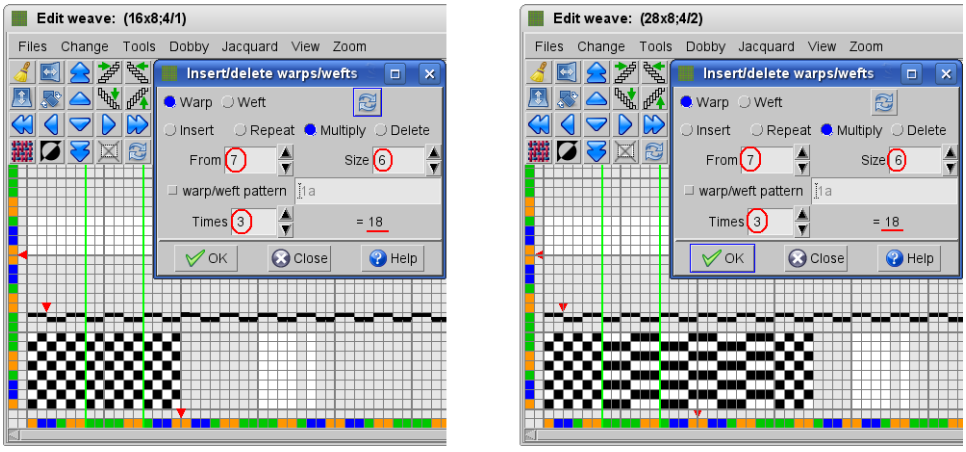



*Figure 113: Multiplying part of the weave*

## 5.14.5 Deleting warp/weft by yarn

Sometimes we want to delete both treads and the area in the weave, covered by these threads. This can be achieved by using a function from the previous chapter (Inserting/deleting warps/wefts), but this one has a simpler and cleaner user interface, and allows faster, one-click solution. To use it, select **Tools** > **Delete warp/weft by yarn**.

Figure 114 shows the extra weft design. We want to remove a green part of the design (weft thread c). Click the Weft radio button in the Delete warp/weft by yarn window, enter c in the **Yarns** field, and click OK. Program deletes the green yarn from the thread pattern and removes the area of the weave covered by yarn c from the weave.

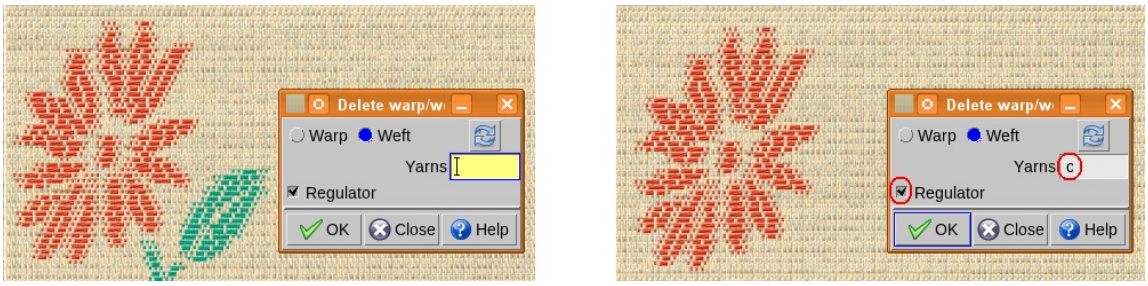



*Figure 114: Deleting warp/weft by yarn*

### 5.14.6 Generating crepe (sable) weaves

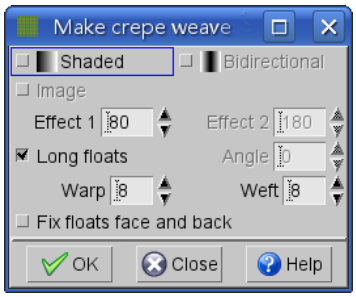



*Figure 115: Make crepe weave dialog*

Weave editor has a tool for generating crepe (sable) weaves. To use it, in the **Edit weave** window choose **Change** > **Make crepe weave**. The tool works both on selection, as on the full weave, but it has more options if it works over a full weave. The tool is more appropriate for jacquard, since it does not handle shafts in any way. If it works on selection, then long float controls are not applied. The value in the **Effect** field may be any integer between 1 and 254. If it is closer to 1, the resulting weave will produce the warp effect on the face side of the fabric, if it is closer to 254, it will be more of weft effect. The value of 128 will make a balanced effect. You can enable/disable the long floats correction with the **Long floats** check-box. Set the maximum float for the warp and for the weft in the **Warp** and **Weft** fields. If you check the **Fix floats face and back** check-box, then the program will shorten the floats to the declared values automatically. Otherwise you have to open the Float dialog (**Edit** > **Float**), and correct floats from there.

The program is fully interactive, so you can use the wheel mouse and observe the effects.

The images in Figure 116 shows the two generated weaves—the only difference is the **Effect 1** parameter (15 and 135) in the setting.

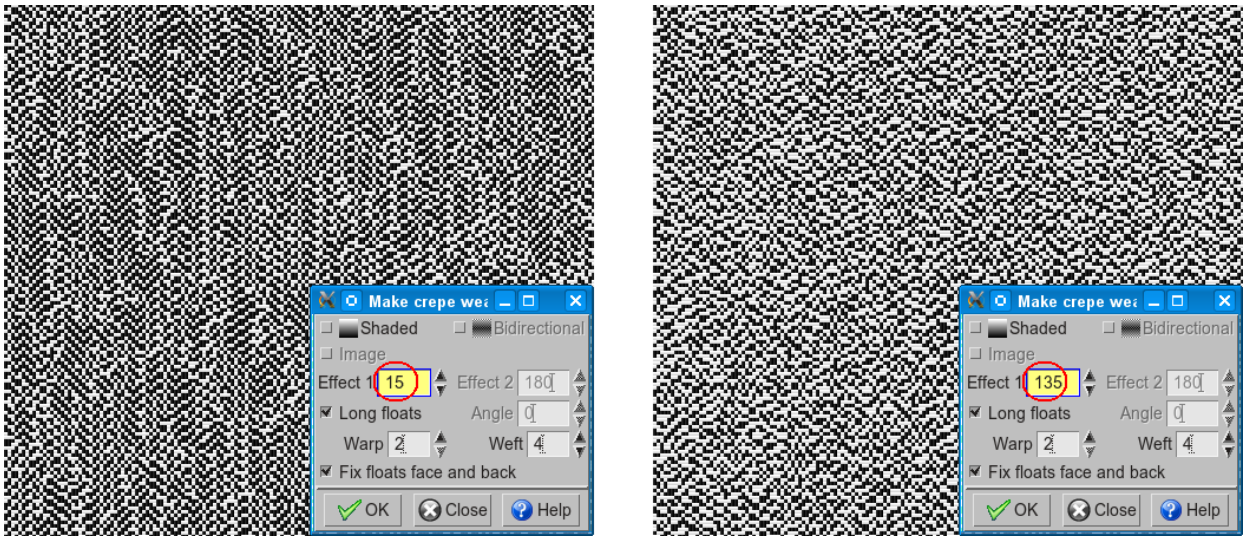



*Figure 116: Making crepe weave*

### 5.14.6.1 Shaded crepe weave

On the top of the **Make crepe weave** window, you can enable the **Shaded** toggle button, which allows you to specify two values for effect. Program will make a horizontal shade from one effect to the other.

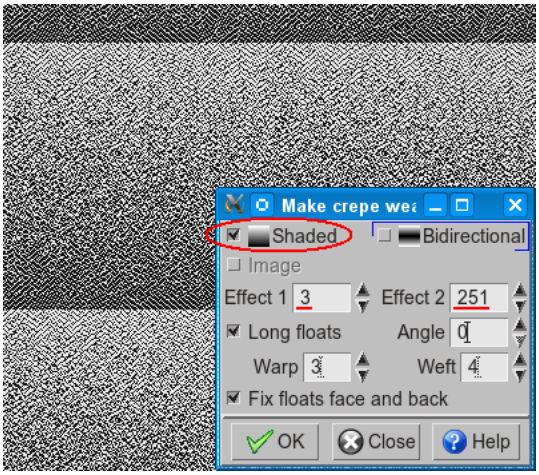



*Figure 117: Shaded crepe weave*

### 5.14.6.2 Bidirectional shaded crepe weave

If you turn on the **Bidirectiona**l button, the program makes a smooth transition between dark and light (warp and weft effect) areas.

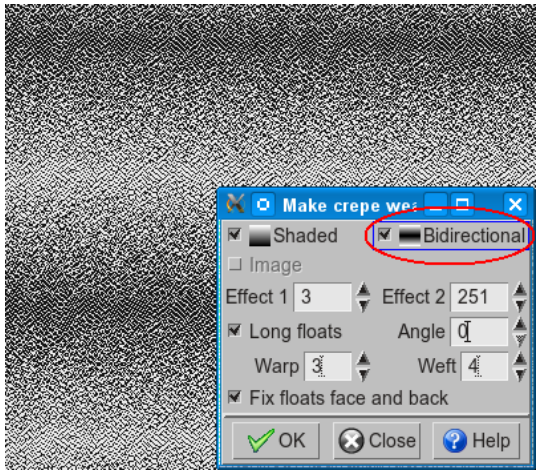



*Figure 118: Bidirectional shaded crepe weave*

### 5.14.6.3 Shaded crepe weave with angle

You can set the angle of the shaded effect through the **Angle** option. It works both for normal and bidirectional shading.

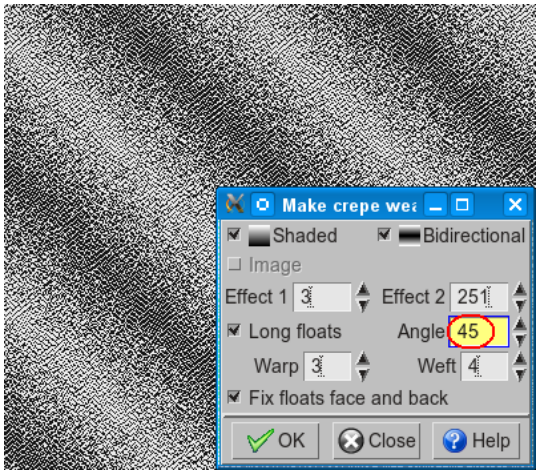



*Figure 119: Setting the angle of crepe shading*

#### 5.14.6.4 Using image for creating crepe weave

You can use image as a base for crepe fabric. Both **Shaded** and **Image** check boxes should be on. Then load the image into Jacquard conversion window (**Weave** > **Jacquard conversion**). Click the **OK** button, and the program creates a crepe weave based on the image.

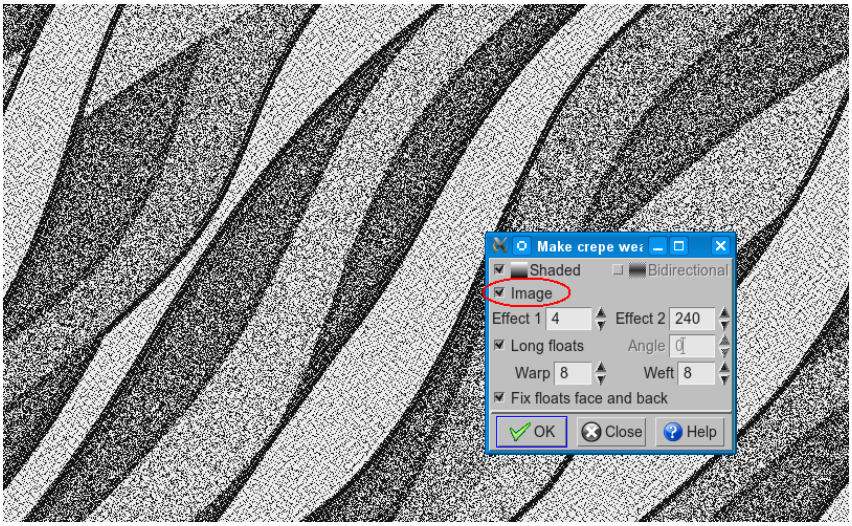



*Figure 120: Using image as a base for crepe*

### 5.14.7 Adding regulator or fringe function to a thread

The **Add to yarn Regulator/Fringe** function enables you to modify a regulator pattern in a fast way. It adds a regulator or fringe to defined weft, and automatically generates new regulator pattern, so you don't need to draw it or write it. It is very useful if you already have regulator pattern (for instance extra weft design), and you want to add regulator to some of the ground wefts.
To use this function, choose **Tools** > **Add to yarn**, and select either you want to use regulator or fringe. In the **Yarns** field enter the yarn, to which you want to add the regulator.

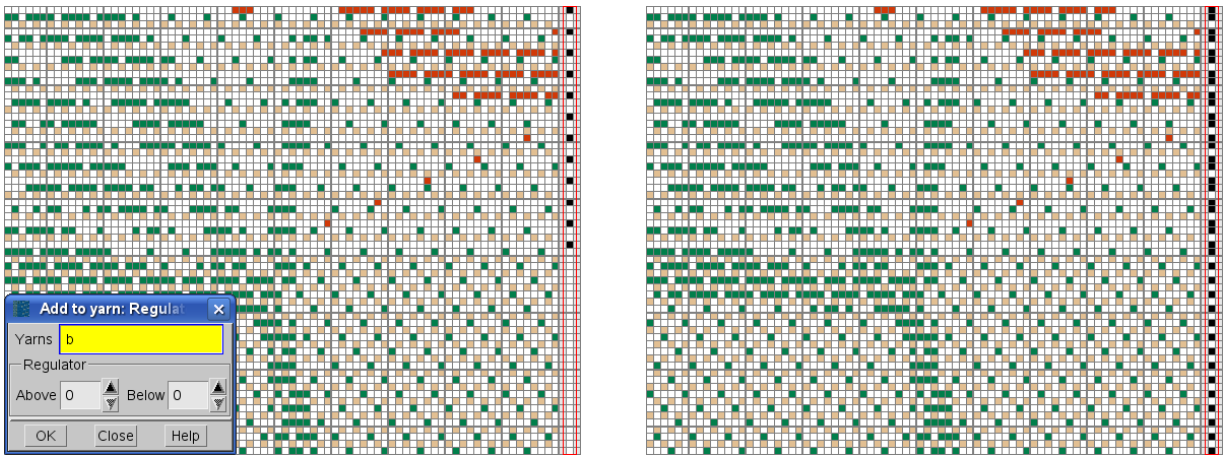



*Figure 121: Adding regulator to yarn*

## 5.15 Warp consumption and lifting information (jacquard)

The weave information window, available from the **View** menu, will display the owner of the weave, when it was last saved, and some other interesting statistics.
**Lifting** gives you a graphical view of how many hooks are lifted on the average. On jacquard, you would choose to reverse the fabric and weave it with back on top, so that fewer hooks would be lifted on average, thus prolonging machine life by reducing its wear and tear.

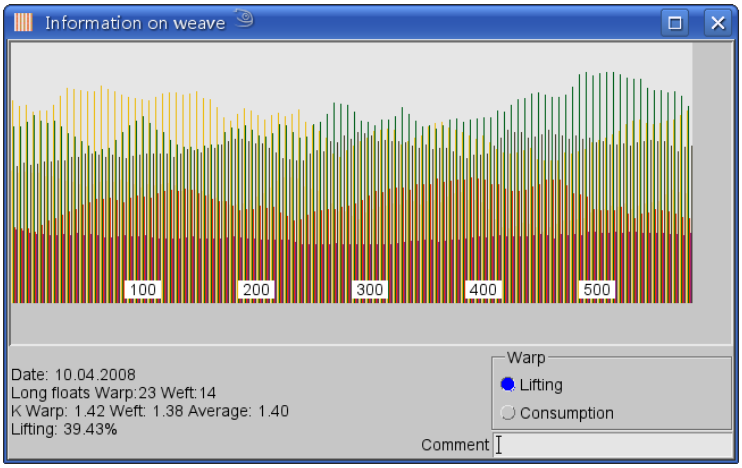



*Figure 122: Weave information - lifting*

**Consumption** will display the relative consumption of each thread according to the weave: it will count the number of passages from back to forward for each warp thread. If the fabric will have warp threads with very different consumption, the ones that consume more will begin to pull after a few meters are woven. They will cause warp to break or errors will be formed on the fabric (so called nests), since jacquard will not be able to pull up the hook due to high tension of the thread. In such cases, you can either use two separate warp beams, or change the weaves, so that they will have more similar consumption, or change the design, so that it will not contain vertical stripes of a single weave.

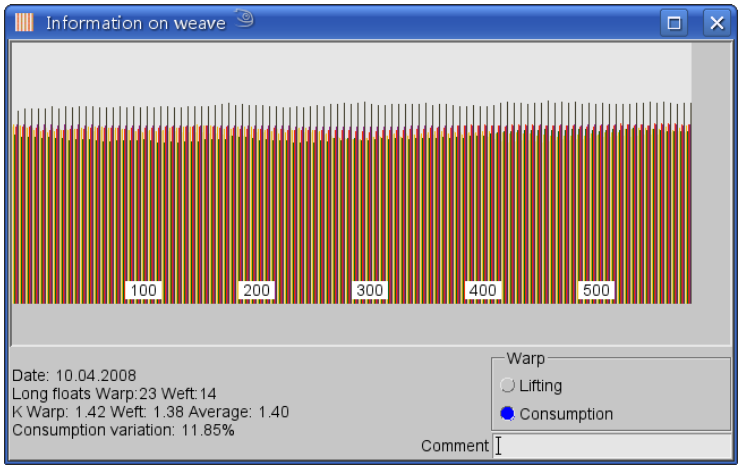



*Figure 123: Weave information - Consumption*

Both **Lifting** and **Consumption** display a warning when the values are out of bounds, but the limits are not really strict, so it is up to you to decide, if you want to resolve the problem or you leave as it is. The warning for lifting is above 50%, and the warning for consumption is above 30%. You can display these reports in black and white or in color; press **Shift+c** to switch color display on or off.

## 5.16 Printing the weave

To print a weave, choose **File** > **Print weave**. Figure 124 shows the **Print weave** window, where you set different printing properties.

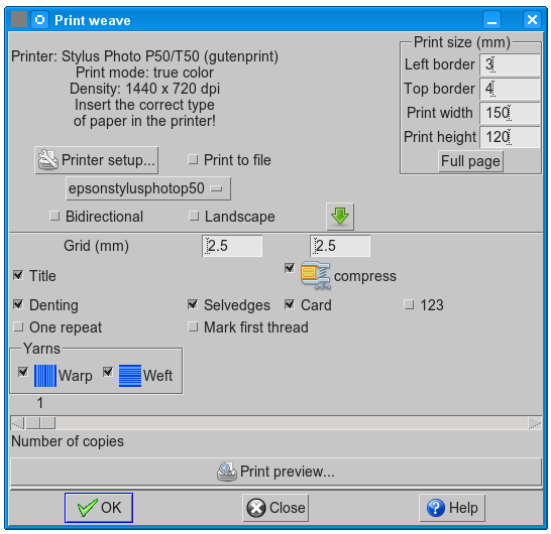



*Figure 124: Print weave window*

### 5.16.1 Printer setup

If you have not saved printer settings in **Save setup**, or you want to print to a different printer or file, you should select **Printer setup** to change printer settings. In this window (Figure 125), you have to choose the desired printer or graphics file format, print mode and density (in dpi—dots per inch). For higher quality printouts use 1440 dpi, but in most cases 720 dpi is sufficient.

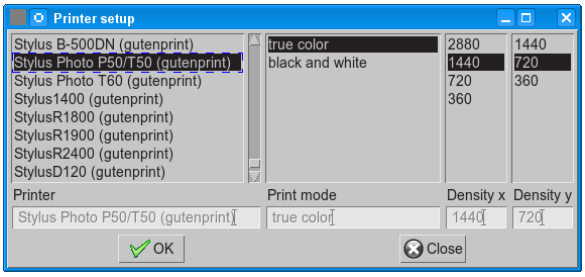



*Figure 125: Printer set-up*

### 5.16.2 Print size

To control size and position of the printout size enter fields in the **Print size** area. The borders are measured from left and top including the non-printable white space. To check the maximum printable area, press the **Full page** button. If you insert an area out of range it will be trimmed and you will be warned with a beep.

### 5.16.3 Grid

Here you set the grid size (mesh). Default value is 1.5 millimeter.

### 5.16.4 Printing options

The printing option toggle buttons are below the **Print size** text fields. Simply, by marking the check box in front of the option, you include that in the printout.

- **Title**; the program extends the title with date, user name, customer name (your company) and version of the program at the top of the page.
- **Denting**
- **Selvedges**; program prints selvedges on the left of the weave, if you have load the weave for selvedge in the Save cards for production window.
- **One repeat**; program prints only the weave, even if there is space for printing more weave repeats
- **Yarns;** you get the warp and weft pattern on the top and right side of the weave.
- **Compress**; if the weave consists of many repeating elements, you can use this function to reduce printout size.

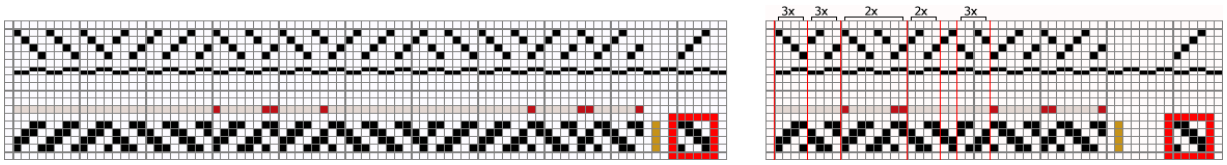



*Figure 126: The same weave in "normal", and compressed mode*

- **Card**; normally, you want to print the dobby card, but if you don't, there is the option to skip it.
- **123**; Program will print the number of shaft instead of black square in the drafting pattern, and in the dobby card. Mesh size should be at least 3, so there will be enough space for the number to be readable.

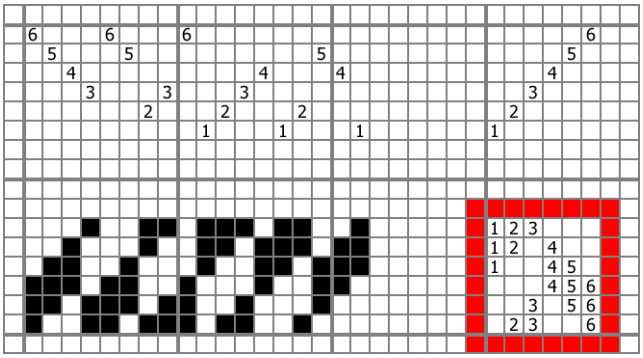


*Figure 127: Weave draft marked with numbers*

### 5.16.5 Print preview

When the settings are correct, check the **Print preview**. It displays weave exactly as it will be placed on a paper (left and top offset). If everything is in the proper place, close print preview, and click **OK.**

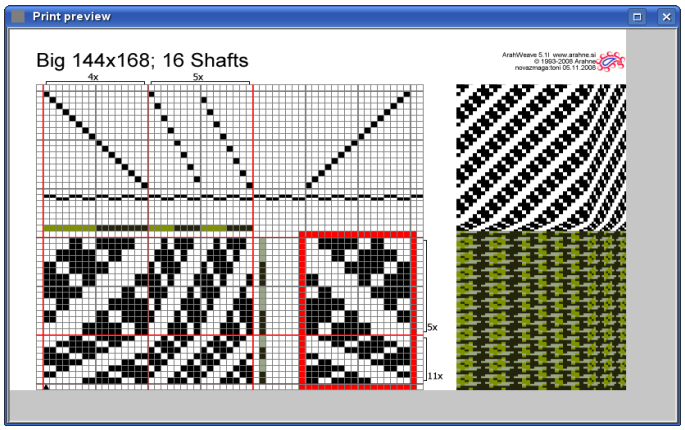



*Figure 128: Print preview of the weave; the compress option is on.*

## 5.17 Extracting the weave from cards

*ArahWeave* enables you to adapt / change / correct designs, which you get in the form of a Jacquard card file and you don't have ArahWeave's fabric file of it. When you load such a file in ArahWeave's weave editor, it is displayed as a regular weave (you know, black and white points). But somehow, this kind of a weave looks strange, because there are some empty columns, and usually there are some random black points at the beginning of the card. These points control the sequence of weft yarns (we call it weft change) and empty columns represent inactive (empty) hooks. There may be some other information, like regulator, density, a weave for selvedges, beside the weft change sequence. To cut just a weave out of it, you will have to remove the loom control information from a card file, but before that, we can use this information to reconstruct a fabric design. In the Jacquard menu of the weave editor you can find a function for guessing a weft change from a specified weave point and the length of weave area that presumably contains this information, and for guessing the regulator (stop motion) from a specified weave point. The following paragraphs explain the functions needed to extract this information.

### 5.17.1 Loading a card file into weave editor

Use **Weave** > **Load cards...** to open the Cards browser, and load a card into Weave Editor (if you are loading a card from a floppy, choose **Weave** > **Read Jacquard floppy**, and wait until the program reads the floppy, and then load the desired file.)

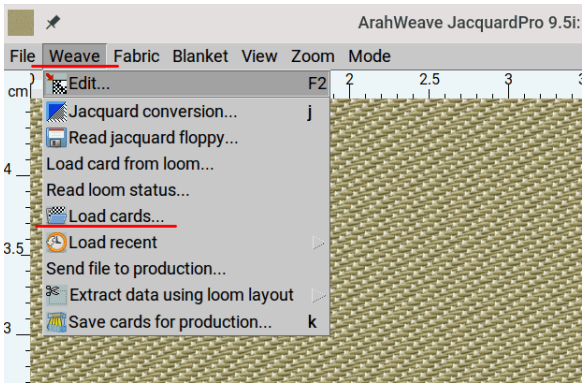



*Figure 129: Opening the card browser*

To work within the logic of *ArahWeave*, you must extract only the weave information, deleting the fields for empty hooks, selvedges, control information, etc. Once you have only the weave, you can correct the long floats, if any, and save the jacquard file in a different format or for a different loom setup.

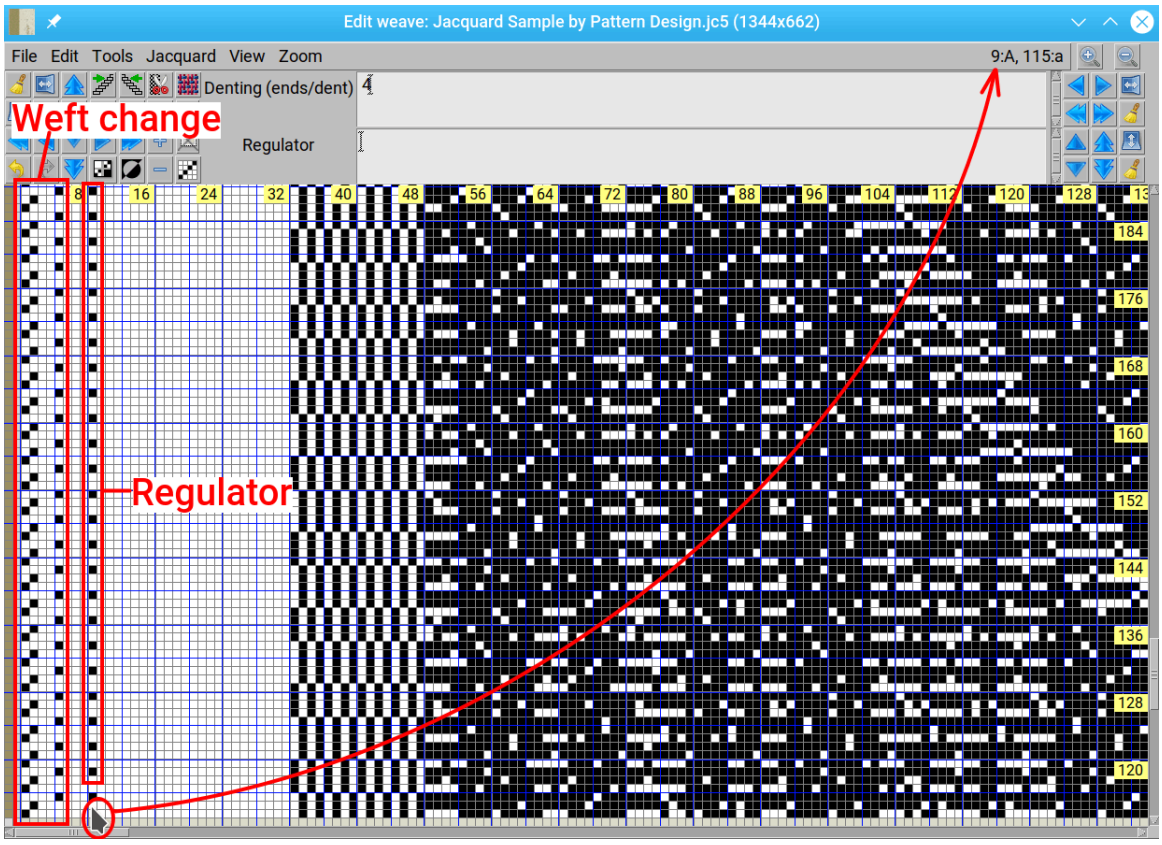



*Figure 130: Cards in weave editor*

### 5.17.2 Guessing the weft change

Choose **Jacquard** > **Guess weft change** in the main Weave editor's menu.
You have to tell the program, where the weft selection information is positioned (the **From position** field), and how many hooks are used for the weft change (**Length**). Move the mouse in the **Edit weave** window to find the position and number of hooks, which are used to control the weft pattern. In the Guess weft change window, type in the starting position (the position of the first hook which controls weft), and the number of hooks, which are used to control the weft pattern.

The jacquard file displayed in Figure 131 contains the weft change information which starts at the beginning of the file, so enter 1 in the From position field. We can see that the regulator is on the ninth hook, so eight hooks before the ninth hook are used for the weft selection.

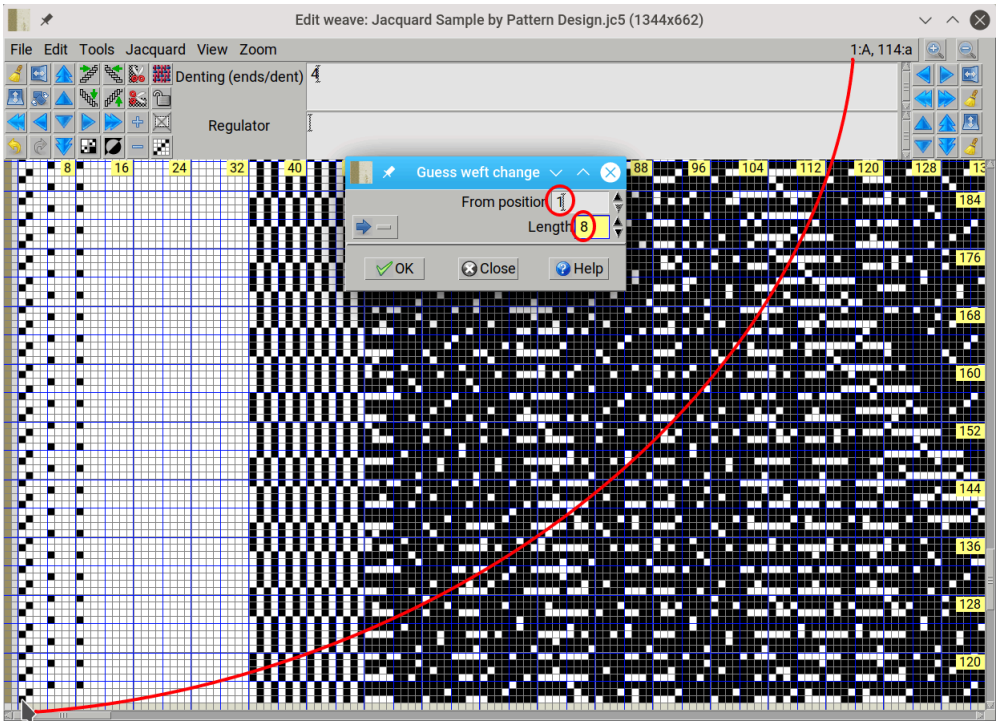



*Figure 131: The guess weft change dialog*

When you click on the **OK** button the program writes the weft pattern into the **Edit warp and weft pattern** window.

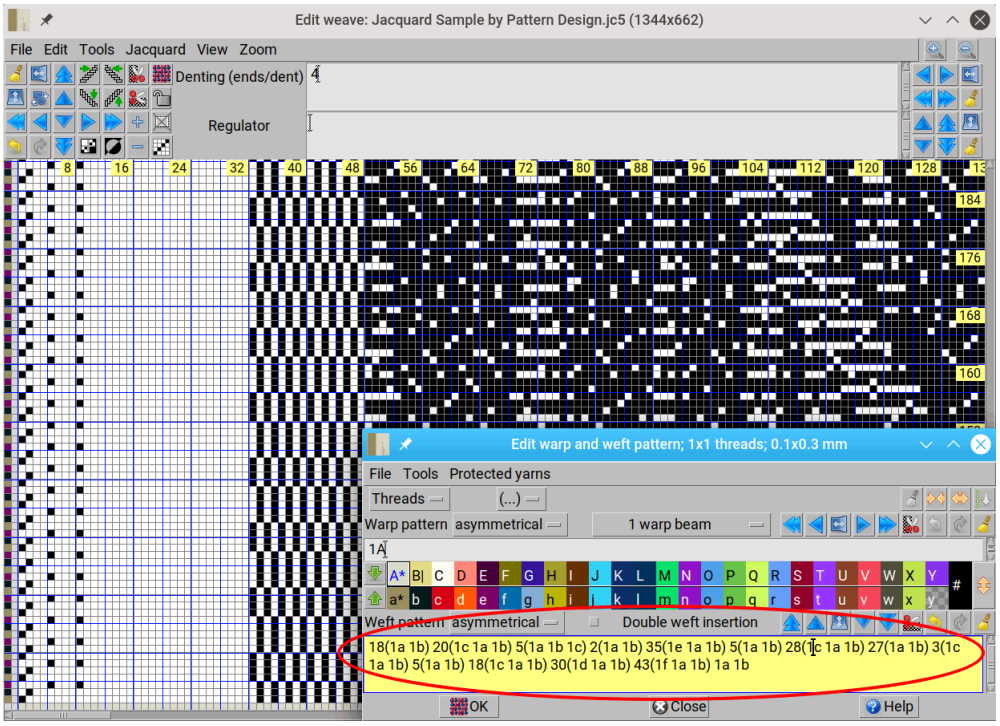



*Figure 132: ArahWeave reads a weft pattern from the file, and writes it into Edit warp and weft pattern window.*

### 5.17.3 Guessing the regulator

Choose **Jacquard** > **Guess Regulator** in the main Weave editor's menu. Similar to weft change, you have to find a position of the regulator. Usually it is a single hook.

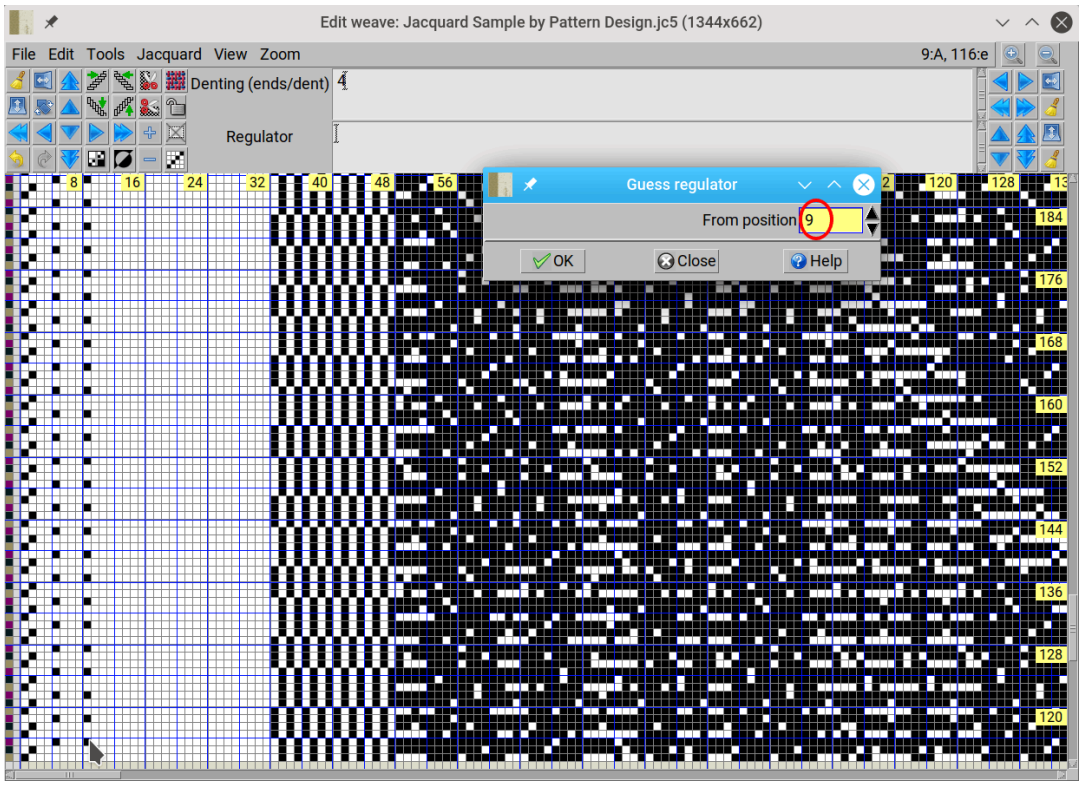



*Figure 133: Guessing the regulator*

When you click on the **OK** button the program writes (and draws it on the right side of the weave) the regulator pattern into the **Edit weave** window.

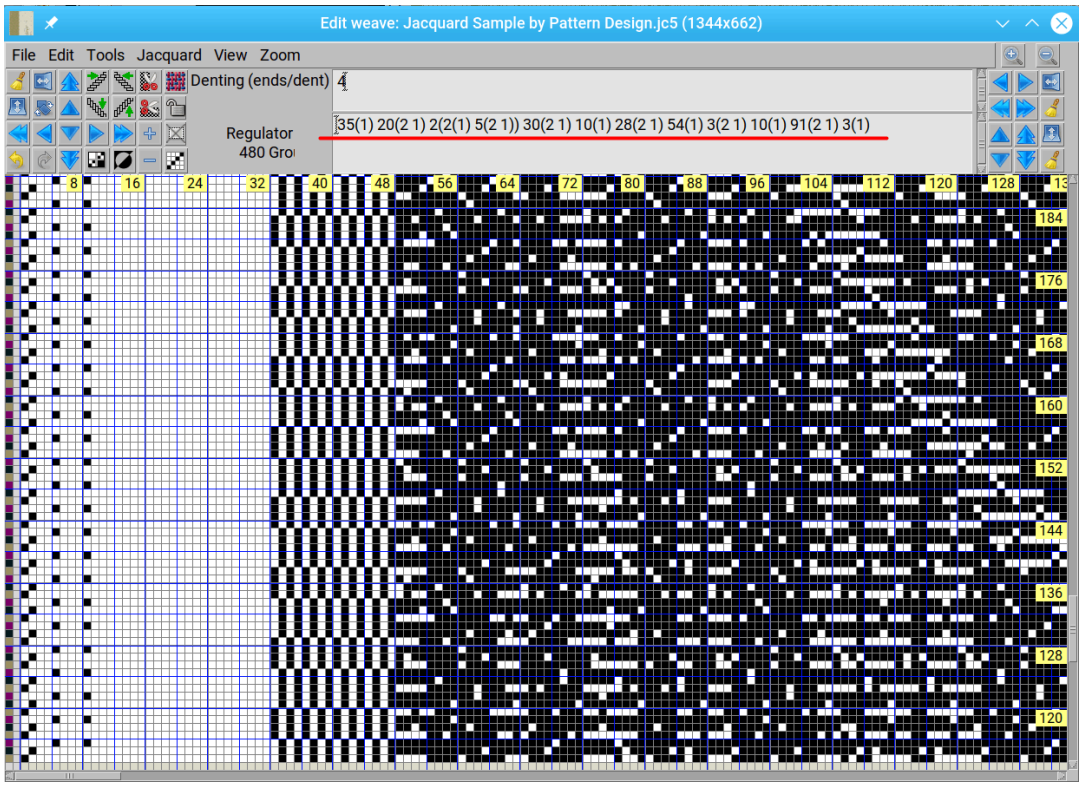



*Figure 134: The regulator pattern written in the Edit weave window.*

*Regulator cannot start with active regulator (black point) on the first weft in ArahWeave. If it is on the first weft in your card file, move the weave (card) vertically until it starts with a white point.*

### 5.17.4 Removing selvedges from weave

The **Jacquard** menu of weave editor also contains function **Remove selvedges** and **Remove extra warps / wefts**. The first function removes selvedges—it tries to find out if there is a complete vertical repeat in the weave, identifies it as selvedge, and removes it. It will search for repeats with length of up to 40 points. The second function is useful for removing empty spaces (areas of complete float in either warp or weft). The aim of both functions is getting the weave out of a jacquard design prepared for weaving.
If there are some warps that cannot be removed automatically with the above functions, you can remove them manually by deleting them: right mouse button click in the weave on the gray area below the warp removes the clicked warp end.
In the case of a simple jacquard file, like the one used in previous figures, **Jacquard** > **Remove selvedges** deletes all except the weave information from a Jacquard file. You can make a fabric simulation, after you set the colors, yarns and density.

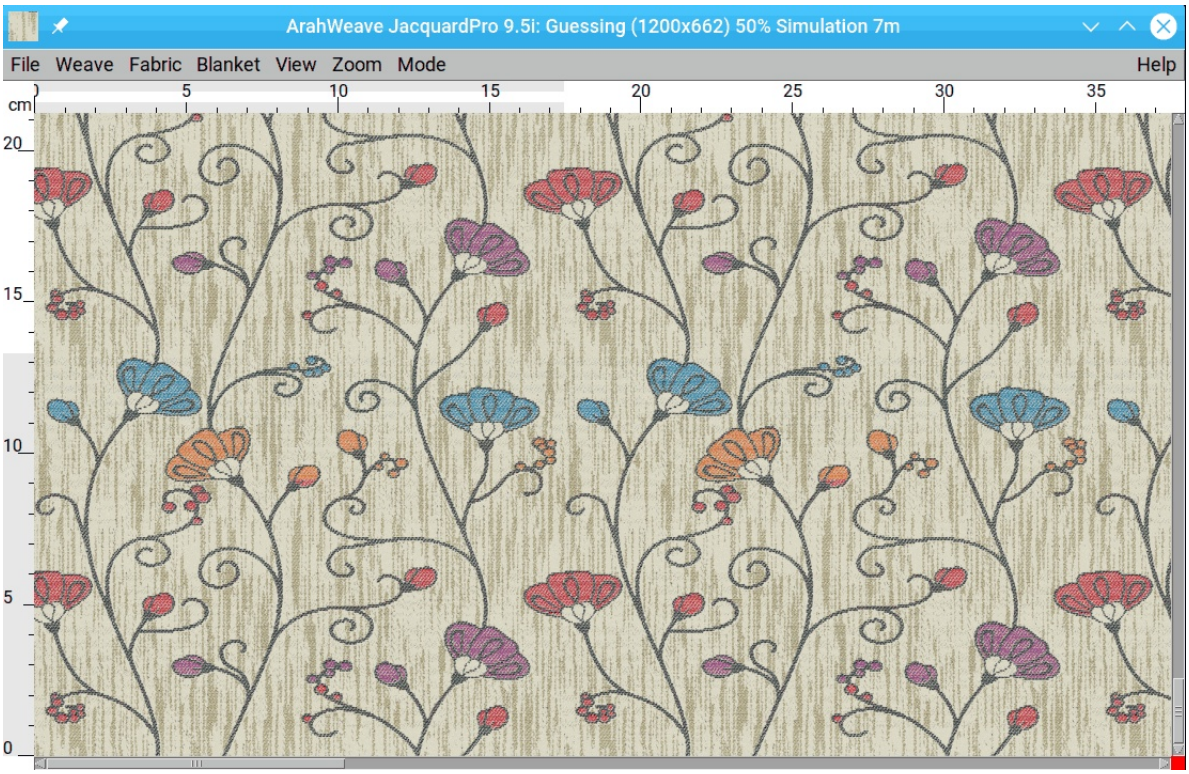



*Figure 135: The simulation based on the data extracted from the jacquard file.*

# 6 Yarns

To edit yarns, choose **Fabric** > **Yarns**.
On top of the **Yarns** window, you will see warp (A...Y) and weft (a...y) colors. To edit a particular yarn, click to the desired entry. The selected yarn color and code will be displayed below.

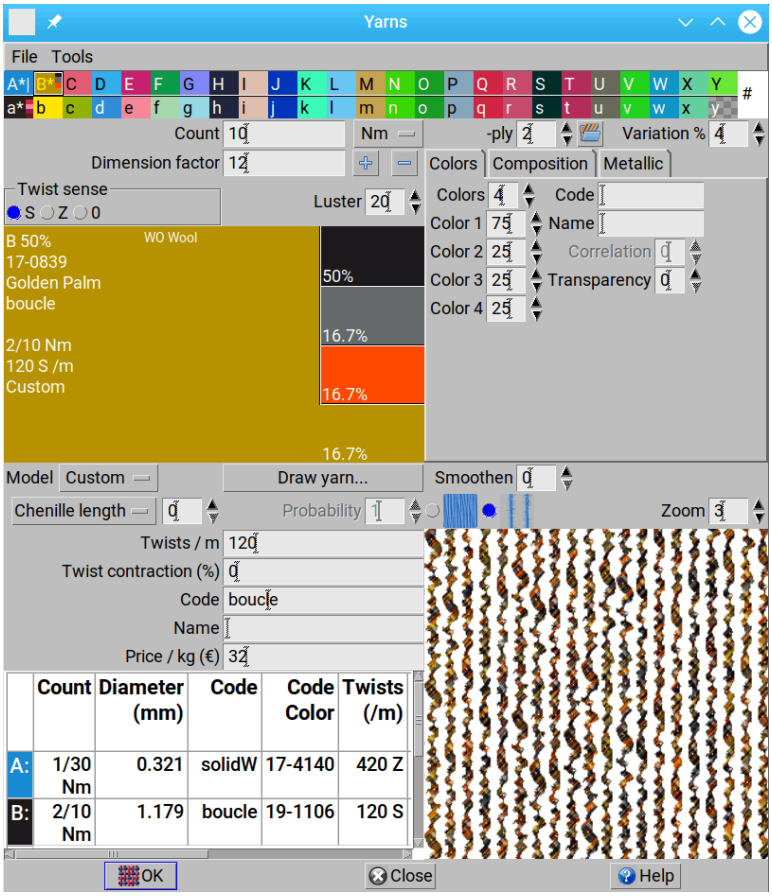



*Figure 136: The yarns editor; selected is the "B" yarn in warp.*

## 6.1 Yarn count

The most important property of yarn is its count. The count is entered into the **Count** field and can be expressed in any of the common units; you select the unit with the unit toggle button. Supported yarn count units are:

- Tex The ISO standard (gram/kilometer)
- Nm Metric (meter/gram)
- NeC Cotton (English); 840 yards per lb
- NeW Worsted
- Np Woolen (Prato)
- Ny Woolen (Yorkshire)
- NeL Linen
- NeS Silk
- Td Denier (grams/9000 meters)
- Run American woolen unit
- dTex equals 0.1 tex
- YPP yards per pound

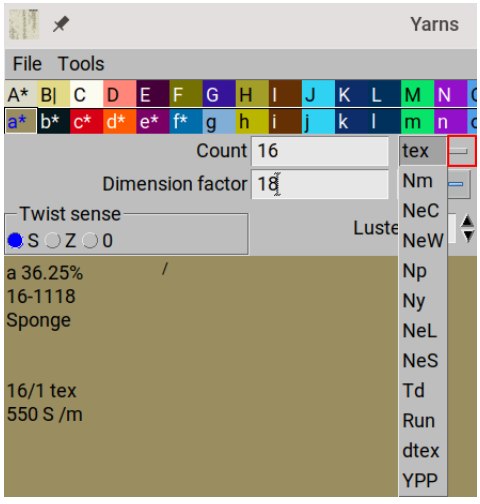



*Figure 137: Choosing the yarn-count unit.*

## 6.2 Yarn diameter (dimension factor)

The yarn diameter is the basis for fabric simulation in the **Simulation** view. You can't enter it directly, as it is calculated from yarn count and dimension factor, according to the following formula:

$$Diameter = \frac{\sqrt{count_{tex}}}{Dimension\ Factor}$$

Every time you create a new yarn, the default value of the dimension factor, which is 18, is used. Different factors are suggested for different yarn types (carded cotton 18.7, combed cotton 22.5, combed wool 25.3, wool 16.7, linen 27.1, etc.). Usually we change the dimension factor rather than a yarn count to modify the yarn diameter. When changing the dimension factor, either by directly entering the value or by using the plus and minus icons, you can observe the change in the theoretical diameter of the yarn in the yarns property table; to apply a change to the fabric simulation, press the OK button in the Yarns window.

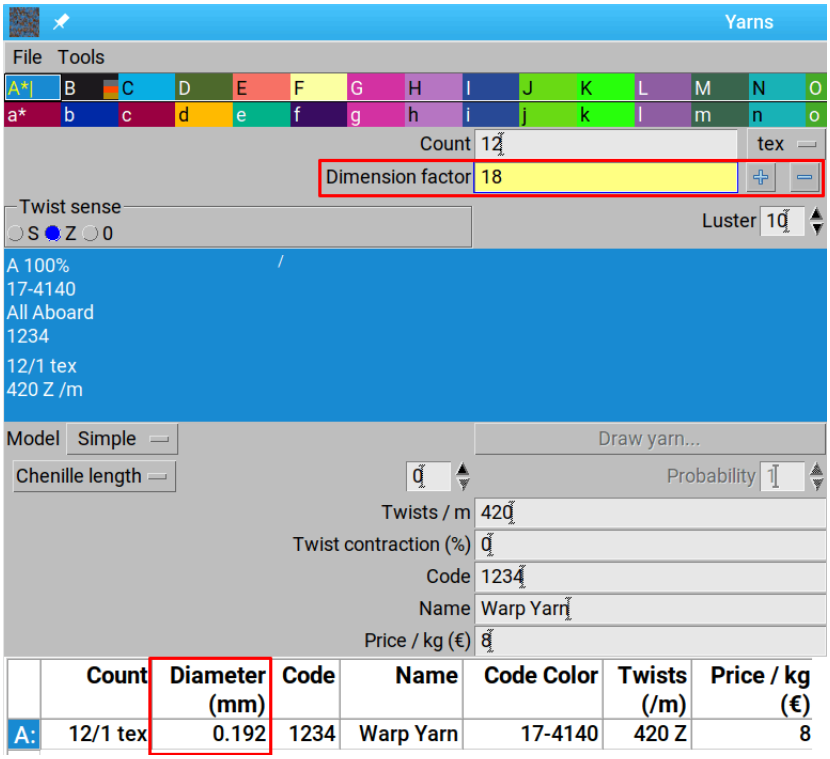



*Figure 138: Instead of typing in the dimension factor value, you can increase or decrease the yarn diameter by pressing the plus or minus icons next to the input field (yarn thickness).*

## 6.3 Luster

**Luster** determines luminosity value of contrast between the light shading and dark shading color in yarn simulation. Default value is 10. You can vary this value from 0 to 30, where higher value means stronger shading effect. Figure 139 shows the same yarn at three different luster settings. Yarn images are taken from the yarn preview part of the **Yarns** window; preview works only for the **Simulation view**.

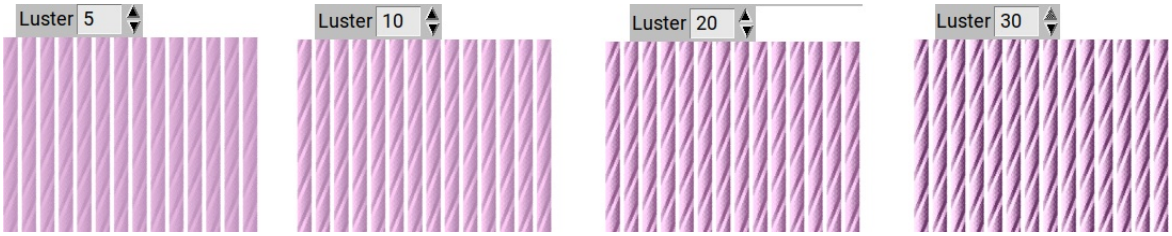



*Figure 139: Same yarn color at Luster 5, Luster 10, Luster20, and Luster 30*

## 6.4 Variation

The Variation% parameter (located in the upper right corner of the Yarns window) allows you to vary yarn diameter to make a simulation look more fabric-like. For wool-like fabrics, use 10 to 20%, and for regular yarns, use less (default is 0). Variation of up to +-50% is possible. The yarn variation is random within given limits, but each yarn has only one diameter, unlike real yarns, which change diameter after, say, 50 cm, depending on the yarn properties.

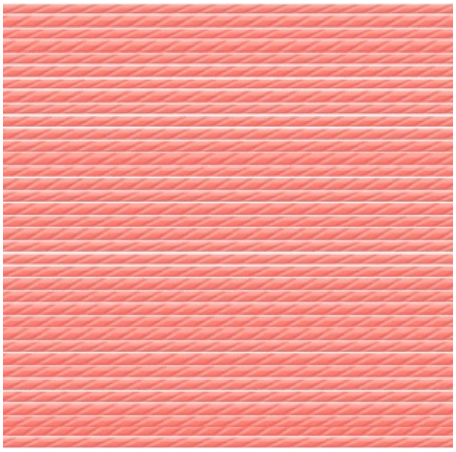


*Figure 140: Variation set to 15%*

## 6.5 Twists

Yarn twist is used to bind together fibers in spun yarns. The number of twists per length unit determines the yarn twist angle, which affects the yarn appearance. Twist sense has S (left) or Z (right) directions. You can disable the twist simulation in yarn by choosing 0 (zero) as twist sense.
**Twist contraction** is inserted as %, and it increases the weight of yarn and yarn diameter by a given percentage.

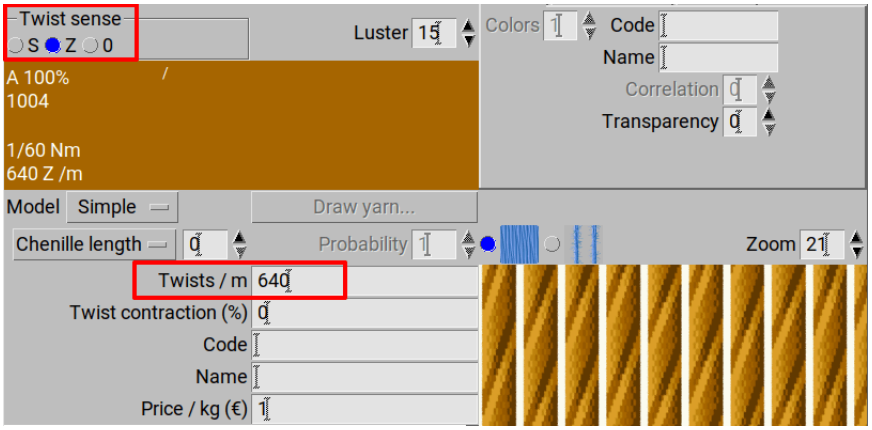



*Figure 141: Choosing twist sense and setting the number of twists per meter.*

Figure 142 shows the effect of twist on yarn appearance.

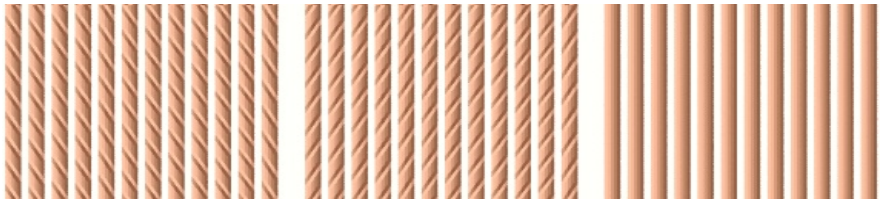


*Figure 142: Yarn with twist sense S, Z, and without twist*

## 6.6 Transparency

If you use semi transparent yarns, you can adjust the level of **Transparency** from 0 to 9, where 9 means that 90% of pixels in yarn are transparent.

## 6.7 Name, code, price

You can enter the code and name of the yarn according to a weaving mill's or producer's naming scheme in the text boxes labeled, as you would expect, code and name. Same goes with the price of the yarn, enter it in the **Price** text box. This yarn price is used then in the fabric cost calculation.
*The currency is set in the ArahWeave configuration file (Help > Save setup).*

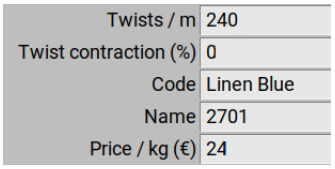



*Figure 143: Yarn's input fields*

## 6.8 Yarn composition

You can set the fiber composition for every yarn. First enter the number of **Components**, then enter the relative part of every fiber, and select the fiber code from the drop down list.
The codes are taken from the ArahneFiberImport.[lang].xml file from the folder named "common". The [lang] stands for the language code. For instance, when English is the selected language in ArahWeave, the fiber codes from ArahneFiberImport.eng.xml are used.

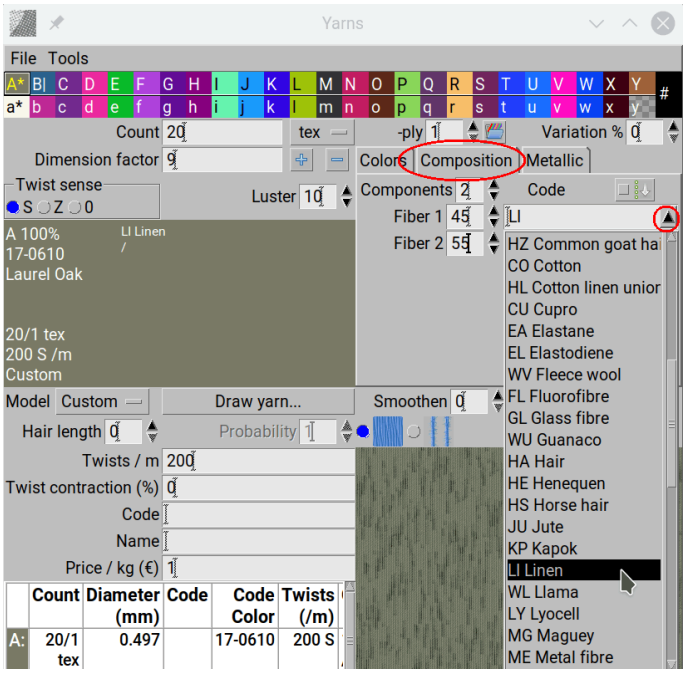



*Figure 144: Choosing the fiber code from the drop-down list.*

If you like, you can use your own fiber codes table. Copy one of the Fiber import files, for instance common/ArahneFiberImport.eng.xml file into your default XML folder (usually it is data/xml). Then delete the language code from its file name (.eng from ArahneFiberImport.eng.xml). This file now becomes the fiber codes import file read by ArahWeave at startup. You can open it and edit it in a text editor program (notepad, kwrite, kate...), like deleting fibers you don't use, adding new fiber codes or modifying the existing ones. To remove a fiber code from a list, find it, and delete the whole line, which contains this code, starting with <Value> and ending with </Value>.


*Figure 145: ArahneFiberImport.eng.xml file displayed in a text editor.*

*ArahWeave* calculates the fabric composition in the **Calculation of thread consumption** window, if the composition of every yarn in the fabric is set (Figure 146).

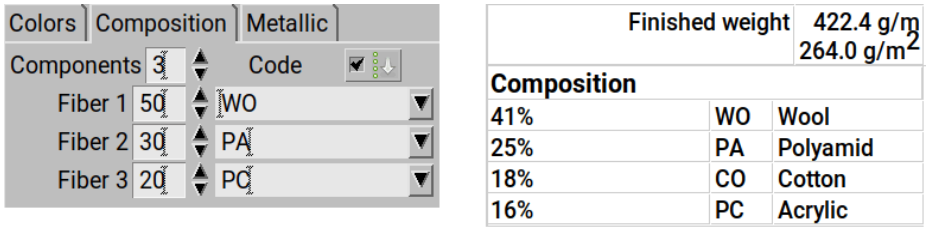



*Figure 146: The yarn composition in the Yarns dialog, and the calculated composition of the fabric in the Calculation of thread consumption window.*

## 6.9 Yarn model

You can choose the type of yarn from the **Model** option menu (Figure 147). **Simple** is the default model. It means a regular, solid color yarn. Other models are **Mouliné**, **Mélange**, **Multicolor**, and **Custom**.

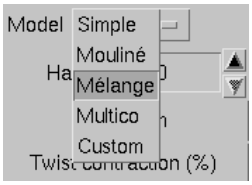



*Figure 147: Yarn model menu*

### 6.9.1 Complex yarns (Mouliné, Mélange, Multicolor)

When you choose one of the complex yarns (mouliné, mélange, multicolor), the number of colors in yarn changes to two. You can change it to have up to six component colors.

The right part of yarn color display window contains the yarn sub-colors. Click the color to select it. In the **Edit color** window, you can then copy, exchange or modify colors as you do if you have a single color yarn. In the **Integer** view, only the first yarn color is used to simulate the whole yarn. In the **Simulation** view, the yarn is correctly simulated with all the components. For each yarn color, you can enter the relative size of a component yarn in the final yarn.

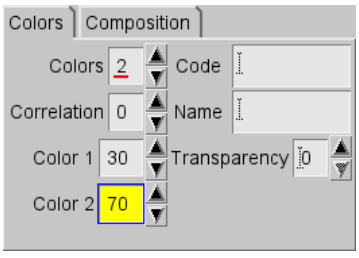



*Figure 148: Setting the number of colors in yarn*

Yarn color values are relative to the total of all yarn colors. As you enter them, and press Enter, the computer will automatically recalculate the relative percentage of each yarn color. You can also enter values as %, if you like, but since values are relative, there is no checking to make a sum of all colors 100%.

The **Correlation** parameter (Figure 149) is used for mouliné and mélange yarns. As you increase the correlation parameter from 0 to 8, the program will introduce stronger and longer variations in relative sizes of the two (or more) mouliné yarns. If correlation is 0 (default), then each point is random within given proportions, as before. But if you increase the value of correlation, the mélange will look as if it was not mixed very well. You can set the intensity according to your pleasure up to a maximum of 8.

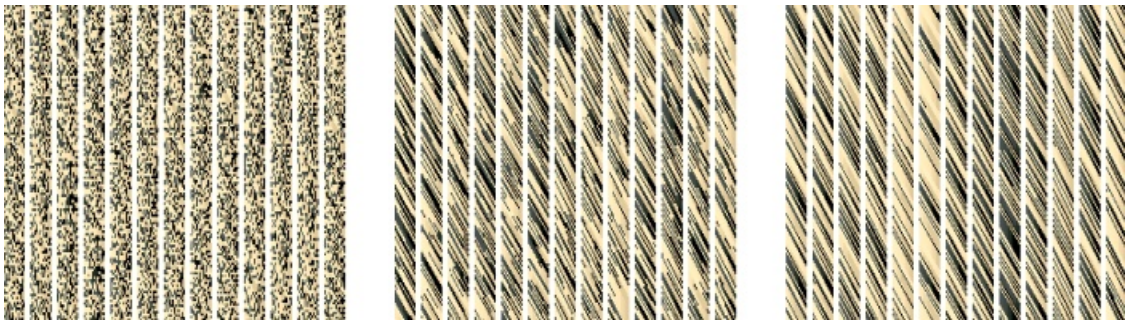


*Figure 149: Mélange yarn at Correlation 0, 3, and 8*

**Multicolor** model simulates a yarn composed of different stripes of a single color. They appear as "random" color stripes, while the probability of their appearance is controlled by the value you enter for each color. Use the **Length** field to control the length of color segments. To create a smooth transition between colors, set the **Smooth** option. It can be any value from 0 (no transition) to 30 (highest dither). Figure 150 shows the multicolor yarn.

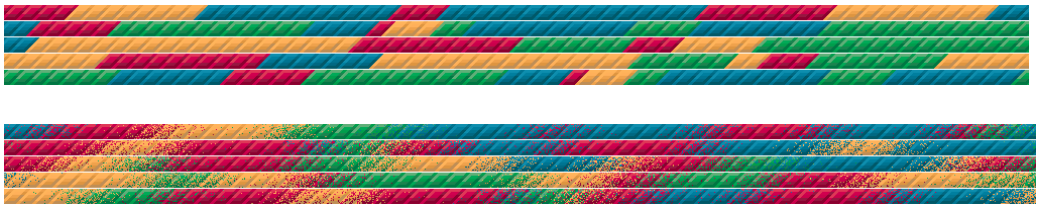


*Figure 150: Multicolor yarn without smooth (top), and with the smooth option set to 15*

When you have just one color per yarn, the boxes and arrows for entering relative size of component color are not mapped; they appear as you increase the number of colors. The yarn **Model** buttons are also not mapped on single color yarns.

Chenille yarns: for each yarn, you can specify the **hair length** and **hair probability**. **Hair length** is expressed as tenth of yarn diameter. So length of 10 means a hair as long as yarn diameter. Maximum hair length is 50, that is 5 times the yarn width. The hairs will go in all directions randomly with equal probability. 16 directions are supported. You must also specify **hair probability**. Maximum probability is 20. You can use any value between 0 and 20 (inclusive) for your desired effect. The nice thing about simulation of chenille yarns is that you can use it on all yarn types supported within *ArahWeave*: single color, mouliné, mélange, multicolor, and drawn yarns. Chenille is fundamentally different from other yarns, since its hair will cover other yarns close to it, in spite of the fact that those other yarns would be on the top according to the weave. For this reason, it is not possible to simulate chenille simply by increasing yarn count (thickness). It is also good to know that chenille yarns are very open, so the yarn count with respect to diameter as calculated by default dimension factor of 18.0 will probably not be correct. You will need to adjust it to a higher or lower value.

### 6.9.2 Making chenille yarn

Some yarns, especially chenille types, appear like they are made from many light shades of one color. If you want to make a realistic looking chenille yarn, you have to make a multicolored yarn with sections of different, but similar colors. There is a function in the Yarns editor, which helps you to create this type of yarn in a quick way.

First, choose a color for yarn in the **Edit colors** window. In the **Yarns** window choose Multicolor as a type of yarn, select a number of shades in yarn (up to six), and choose **Tools** > **Make yarn color shades**. You

can also increase the **Length** and **Smoothen** parameters. In the **Make color shades** window you set the **Luminosity** parameter, which determines the **L** (luminosity) differences between color shades. If you have 5 colors, and luminosity difference should be **−+5**, the program will keep the base color, and then make a different variation of it which will be +5, -5, +10, -10 as Luminosity in Lab values. Usually 3-5 gives good results.

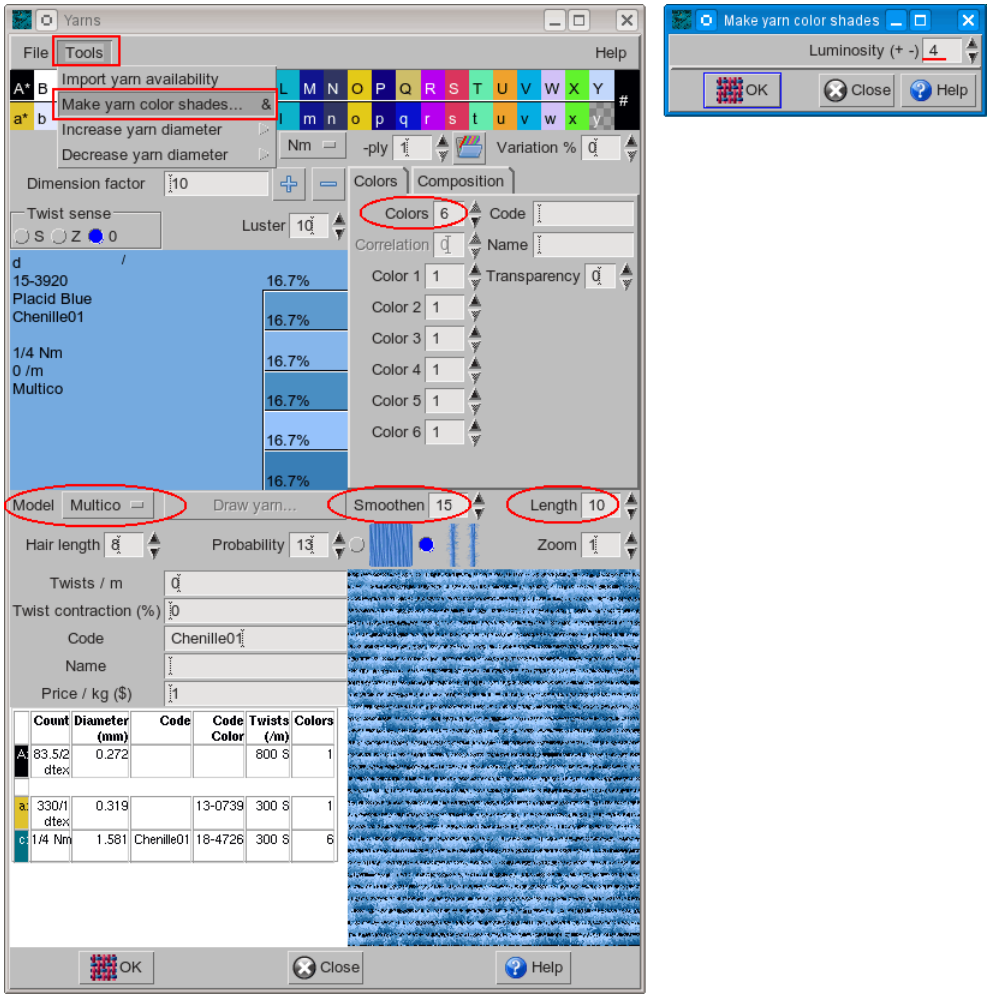



*Figure 151: Making yarn color shades for chenille.*

### 6.9.3 Custom mode (drawing yarns)

You can draw your own yarns using paint tools. The initial yarn will always be based on the previously selected yarn. So if you want to save some time, it is a good idea to set all the yarn parameters (count) for the yarn which is most similar to the yarn you want to draw (like for example, melange), and then switch to the **Custom** yarn model. Then increase the number of colors (if you want to have more than one), click on the **Draw yarn** button, and the **Draw yarn** window pops up (Figure 152).

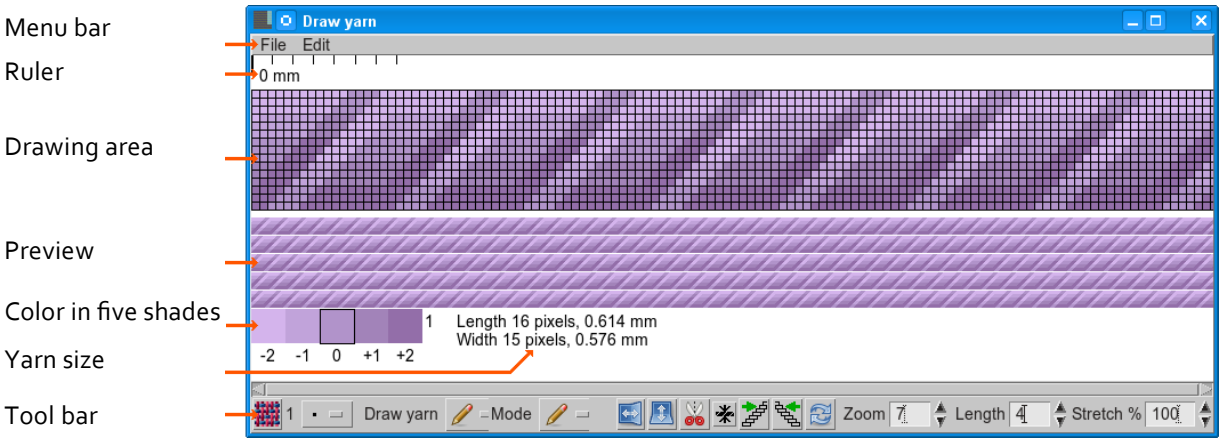



*Figure 152: The Draw yarn window*

The **Draw yarn** editor is composed of several areas. On top, you have the drawing area. The yarn is drawn in a grid, and you can change the zoom level by pressing + and – on the keyboard, or by Ctrl+mouse wheel. The top of the yarn also displays the ruler, so you know in real size how long a certain effect will be. Below the yarn draw area you have the same yarn repeated 5 times, so you have some idea how the yarn will look when it is repeated several times. Each yarn has its own random starting offset.

The colors used in the yarn are displayed at the bottom, together with the actual yarn dimensions, both in pixels (points) as in real length. If you want longer yarn, you can increase the **Length** value in the lower right corner. Note that you will not get new empty space, since the program will automatically copy the existing yarn to the new area. The length of yarn is not arbitrary—it must always be a power of two. For instance, a length of 11 means length of 2 to the power of 11, that is 2048. The **Stretch** value gives you the possibility to match the desired length of the yarn repeat.

It can be painful to draw very long yarns, so we have some tools which make it easier: you can scroll across the yarn with a wheel mouse, and the program supports auto-scrolling for drawing long areas. This means that, if you draw out of the window area horizontally, the program will scroll the yarn until you return back into the drawing area.

The available colors for drawing are below the yarn. Each yarn color allows 5 variations of the basic color. The basic color is in the middle, labeled 0. Then you have two lighter colors labeled -1 and -2, and two darker colors with labels +1 and +2 (Figure 153).

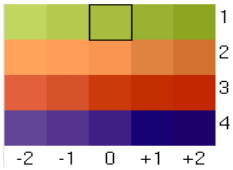



*Figure 153: Yarn colors*

You have an option menu to choose the thickness of your draw pen—it can go from 1 to 9.

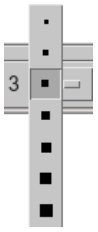



*Figure 154: Yarn pen size*

There are several icons or menus to choose from at the bottom of the **Draw yarn** window. The first one on the left allows you to apply the yarn to the fabric, to observe the yarn changes in the real fabric simulation.

Next comes the Draw tool – freehand, rectangle, spray, mix. The left mouse button draws with the selected color, the right mouse button draws with the background color (that is a hole in the yarn).

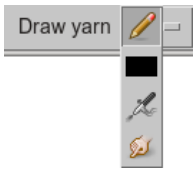



*Figure 155: Draw yarn tool*

After that you have the choice of the **Draw mode**: first is **normal**, indicated by a pen. Then you have the **Recolor** tool which keeps the shades of the yarn image, and just recolors it into a different yarn color. In this way, it will be easy to keep the yarn twists in the image, and make a complex printed yarn with colors changing across the yarn.

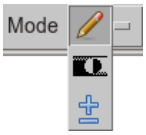



*Figure 156: Draw yarn mode*

The last mode is **lighten/darken**. It allows you to draw the area into a darker color (left mouse button) or lighter color (right mouse button). It does this without affecting the actual color. So if you draw across a yellow, it makes a yellow darker, but if you draw across green, it makes a darker green. In this way, it should be easier to draw yarn twist, or shade the yarn illumination from top to bottom.

After these main operations, you also have other tools, most of these should be easy to understand, if you know *ArahPaint* or weave editor. There are two icons to mirror the yarn horizontally and vertically. The scissors will move the beginning of the yarn to the middle (so you can fix the repeat at the beginning and the end).

The next tool is intended for yarn thinning. It will thin the yarn for the number of points of the currently selected pen size. If pen size is 3, it will take 3 pixels from the top and from the bottom. This function serves for making space for the bouclé or flammé yarn. You first need to thin the yarn, so you can later draw the thick effects.

After that you have two icons for tilting the yarn to the left and right. You can use it to adjust the twist angle.

You also have one level undo for your drawing operations.

To adjust the zoom level of the yarn editor, change the zoom factor, or roll the mouse wheel up or down while holding down the Ctrl key.

### 6.9.3.1 Edit menu

The Edit menu of the **Draw yarn** window contains additional tools / functions for faster yarn drawing. **Clear shades** changes the five-shades color into one solid color (middle tone), which makes drawing much easier and faster. To revert the shades, use **Edit** > **Add top/bottom shades**, and then **Edit** > **Add twist**. Program draws twists automatically.

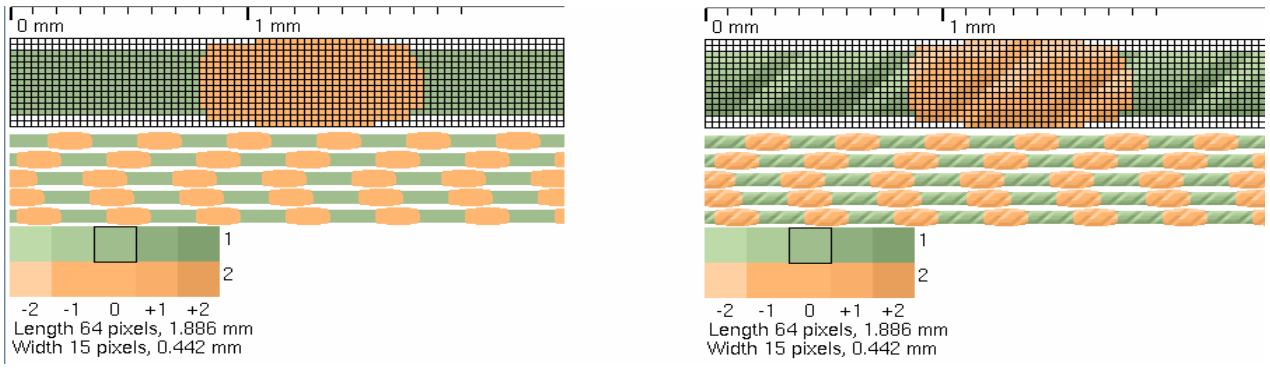



*Figure 157: Add shades and twist*

Once you have finished drawing your yarn, you can save it, so you can use it in a different fabric. The yarn colors are saved in the yarn file; you can change colors as for any other “normal” yarn in the **Edit**

**colors** window. So you don't need a couple of flame yarns, you can use one for all the different colors and yarn counts.

### 6.9.3.2 Loading yarn shape

**Load yarn shape** overdraws the shape and twists of the existing yarn in the **Draw yarn** window with the shape and twist of a loaded yarn, but preserves the colors. It is useful, if you want to change mélange, multicolor, or mouliné template yarn into already prepared bouclé, flammé (slub), or similar yarn.

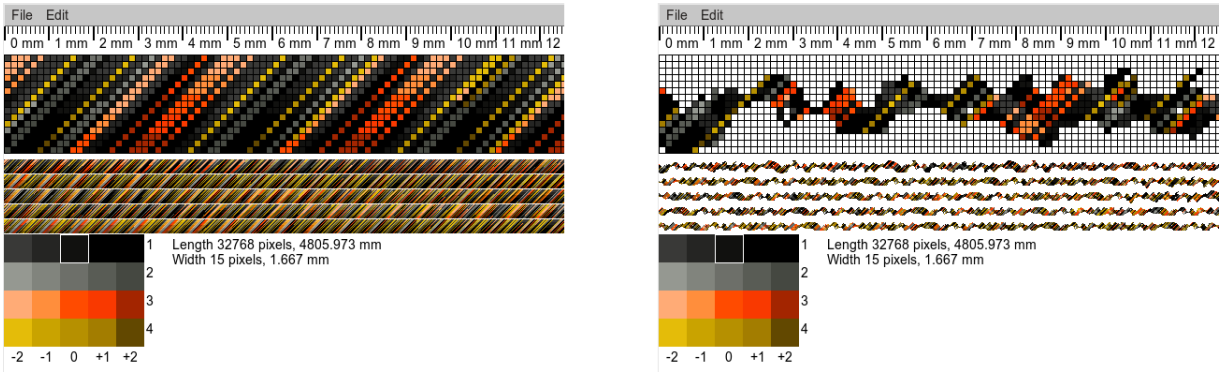



*Figure 158: Mélange yarn before and after loading boucle yarn shape*

## 6.10 Saving and loading yarns

Saving and loading of a single yarn is supported from the **File** menu on top of **Yarns** window. Yarn is loaded to, or saved from the currently selected yarn. Colors are also saved in the yarn definition. If you do not want to load the color of the yarn, load it to an unused yarn and then copy the yarn definition across the desired yarns with the right mouse button in the **Yarns** window.

## 6.11 Yarn browser

To open the Yarn browser, select **File** > **Browse yarns** from the Yarns dialog. The window is split into two parts. The left part displays all yarns from the default yarn directory. On the right side there is a list of colors associated with currently selected yarn.

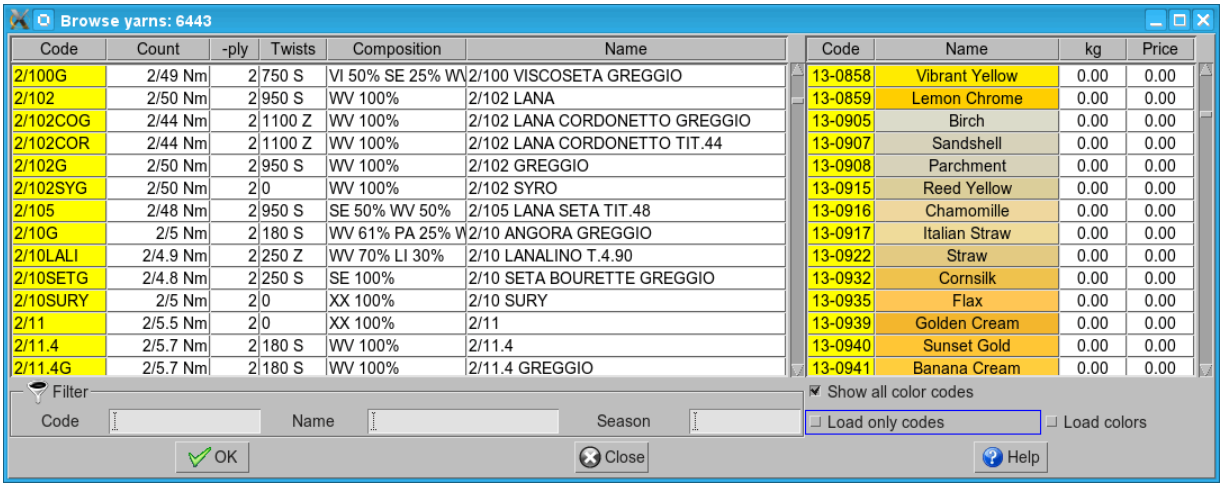



*Figure 159: Yarn browser*

It shows all the yarns, and you can order the list by yarn code, count, ply, twist, composition or name. To change the sort key, click on the title of the list. Once you click on the yarn, the program will show all the yarn colors of that yarn, together with stock quantity and price. If you double click on the yarn, it will load these values into the yarn. In most cases, you only want to transfer the codes, yarn count and composition. So the **Load only codes** toggle button is enabled by default. If it would not be enabled, the

program would load all yarn's properties, like the actual color values (not just color codes), yarn image, mélange / mouliné settings etc. When you load a yarn using **File** > **Load yarn**, the program loads all yarn's properties.
The yarn color section can also be sorted by code, name, weight and price. This can be useful, when a single yarn is available in many colors.
The browser has some tools for yarn selection, for example you have a filter to select only yarns which match certain code, name, or were defined in a certain season. The yarn season cannot be defined in *ArahWeave*; it is specified in the XML import file. More on that in Chapter 19.2.
If you want to refresh the yarn availability, select **Tools** > **Import yarn availability** from the **Yarn** window. This reloads the yarn stock XML file and refreshes the data.

## 6.12 Using scanned yarns in ArahWeave

### 6.12.1 Scanning a yarn

Most consumer grade flatbed scanners are designed for Letter and A4 paper. So the usable length of scan is not more than 30 cm. This is a major shortcoming of yarn scanning because a repeat size of many novelty yarns exceeds this length. So we don't get full repeat, or we have to use rather complex image manipulation to get our final yarn image.
A yarn image should meet three requirements in order to allow *ArahWeave* to use it:

1. The i**mage width**: the yarn image **should be exactly 15 pixels**.
2. The **image height**: it should be any power of two; in practice it means numbers like 512, 1024... but since the width of the yarn is relatively small compared to the length of yarn, the number would be more likely 8196 or 16384.
3. The **number of colors** in the image should not exceeds 31. The first color in the palette is determined as a color of background. It will be invisible (transparent) in the Yarn editor, and also in a fabric. You can use *ArahPaint* to determine, which color will be the first one in the palette.

### 6.12.2 Getting a yarn scan

The yarn should be as straight as possible during scanning. The image in Figure 160 is almost useless, because you would spend too much time editing yarn images.

*Figure 160: Various fancy yarns scan*

In our example, we have fixed a yarn to a paperboard. We choose a paperboard shade based on a yarn color. Obviously, lighter or mid-tone yarns require dark paperboard, and darker yarns are better visible on white paperboard.

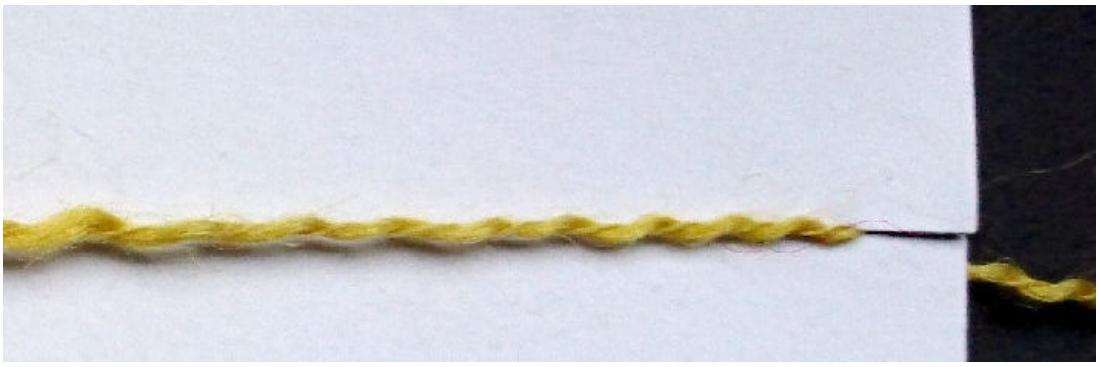


*Figure 161: To prepare a yarn for scanning, cut a notch at each side of a paperboard, and anchor a thread in the notches.*

### 6.12.3 Editing a yarn image in ArahPaint5

Load an image into *ArahPaint*. Check whether a yarn is aligned horizontally (or vertically). If not, you should rotate the whole image to achieve alignment. To do this, choose **Edit** > **Rotate Image**. Draw a line along the edge of a yarn that should have been straight.

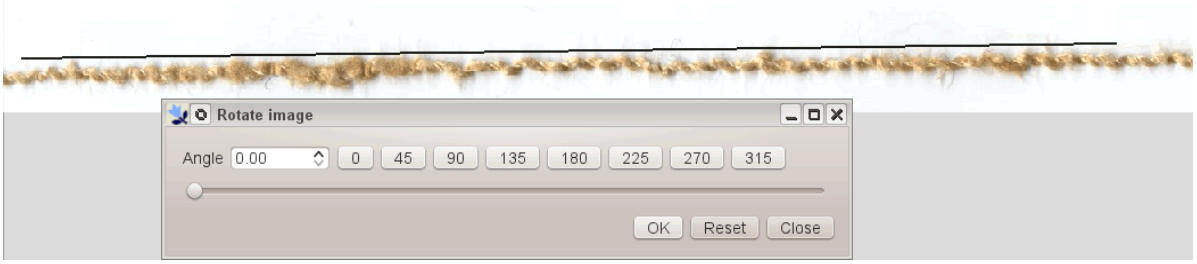



*Figure 162: Aligning a yarn after scanning*

*ArahPaint* will automatically rotate the image by the right amount, resize the image, and show you a live preview of what the final image will look like.


*Figure 163: Applying rotation*

Then create a selection around yarn in the image, and crop to selection (Image > Crop to selection), and save the file.

*Figure 164: Selecting a yarn in the image*

You can get more color variations from one yarn, if you modify it in some photo editing software. We are using black-and-white fancy yarn in the example below.
Before loading it into ArahWeave, change (scale) the size of the yarn in pixels, so that it will meet *ArahWeave's* requirements. At this stage the size should be 15 pixels by $2^n$. pixels (or $2^n$ x 15 if you work on a horizontal image like we do).
In our example, the image size is 3461 by 29 pixels.

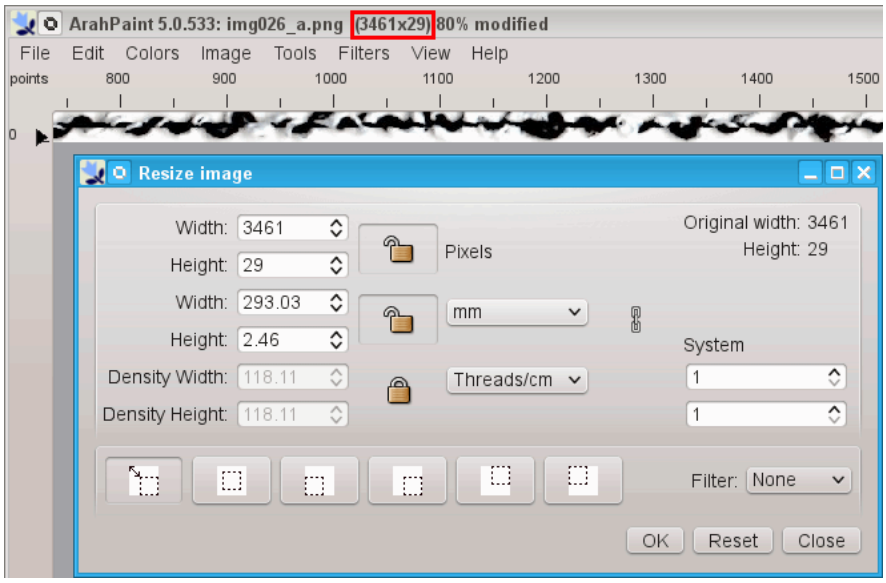



*Figure 165: The resize image dialog*

We are working on horizontal oriented yarn; first change the Height to 15. The **Width** will auto adjust according to the aspect ratio (proportion).

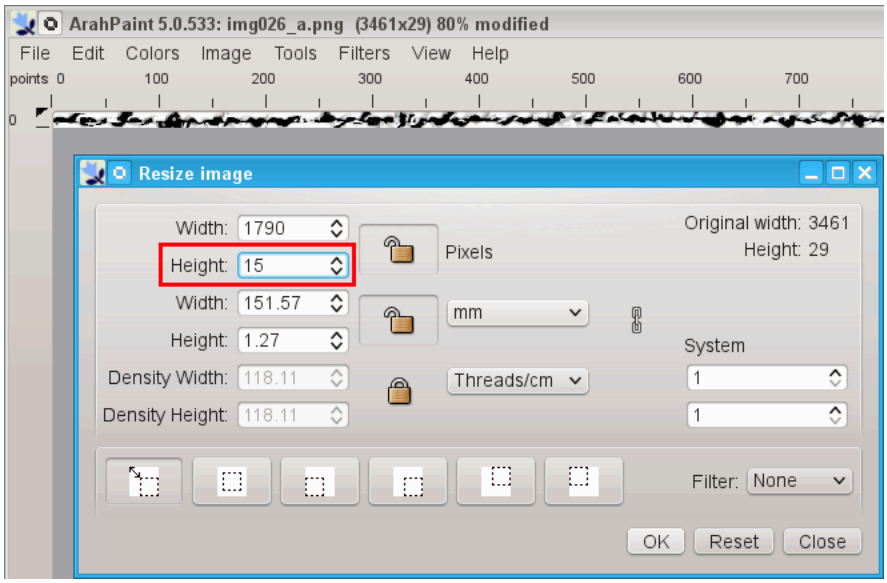



*Figure 166: Setting the yarn size*

Now break the chain by clicking on it ( ). It changes to the broken chain icon ( ). Now you can set the width independently from Height. The closest power-of-two number to 1790 is 2048, so set the width to 2048. Before clicking the OK button to apply the changes, set the scaling filter (algorithm) to **Bicubic**.

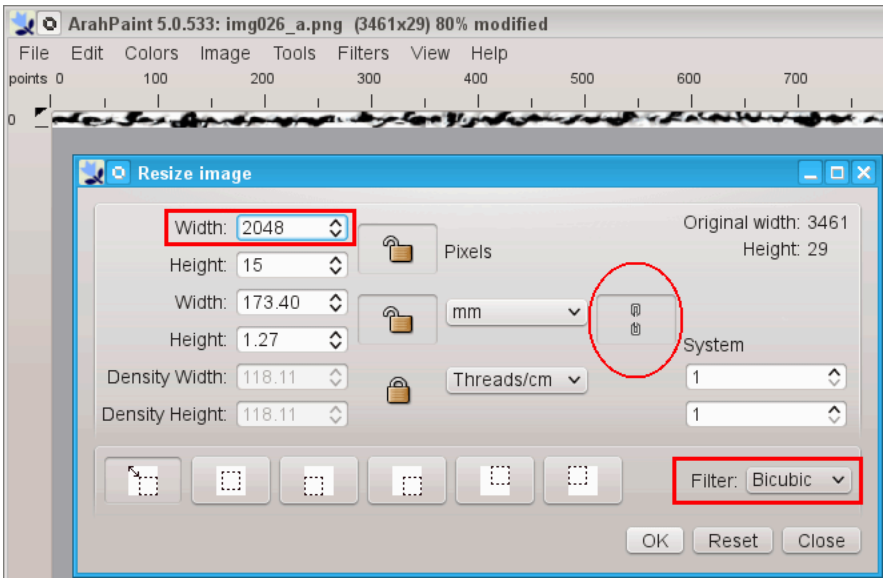



*Figure 167: Setting the yarn width*

The yarn is stretched a little bit now, but you can control this later in ArahWeave's yarn editor.

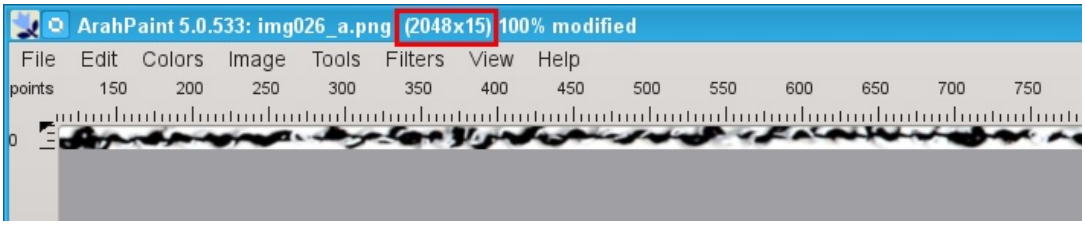



*Figure 168: The yarn image after resizing*

Now we have to reduce the number of used colors in the yarn image. Choose **Colors** > **Set number of colors**, and set the number of colors, that you want to have in the image. You can start with higher number than the actual number would be.

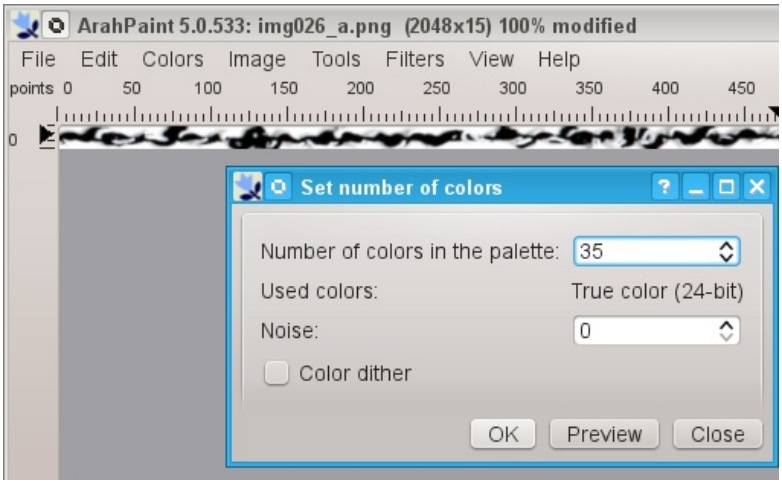



*Figure 169: Reducing the number of colors*

We have reduced the number of colors to 35. You can see that many of them are almost identical. You can merge these colors into one color in the *ArahPaint's* color palette. First select one of the colors from the almost-identical group (left-click selects a color); then paste it into other colors from the group (right-click pastes selected color into clicked color). After that, you just need to merge equal colors – click the merge identical colors icon .

*Figure 170: Merging colors in the Color palette*

Obviously the white, color No. 6, is the background color in the yarn image. To enable ArahWeave to recognize it as a background color, it should be on the position 1 in the Color palette. To change the position in the palette, first click it to select it, and then click the color on the position 1, while holding the CTRL key on the keyboard.

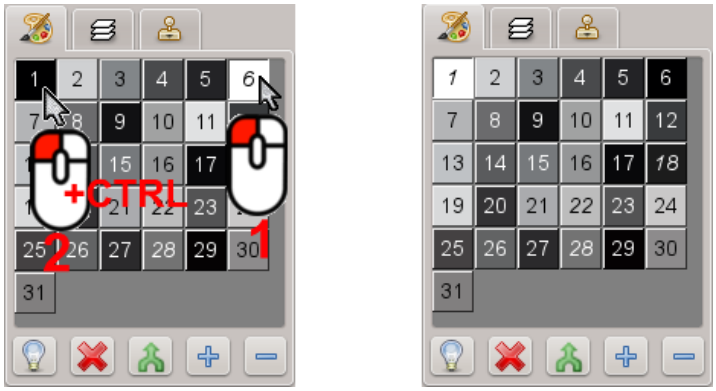



*Figure 171: Positioning the background color to No. 1*

You can change the color of the background to something which will be more distinguishable from other parts of the yarn. This background color will be invisible in *ArahWeave* anyway.

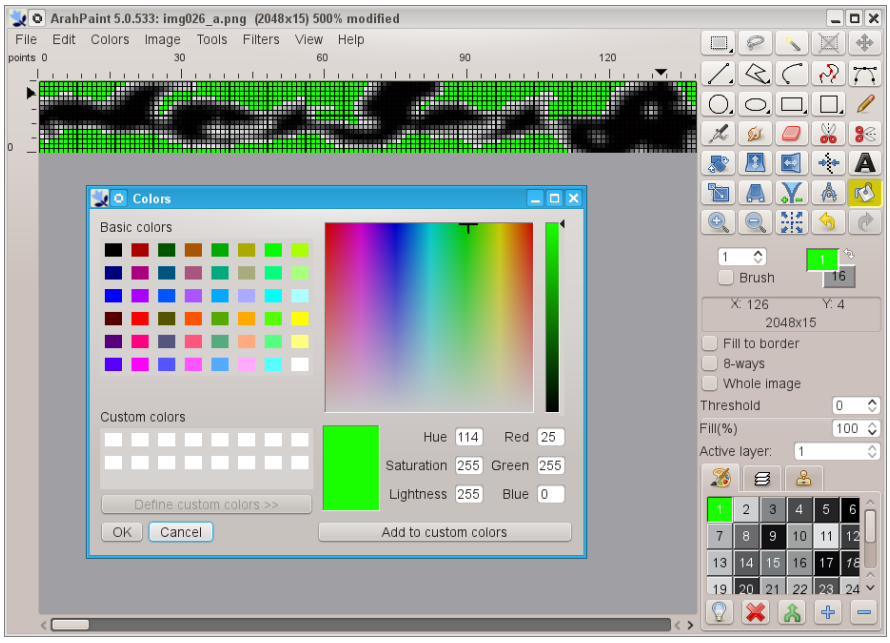



*Figure 172: Changing the color No. 1*

And now the final step: if you work with horizontally oriented image, you should put it in vertical position.

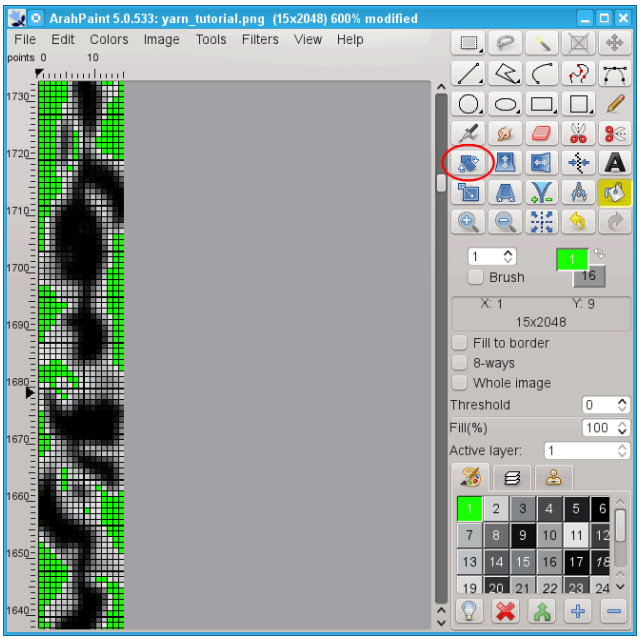



*Figure 173: Rotating the image*

## 6.12.4 Loading a scanned yarn image in ArahWeave

Open *ArahWeave*, **Fabric** > **Yarns**. Choose Scanned as the yarn model, and click the Draw yarn button. This will open the Draw yarn dialog.

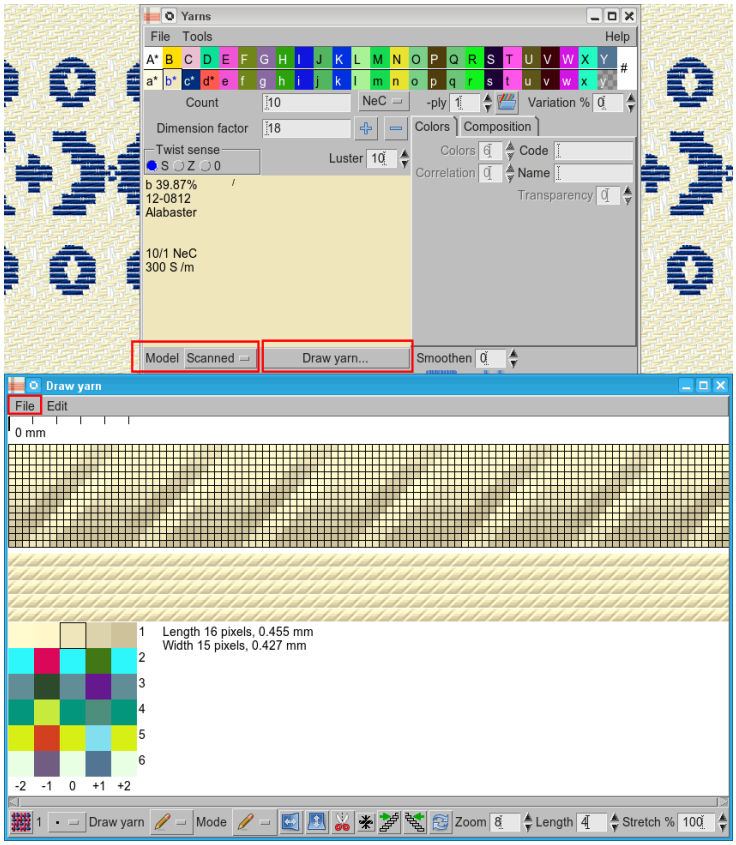



*Figure 174: Opening the Draw yarn dialog*

Choose **File** > **Load yarn image** from the Draw yarn window's menu, and load an image from the file selection box. Click the OK icon ( ) to confirm the new yarn.

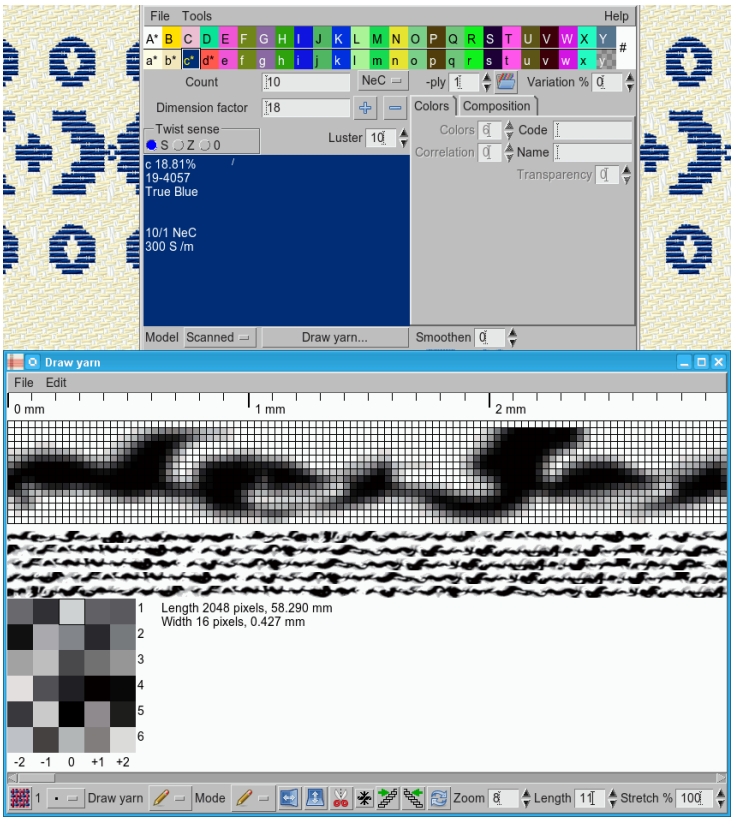



*Figure 175: Loading a yarn image*

Set the yarn count in in the main Yarns window. From here, you can also save a yarn, and use it in other fabrics, or just use its shape (**File** > **Load yarn shape...**) while constructing different fancy yarns.

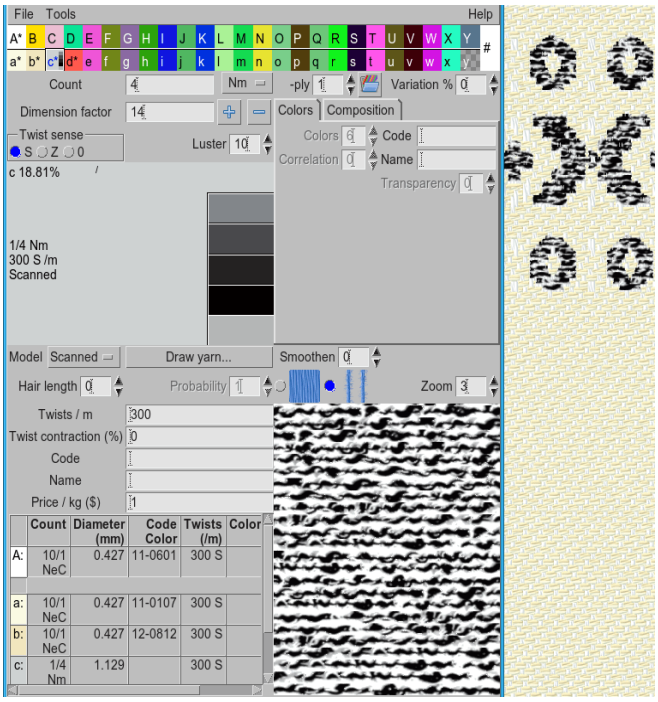



*Figure 176: Preview of the yarn in the Yarns window*

After you have saved a scan-based yarn, you can use it in any *ArahWeave* fabric file.

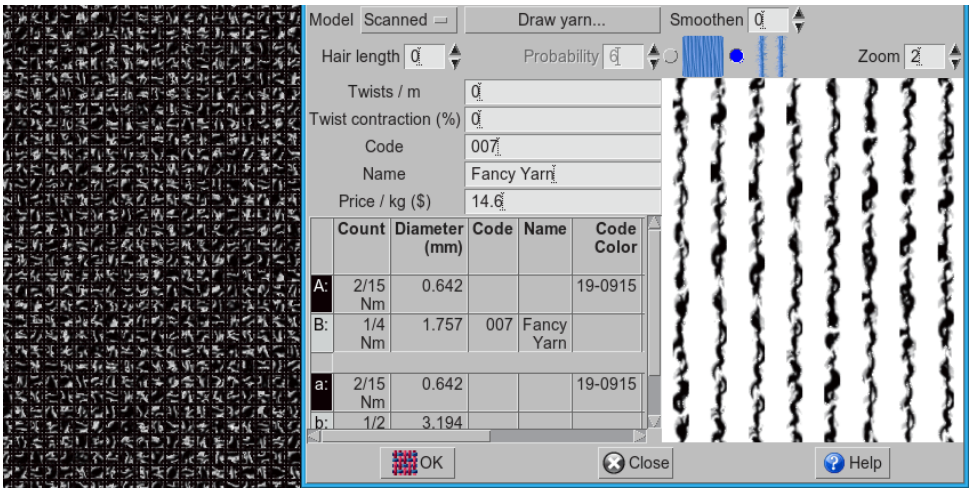



*Figure 177: Using scan-based yarn in a fabric*

# 7 Editing warp and weft pattern

Figure 178 shows a window for entering the warp and weft patter. The main parts are :

1. The menu bar.
2. The option menu for choosing between entry as threads or as length in millimeters, and option menu containing the preferred type of parenthesis in warp and weft description, either **( )** or **[ ]**.
3. The option button to choose Warp pattern mode (**asymmetrical**, **symmetrical**, **pivot1**, **pivot2**).
4. The option button to choose **2 warp beams.**
5. The icon bar for warp pattern.
6. The multi-line warp entry field.
7. A color box with warps on top and wefts below. The last color is the background color. Color **Y** is mark for fringe – weaving without weft. On the left there are arrows to copy warp to weft, and weft to warp, and arrow on the right for exchanging warp and weft pattern.
8. The multi-line weft entry field.
9. The option button to choose Weft pattern mode (**asymmetrical**, **symmetrical**, **pivot1**, **pivot2**).
10. The option button to choose **Double weft insertion.**
11. The icon bar for weft pattern.
12. **OK**, **Exit**, **Help** buttons.

*ArahWeave* uses a very simple way for entry of warp and weft pattern. You just enter the number of equal threads followed by identifier of the thread. In this way, warp pattern **2A 3B 1C** will expand to **AABBBC|AABBBC|AA...**The vertical bar ( **|** ) is meant just to indicate the end of repeat.

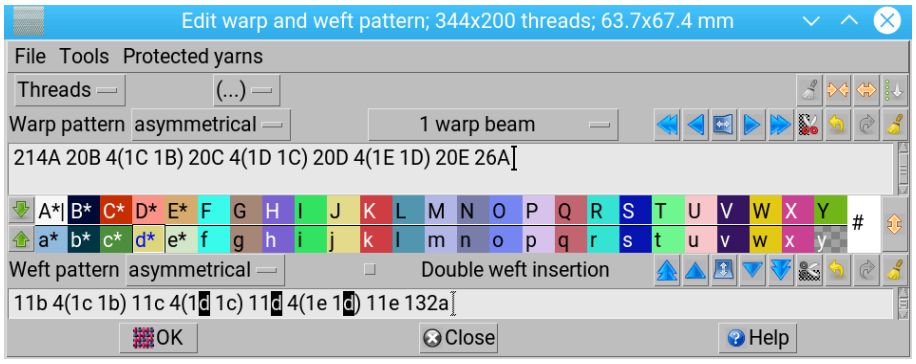



*Figure 178: Warp and weft pattern editor*

The list of things to consider when editing warp and weft pattern:

- You must use thread identifiers from **A** to **Y**; you can see the actual thread colors below warp or above weft pattern entry field.

- Warp ends are identified by capital letters in the yarn bar; as you type in the warp pattern, the letters are written in capital form whatever the status of the Caps Lock key on the keyboard is.
- You can enter space characters to format your entry. You can add spaces later to divide yarn entries for easier reading by clicking on icon. You can remove spaces from pattern to reduce the space required on printed form by clicking on icon.
- The actual size of the warp and weft repeat is displayed in the window title bar.
- The letters of warps / wefts, which are used in the pattern, are marked by an asterisk (`*`).
- The letters of warp, which are used in the selvedges, are marked by a vertical bar (`|`) (letter A in Figure 178).
- The last color in the yarn bar (in Figure 178 it is white, labeled with #) is the background color. If the fabric it is transparent, like a curtain, you can see the background color through the fabric.
- Currently selected yarn (**d** in weft in Figure 178) is highlighted in the pattern, so you can easily find it.
- There are special provisions intended to help you in the entry of complicated and repeating patterns. Round parenthesis will repeat the whole sequence for the number of written before the parenthesis, while square parenthesis will repeat the sequence until the number of threads before the parenthesis is consumed. Sequence `2a 3(1b 1c) 2d` will expand to **aabcbcbcdd**. Sequence `2a 5[1b 1c] 2d` will expand to **aabcbcbdd**.
- Nesting of parenthesis like `5(1a 20(1b1c))` is permitted.
- You may mix square and round parenthesis in your pattern entry, while computer will use just one of the two, depending on the state of the option button in the upper right angle of the entry window.
- The program will also check for syntax errors like parenthesis mismatch and other forms of errors. It will warn you about the error refusing to process the illegal sequence, and position you to the field and character, where it finds the error.

## 7.1 Warp and weft pattern modes

*ArahWeave* also implements special symmetry tools. The patterns we have explained so far are all asymmetrical, but if you select the option menu labeled **asymmetrical** in warp or weft pattern, you will also see options **symmetrical**, **pivot1,** and **pivot2**.

A **symmetrical** pattern `1a1b1f2c3d` will expand to **abfccddddddccfba|abfccddddddcc**...
Note that first and last entries in the pattern are effectively doubled in the expanded sequence. This is correct, but may not be desired.
To avoid this you can use **pivot1** type of symmetry. This symmetry mirrors the pattern without repeating the first and last entry in sequence. It is used in almost all Scottish tartans. The same pattern from above would expand to:

**abfccdddccfb|abfccdddccfb|ab...**

Symmetry **pivot2** does the same as **pivot1**, just that it does not mirror first two and last two entries.
Therefore the above sequence would expand to:

**abfccdddf|abfccdddf|abfcc...**

## 7.2 Loading and saving thread patterns

Loading and saving thread patterns is possible through the **File** menu of the **Edit warp and weft pattern** window.
To save warp pattern choose **File** > **Save warp pattern**.
To load warp pattern choose **File** > **Load warp pattern**.
To save weft pattern choose **File** > **Save weft pattern**.
To load weft pattern choose **File** > **Load weft pattern**.

## 7.3 Browsing warp/weft patterns

To open the warp browser, choose **File** > **Browse warp patterns**. Browser displays warp pattern name (code), pattern, repeat, the number of used yarns, and date of creation. You can sort the warps order by any of these criteria. Below list of warps is graphical presentation of warp in current fabric's colors.

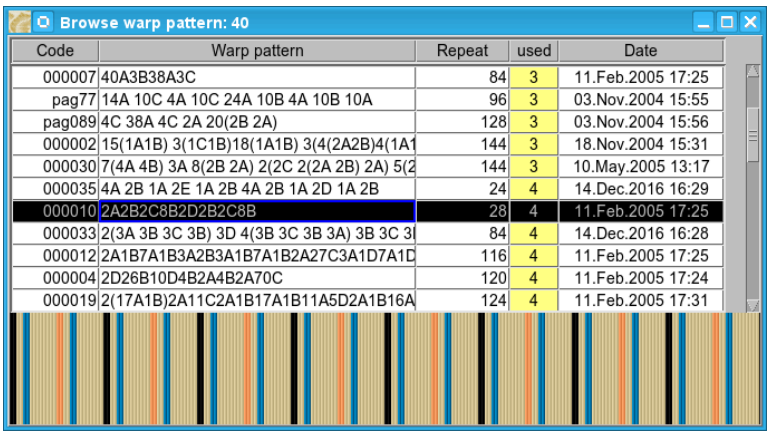



*Figure 179: Browse warp pattern*

The weft pattern browser is similar to warp browser, but it displays a weft pattern vertically.

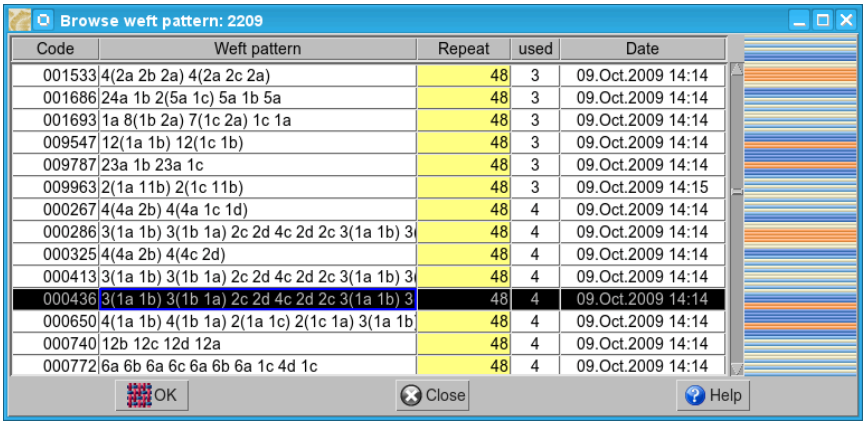



*Figure 180: Browse weft patterns*

## 7.4 Toolbar

The **Edit warp and weft pattern** window has its own toolbar—actually there are two, one for warp and one for weft.

 move warp to the left by 8 threads

 move warp to the left by 1 thread

 mirror warp pattern

 move warp to the right by 1 thread

 move warp to the right by 8 threads

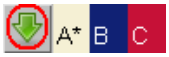
 match warp pattern to weave size (if the weave size is already equal to the warp size, then the icon is grayed out  )

 undo for thread pattern operations

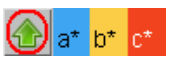
 redo for thread pattern operations

 clear warp/weft pattern

To copy warp to weft, or weft to warp, or exchanging them use arrows next to the color bar. The operations copy (exchange) both pattern and the yarns.



Copy warp to weft



Copy weft to warp

Exchange warp and weft

There are three more icons which are not strictly related to changing the appearance of fabric:


Remove or add spaces in pattern (instead of 1a1b1c1d it writes 1a 1b 1c 1d, which is easier for reading).


Sort pattern rewrites the pattern so that it starts with yarn **A**, followed by **B**, **C**...

## 7.5 Drawing warp and weft pattern in fabric with mouse

Beside the numeric way of entering the warp and weft pattern, you can draw it by mouse.
First, set the size of repeat, either as number of threads, or as length in mm, depending on your current settings. Select the yarn (warp or weft), that you want to use. You can do it in yarn editor, color editor or warp and weft entry window. As you click it, you will see that the pointer color and shape will change (to either cone for warp, or shuttle for weft yarn selection), and currently selected yarn will be outlined in with a black and white rectangle.
To enable drawing warp / weft pattern with mouse, the Edit warp and weft pattern window, or Edit colors window, or Yarns window should be opened, and the warp or weft pattern repeat should be at least 10. On very short patterns, drawing by mouse does not make much sense, and we prefer to have the pan (hand) tool.
There are two different modes of drawing warp and weft pattern with mouse: replacing and inserting / deleting yarns.

### 7.5.1 Replacing yarns in thread pattern

Click in the fabric on the yarn, that you want to replace. If you keep it pressed, it continues to draw. The fabric changes in real time and the “complicated” warp or weft pattern is written automatically. You can use it to draw completely new patterns, or just to change yarns in existing patterns.
The function also works on symmetrical patterns.

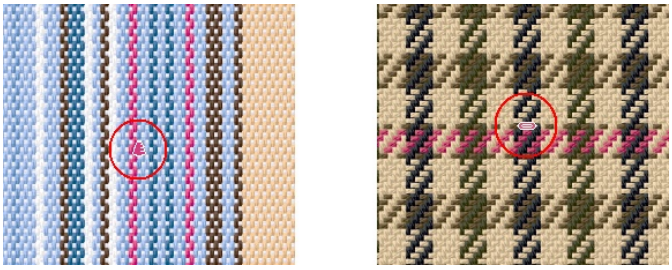


*Figure 181: Drawing warp and weft pattern with mouse*

### 7.5.2 Inserting or deleting yarns from thread pattern

To insert yarn into thread pattern with mouse use **Shift + left click**. It will insert a thread left of the clicked thread.
To delete yarn from thread pattern press **Shift + right click** on a thread, which you want to delete.

### 7.5.3 Protected yarns

In drawing warp or weft pattern with mouse, you can now protect yarn colors for easier editing of complex patterns. In the warp/weft pattern bar, where you usually select the yarn color with which to draw, you can double click a yarn, and it will become protected (shown by crossing out the yarn letter). Then you can draw thread pattern in the design with a different yarn, and the protected yarns will remain unchanged. This is most useful if you have an **extra weft** or **fil coupé** design, and you want to modify the ground pattern to make it more interesting. Simply protect the yarns which you use as “extra wefts”, and freely draw the weft pattern and only the ground yarns will be changed. The settings

of protected yarns is purely for editing purposes, and it is not saved in the fabric file. Yarn protection is cleared upon every loading of a new design. Yarn protection only affects drawing the pattern with mouse; you can still type a different pattern in the warp/weft editor.

In Figure 182 we want to change weft **c** with weft **d** just in one short segment. Normally we should select weft **d**, and then click with mouse on every weft **c**, that we want to change.

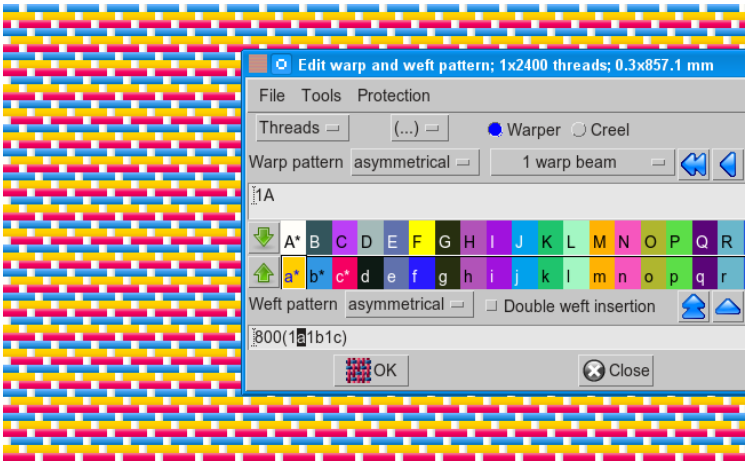



*Figure 182: Before drawing over protected yarns*

But with protected yarns the task is much easier. Just double click wefts **a** and **b**, select weft **d**, and drag a mouse on the part, where you want to change weft **c** to weft **d**. It will change, protected **a** and **b** will remain unchanged.

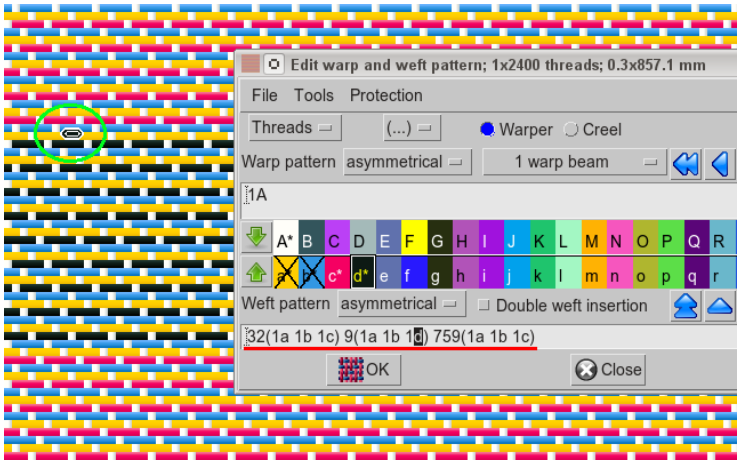



*Figure 183: After drawing over protected yarns*

*Protected yarns have another useful function: they protect area in weave editor also – so you can draw, copy, weave in the Weave editor, but weaving points "under" protected yarns remain unchanged. In case that you have selection in the weave, protected yarns actually create a protected area (mask) in selection. If you load another weave into selection, area covered by protected yarns remains unchanged.*

## 7.6 Entering thread pattern as series of lengths of different thread colors

Usually, you enter a colorful thread pattern as series of numbers and yarn letters, each number representing the number of repeating threads of particular color, like 3 threads of color **a**, 5 threads of color **b**, and so on. But instead of number of threads, you can use the length of particular color (millimeters or inches), followed by another length of different color and so on. When you finish, you can change the "pattern unit" from millimeters back to threads by choosing **Threads** from the option menu (see Figure 184).

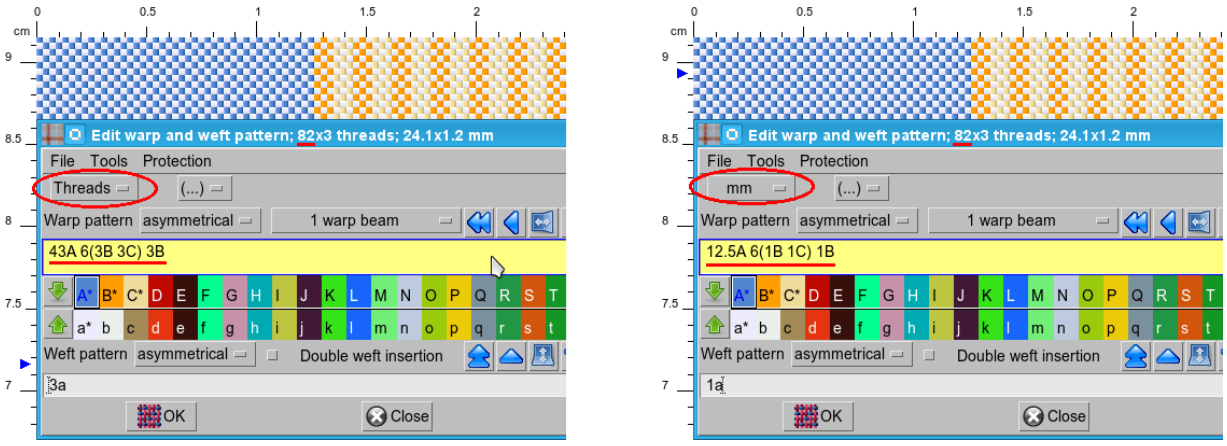



*Figure 184: Warp pattern, expressed in the number of threads per each color section, and same pattern written in lengths of each color section in millimeters*

## 7.7 Splitting or merging weft threads

This function can help against streaking, if you have uneven yarn in weft, and you want to split one weft yarn across several cones. Choose **Tools** > **Split/merge warp/weft** from menu in the **Edit warp and weft pattern** window. If you enter **aef** and only the yarn **a** is used in the pattern, then weft pattern is rewritten, so that yarn **a** is split evenly among yarns **a**, **e**, **f**. If, on the contrary, yarns **a**, **e**, and **f** are all used in the pattern, they merge into yarn **a**.


*Figure 185: Split/merge warp/weft window*

### 7.7.1 Random

It is more advanced method to prevent streaking because of irregularity weft yarn then normal split method. First you need to enter the whole weft repeat, which you want to split (**120a** in Figure 186). Then choose **Tools** > **Split/merge warp/wefts**. In new window enter wefts, which you will use instead of single weft a (wefts **abcd** in Figure 186). Click on the **OK** button. Program randomly splits the weft **a** among wefts **a**, **b**, **c**, **d** and changes yarns **b**, **c**, **d** into yarn a; the repeat of the pattern is 120. However, you can use same function in design purpose—just check the **Keep yarns** button, and program doesn't change the color of used yarns—you get random stripe design with repeat of 120 threads.

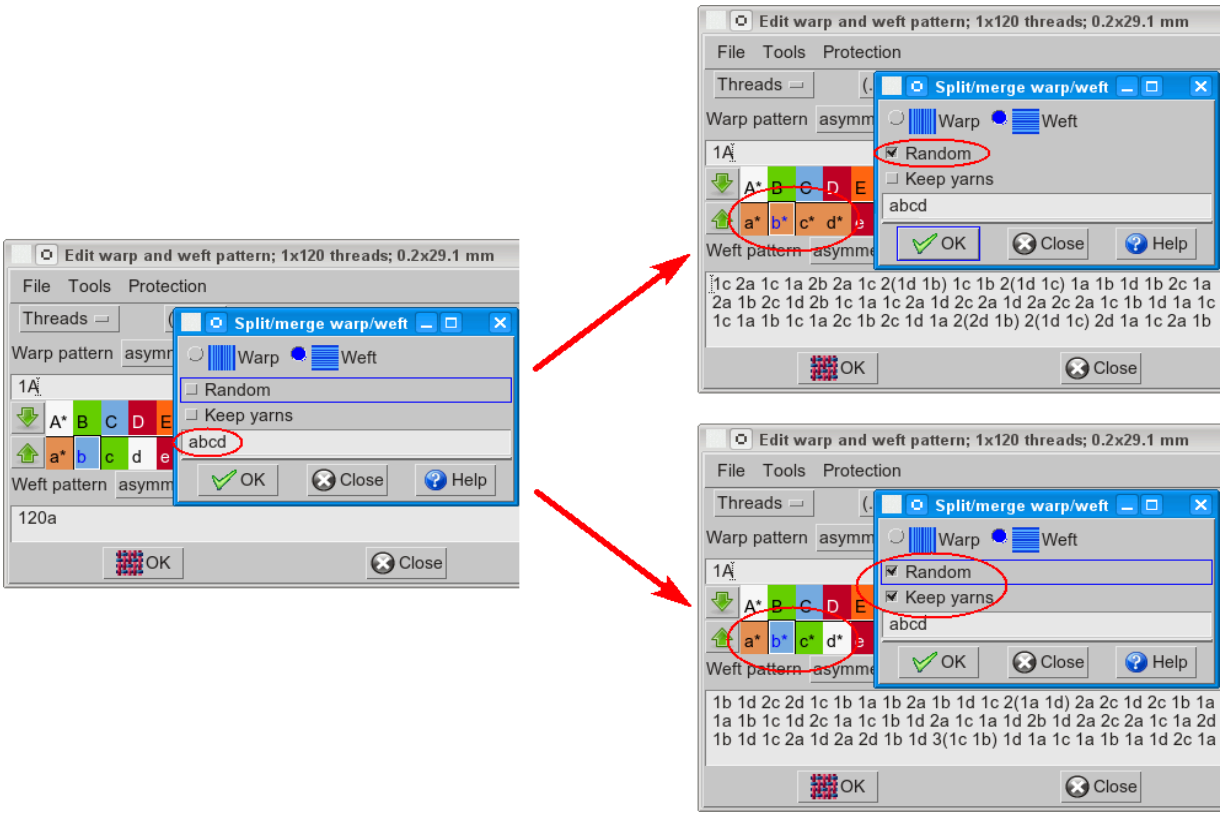



*Figure 186: Split weft in the Random mode with the Keep yarns option off and on*

## 7.8 Sorting

The **Sort** option will rewrite the pattern so that it starts with yarn **A**, followed by **B**, etc., as this is required by production department of many mills. To use it, click  icon.

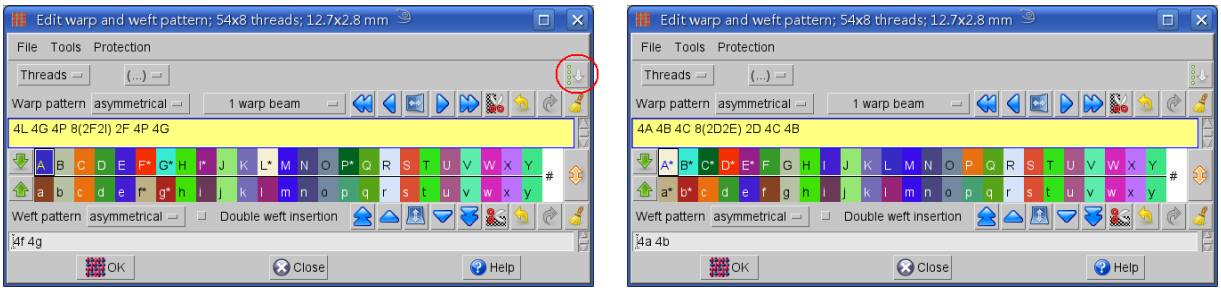



*Figure 187: Using Sort function*

## 7.9 Remapping yarns

The yarn remapping function assists in changing yarn letters in complex patterns (if the pattern is simple, simply retype it). For example, if you want to change yarn **a** to yarn **c** but there are 100 entries with the letter **a**, retyping would be time consuming. However, with Remap yarns, you can do it in a single step. To use the yarn remapping feature, navigate to **Tools** > **Remap yarns**. Select whether you want to remap warp or weft yarns in the Remap yarns window. Change the position of the yarn letter with a mouse click.

Figure 188 shows an example of weft yarn remapping. Yarn **a** will be remapped to **c**, **b** will be remapped to **a**, **c** will be remapped to **e**, **d** will be remapped to **e**, and e will be remapped to **b**.

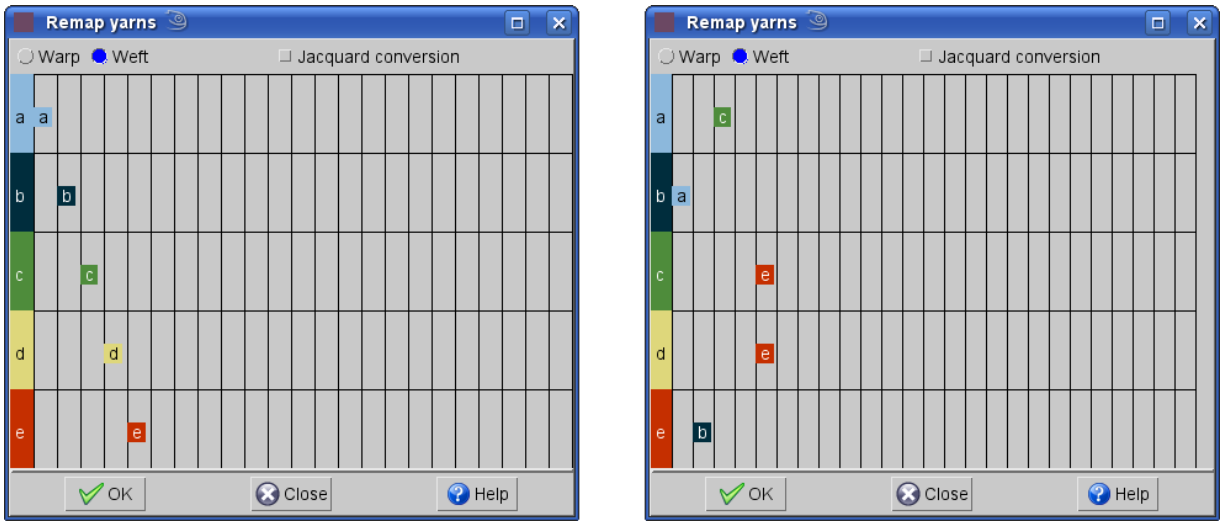



*Figure 188: Remap yarn table*

## 7.10 Two warp beams

In the entry of warp and weft pattern window, you can specify two warp beams, and the way in which the warp is split:

- By number of **shafts.**
- By thread in **dent.**
- By **yarn.**
- In **half.**

Some of the choices have a corresponding parameter, for example the thread in dent which goes into second warp beam, or number of shaft which goes to second warp beam.

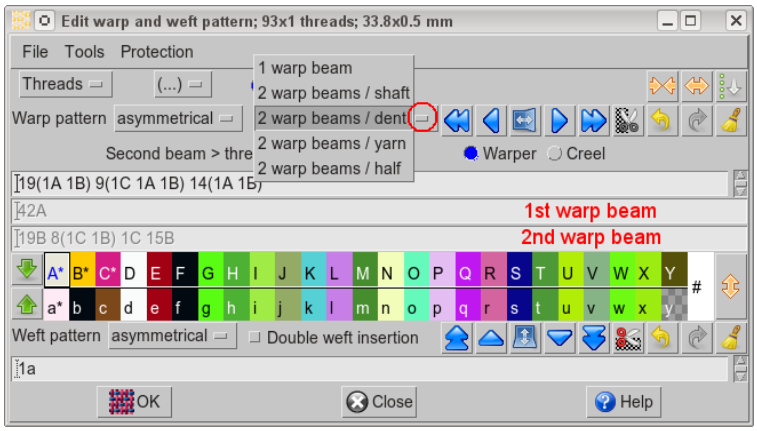



*Figure 189: Two warp beams*

## 7.11 Adjusting warp symmetry

It is desirable to have warp symmetric with respect to fabric width, since this gives more freedom, when one wants to cut the fabric. The leftover in cutting can be much smaller if the warp is symmetric. To achieve warp symmetry, you must first enter warp and weft sequence, and the number of threads in fabric width in the **Fabric** > **Consumption** window. Then choose **Fabric** > **Center** (keyboard shortcut **F7**).
On the top of the window, there are four buttons (Warp, Weft, Warp blanket, Weft blanket) to select which pattern will you center. Usually it is a warp; the other three are rarely used.
The fabric preview in the Center window consist from three sections: the left side of the fabric, the right side of the fabric, and a gray jagged mark in the middle, which delineates both areas.
The slider serves as a tool for manual shifting of the pattern: as you slide it, you see what happens on the fabric's edges.

The automatic mode works in two ways: a simple **Automatic** shifts the pattern without taking care about the weave, while **Automatic without moving the weave** shifts the pattern only for a multiple of the weave width (it means that the weave is not shifted).
The warp repeat of a fabric sample displayed in Figure 190 is 224 ends, so this is the maximal number for which we can shift the warp. The numbers on extreme edge on left and right tell you how much equal threads do we have on left or right.

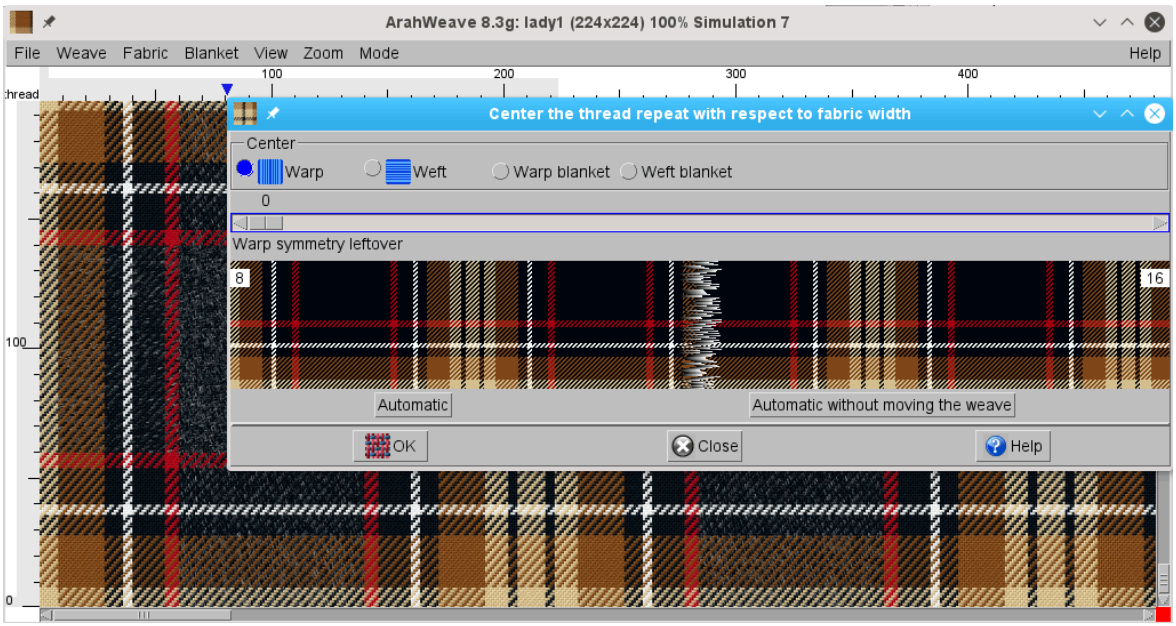



*Figure 190: Adjusting the warp symmetry*

When you press the **Automatic** button, program finds symmetry on its own, if it exists, moves the slider, and redraws a fabric preview, using new shift number. If you don't like the result, you can modify it with slider.

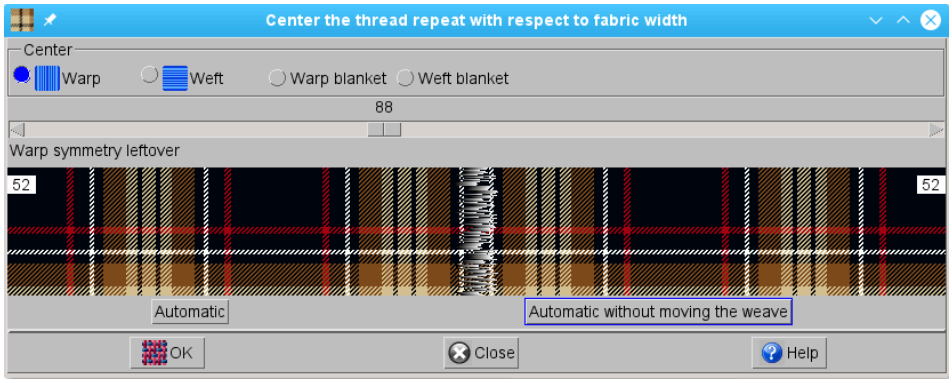



*Figure 191: Automatic centering of warp pattern*

When you click the **OK** button, the pattern is rewritten and fabric simulation refreshed.
Symmetry can also be adjusted for warp blanket or weft blanket, so that the pattern motif is nicely centered in the space available within the blanket. Centering using weft blanket can also be useful for shawls and bed covers (blankets in normal sense of the word), when your design needs to be vertically centered on certain number of wefts. Just set the desired number of threads in the blanket's weft, and proceed with centering as described above.

## 7.12 Editing decomposed

The purpose of this function is to enable designers to easily enter complex warp and weft patterns with one pattern on the face, and another on the back of the fabric, or to enter complex ground patterns in the extra warp/weft fabric. In the **Edit warp and weft pattern window**, choose **Tools** > **Edit decomposed**.

In the **Edit decomposed** window you need to select whether you want to edit warp or weft, and the type of dividing. You can choose **Custom** (default), **Denting** (warp), **Two warp beams** (warp), **Regulator** (weft).

### 7.12.1 Custom

The principle of editing in the **Custom** mode is the same for both warp and weft, so we will describe it only for warp.

You have to specify the layout in the same way as in decomposed weave editor: enter **112** (**it is not number *one hundred twelve*; it is *first*, *first*, *second***) to have first two threads in first warp, and third warp in second warp. Or enter **3** to have three warps evenly divided (that would be the same as **123**). The program will take the existing warp pattern and will decompose it, using the given division, and display you the editable divided warps. Up to 9 warps/wefts are supported.

Figure 192 shows warp pattern, consist of 96 threads. For two threads on the face we want to have one on the back. In the **Edit warp and weft pattern** window enter **96a** as a warp pattern. Then choose **Tools > Edit decomposed** in the **Edit decomposed** window. Type the warp layout, which should be **112**. The program divides 96 threads into two layers: 64 threads in the first one, and 32 in the second one.

Now you can modify both layers. The pattern in the **Edit warp and weft pattern** window is written as the combination of both layers.

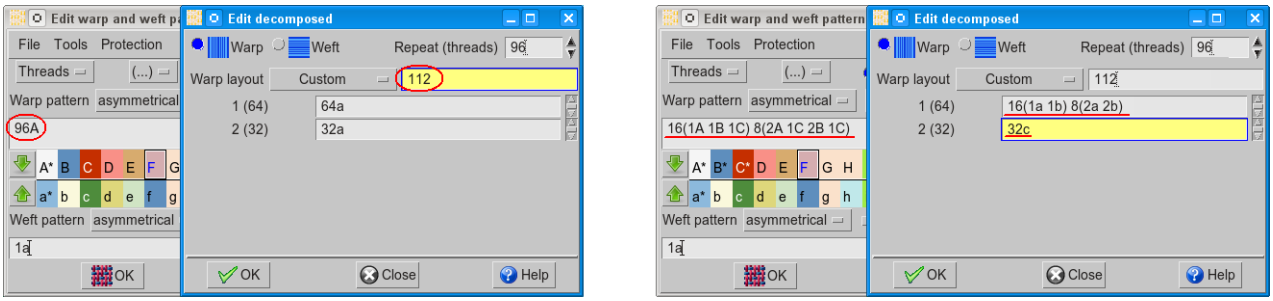



*Figure 192: Warp pattern decomposed*

Once the program writes the decomposed warp, it also adds the number of threads in that warp besides the number of warp. If you choose to modify the warp pattern, and press return, the program will write two numbers - first is the number of threads, which this warp has at disposal, using current layout and number of warp threads, and the second will be the warp length of current divided warp. If the two numbers will not be divisible, the program will warn you with an exclamation mark besides the two numbers. If you want to change the length of warp pattern, you may edit the total number of warp threads.

### 7.12.2 Denting

The second way of warp pattern division is by the number of thread in dent. Click the **Custom** button in the **Edit decomposed** window, and select **Denting** from the list.

### 7.12.3 Two warp beams

If you have the warp pattern split over two warp beams, you can use the **Two warp beams** option in the Edit decomposed window.

### 7.12.4 Regulator

Dividing by the regulator as a criterion is one of the most used function in the **Edit decomposed** window. It allows you to edit the ground weft pattern (which is in a solid color after Jacquard conversion in *ArahWeave*) separated from extra weft pattern.

Figure 193 shows the extra weft design with two extra wefts. We want to change the ground pattern from solid color to **2a1d** repeat. Instead of color **b** in the first extra weft we want to have color **b** and **e**; in the second one we want to have colors **c** and **f** instead of c only. In the **Edit decomposed** window,

click the **Weft** button, and select **Regulator** as a dividing factor. The program divides weft pattern into three wefts: the ground is **300a**, the first extra is **159b**, and the second extra is **22c**.

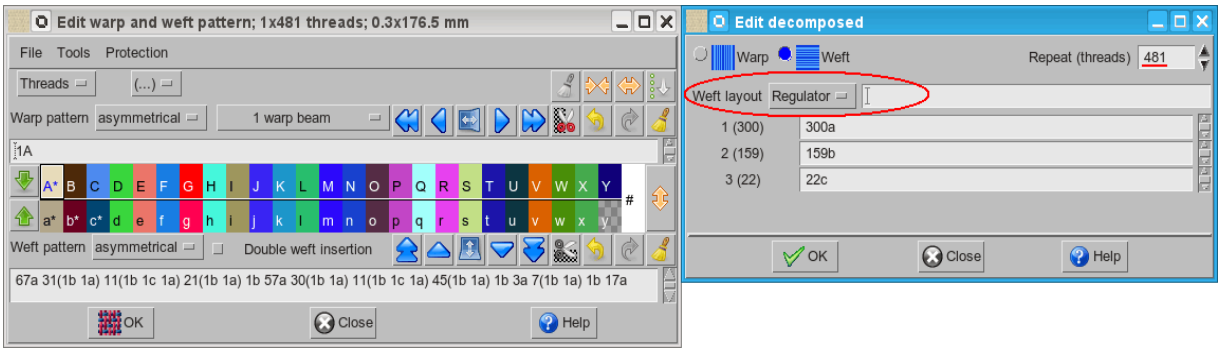



*Figure 193: Weft pattern divided by regulator*

Now to the modifying of weft pattern: instead of **300a** type **300[2a1d]**, instead of **159b** type **159[1b1e]**, and instead of **22c** write **22[1c1f]**. After clicking **OK**, the new weft pattern is also displayed in the **Edit warp and weft pattern** window. It would be quite time consuming to write it without the **Edit decomposed** tool.

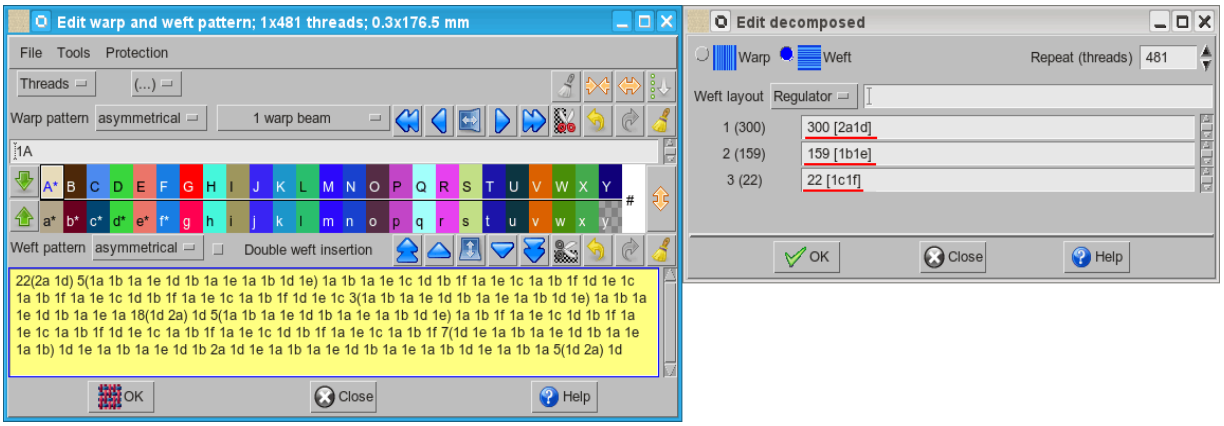



*Figure 194: "Complicated" extra weft pattern*

## 7.13 Double weft insertion

If you need to insert two wefts at a same time through the shed, mark the **Double weft insertion** box in the **Edit warp and weft pattern** window. It should be supported by the CAM format (dobby and Jacquard) and the loom. The weft pattern has to be written in different way: the number of repeats should be followed by two weft letters. In Figure 195 the pattern **4ab 3cd** means, that the loom will insert 4 times **a** and **b** wefts, and then 3 times **c** and **d** wefts.

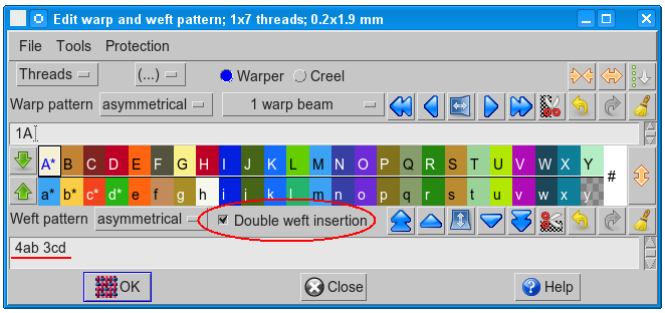



*Figure 195: Double weft insertion*

## 7.14 Fringe (weaving without weft)

To achieve similar effect in weft as it is empty dentin a warp pattern, use **Fringe** (weaving without thread insertion). It is used as a design tool, or to mark the end of “one piece design”, or for easier cutting between two fabric, or to get fringes in blanket etc. To specify “weaving without weft”, use yarn letter **y** in the weft pattern.

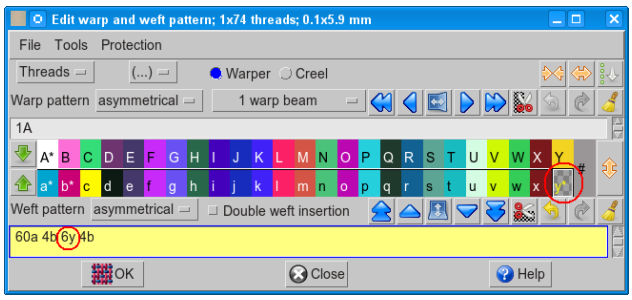



*Figure 196: Yarn letter “y” marks weaving without weft*

To get a proper fabric simulation of fabric with fringe, you need to set technical data (**Threads in fabric width**, **Reed width**, **Finished width**, **Denting**, **Weft density**) in the **Calculation of thread consumption** window (**Fabric** > **Consumption**), and mark the **Density from technical data** button. See Chapter 14 for detailed explanation about Consumption and the fabrics’ technical data.

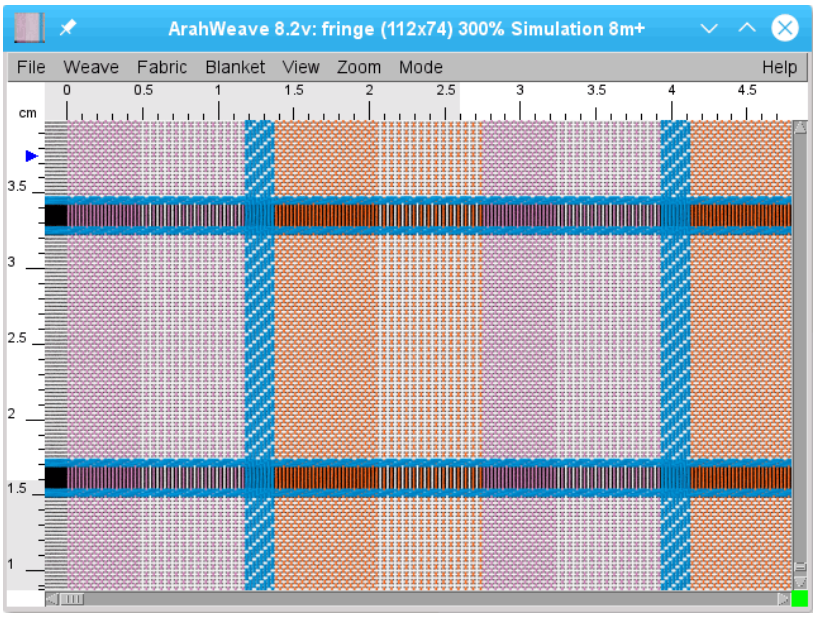



*Figure 197: Fabric simulation with fringe*

## 7.15 Resizing warp or weft pattern

To scale warp or weft pattern to a new pattern size, choose **Tools** > **Resize warp/weft pattern**. In the Resize warp/weft pattern window select either you want to resize warp pattern or weft pattern. In the **Repeat (threads)** field enter a new pattern size (number of threads). Program scales pattern proportionally.

If you roll the mouse wheel up or down, and the mouse cursor is in the **Repeat (threads)** field. the repeat number is changing as you roll the mouse wheel. Program displays the fabric is interactively.

Figure 198 shows fabric before (warp repeat is 94 threads) and after warp pattern resizing (new repeat is 32 threads).

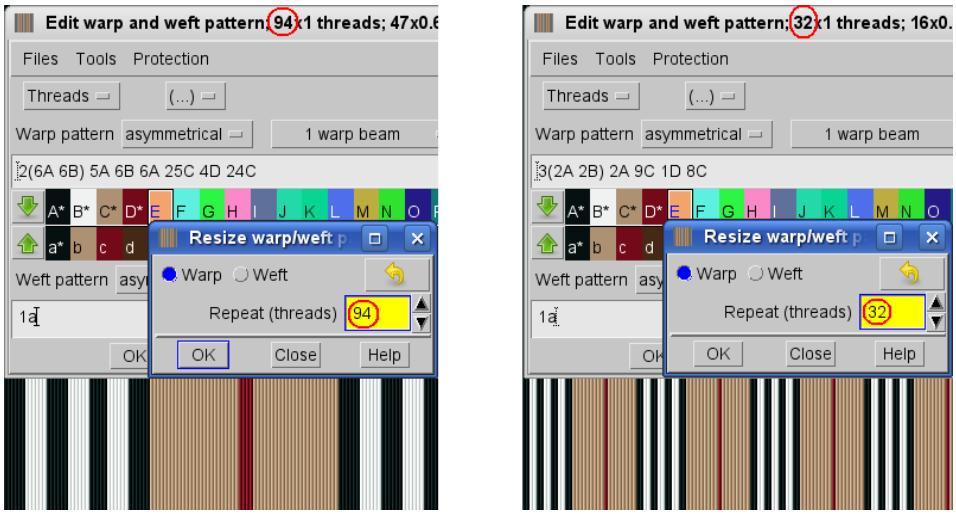



*Figure 198: Resizing warp pattern*

## 7.16 Pattern Generator

**Pattern generator** creates random (or partially random, partially controlled) patterns, usually very complex, from the given set of parameters. To use parametric creation of warp/weft pattern choose **Tools** > **Pattern Generator** in the **Edit thread pattern** window. The window has several buttons and fields, many of which are exclusive. The fields, which do not have any effect in the current setting, are grayed out. The window may appear to have many settings, but only about half can be active at a time, so it is not so complicated as it looks. But we can combine them in various ways, so it is quite powerful.

In the Pattern generator window select whether you want to create warp or weft pattern. Program takes the size of the repeat from the **Edit warp and weft pattern** window, so you should set the repeat to something which is big enough, that it makes sense for parametric creation, instead of numeric writing. In the most simple way of using this function, you combine two things: the yarns to be inserted (yarns a,b,c,d in Figure 199), and the lengths to be inserted. You can specify the **Minimum** and **Maximum** length, and program will randomly insert yarns sections with the number of repeat threads among the limits, until it fills up the repeat.

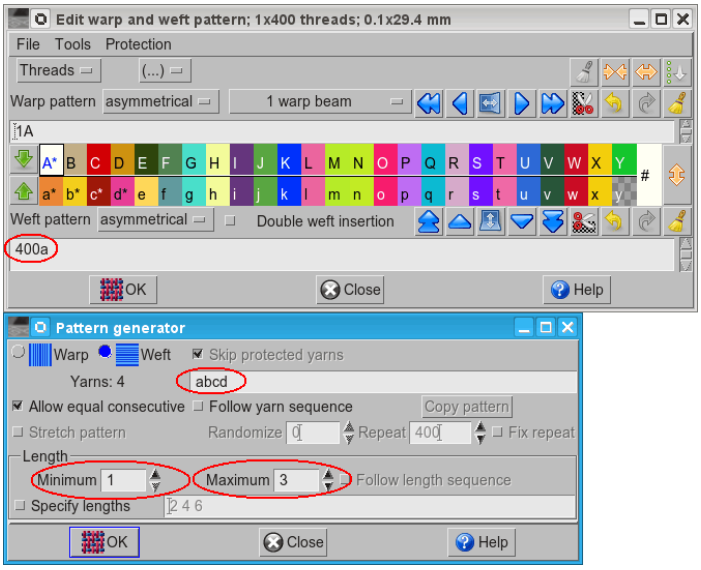



*Figure 199: Pattern Generator*

When you set the parameters, click the **OK** button, and the program generates a pattern. If you click **OK** again, it will generate a new one.

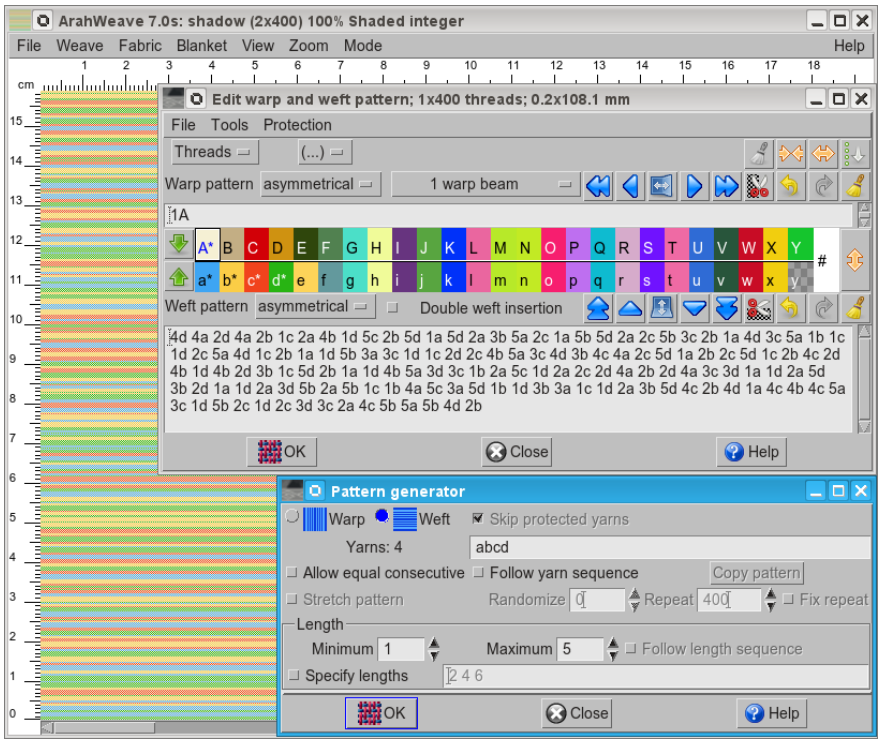



*Figure 200: Random weft pattern*

You can control the amount of each yarn inserted: if you enter **aaaabc** (or **4abc**) in the **Yarn** field, then program will insert the yarn **a** four times more likely than **b** or **c**.

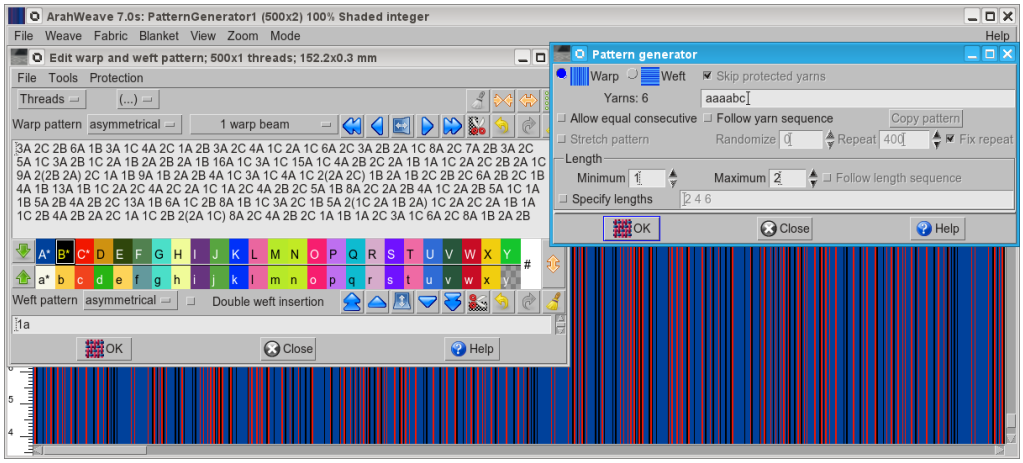



*Figure 201: Random warp pattern*

The **Yarns** parameter has two options. **Allow equal consecutive** means that is possible that one color sequence is followed by the same color sequence based on the statistic probability. If this option is off, then the program prevents following of one color sequence by same color sequence. So the lengths will never be prolonged, since two consecutive yarn sequences will never merge in the same yarn letter.
If the **Follow yarn sequence** option is on, then the program writes the pattern always following the yarn order, which you have entered in the field, regardless the statistic probability.
Instead of setting the Minimum / Maximum length range, you can enable **Specify lengths** and the program will allow you to specify the lengths of repeat of a single yarn which will be inserted. In Figure 202, the allowed lengths are 2, 4 and 6.

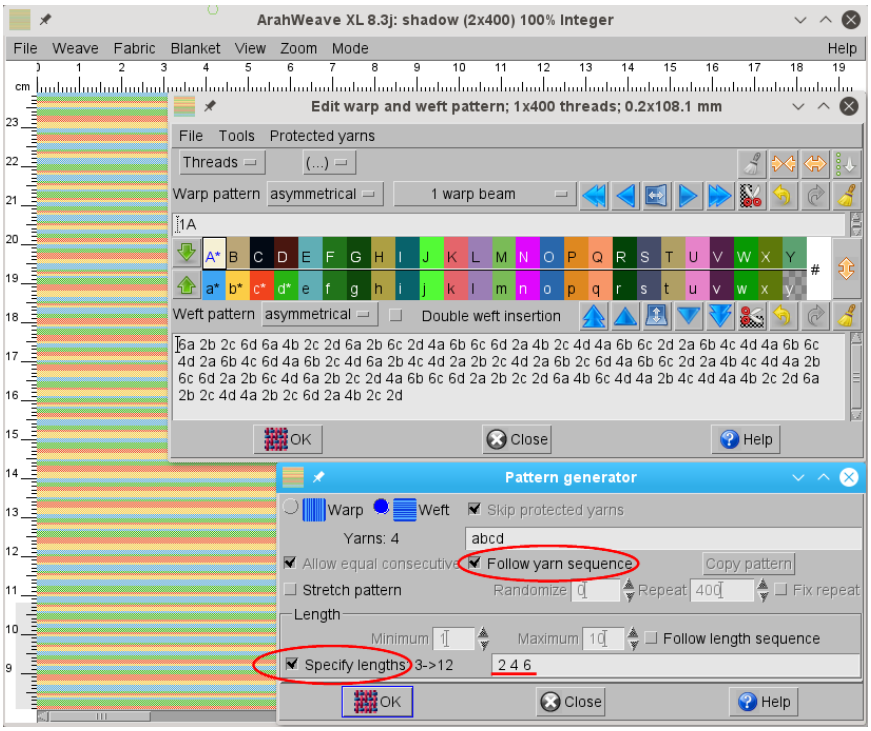



*Figure 202: Follow yarn sequence and Specify lengths options*

As with yarn order, you can also enable **Follow length sequence**. It means that the numbers of yarns in the pattern will be ordered as written in the **Specify lengths** field.

### 7.16.1 Complex shading patterns—Ombré patterns

If you enable both **Follow yarn sequence** and **Follow length sequence**, then the pattern becomes completely deterministic. It is very useful for long and complex shading patterns, where you repeat the same numeric pattern over a sequence of different yarns. In this case, it can be difficult to find out the final repeat length, so you have the **Fix repeat** option, which allows ArahWeave to overwrite previous repeat size with the new one. You can use parenthesis in both the **Yarns** and **Specify lengths** fields.

Suggested order of steps is:

Mark both **Specify lengths** and **Follow yarn sequence**. Enter the length sequences. The sample in Figure 203 below starts with length 15 threads, then 1 thread, followed by 4 times 5 threads and 1 thread, and so on (the whole length pattern is `15 1 4(5 1) 6(3 1) 8(2 1) 12 (1 1) 8(1 2) 6(1 3) 4(1 5)`). Then click the **OK** button, so the program calculates the number of color sequences - there are `98` sequences, and the number of threads is `184`. If we need more or less threads, just change some numbers of the lengths, and press **OK** again.

Then go to the **Yarns** section. Since there are 98 sequences, which should be split between two neighboring colors, just type 49(ab), and continue depending on the number of colors which you want to use. In this example we use four yarn colors, so we enter: `49(ab) 49(bc) 49(cd) 49(da)`. The end result is quite a complex repeat of 736 threads.

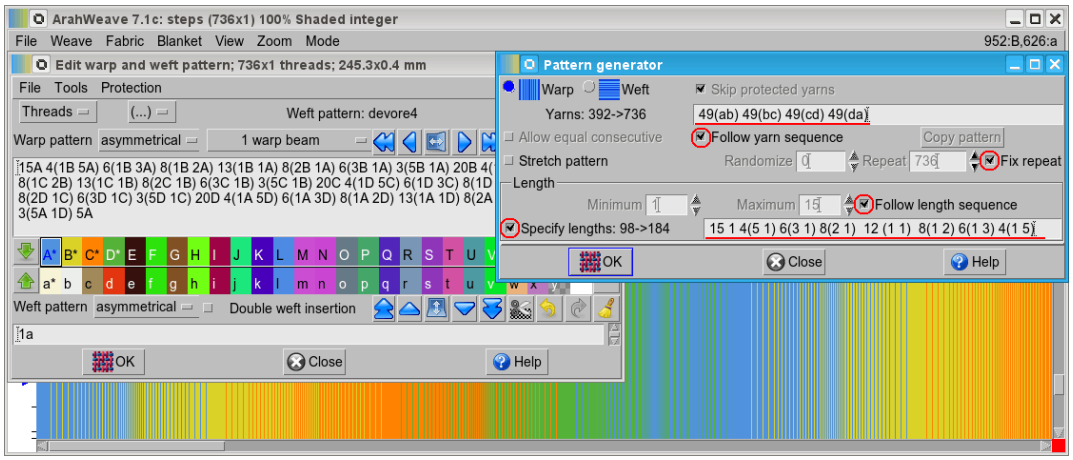



*Figure 203: Completely controlled pattern*

## 7.16.2 Stretch pattern function

If you enter yarns in the **Yarns** field (in Figure 204: **aabcb**), and enable **Follow yarn sequence** and **Stretch pattern**, you are free to set the length of the repeat to whatever you want (on the sample we use value of 500). The **Stretch** function will cause the program to stretch the pattern in the full width of the specified repeat. This makes a pattern of 200A 100B 100C 100B.

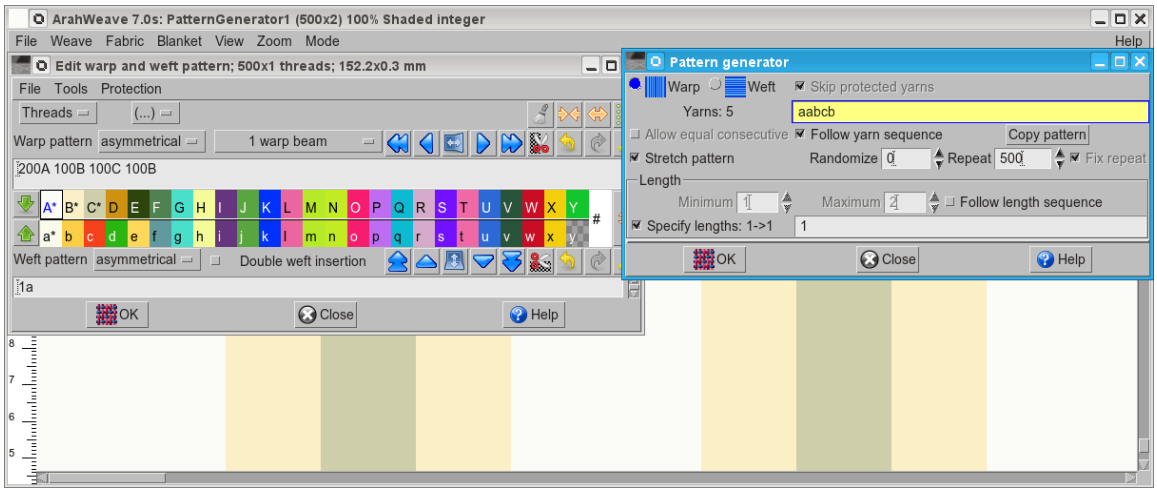



*Figure 204: Stretch the pattern*

Obviously, this is not the purpose of this function. But you can set the length to 1, and **Randomize** to, let's say 150, and program will not only predictably choose the next thread, but will make a random shading transition between the two color segments. The higher the value of Randomize, the more random the transition.

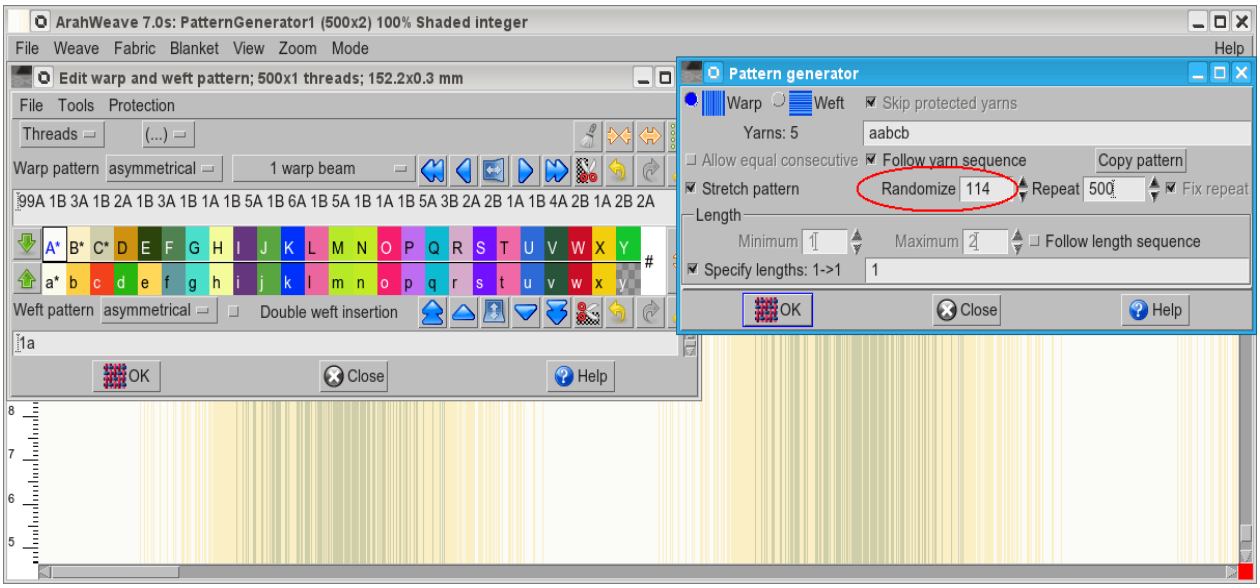



*Figure 205: Stretch with the Randomize option*

### 7.16.2.1 Resizing a pattern with the stretch function

We can also use the **Stretch** function to resize an existing pattern to a new repeat size. For example, you can have the pattern of 356 threads, which you want to proportionally resize to 220 threads. You should enable **Follow yarn sequence** first, then **Stretch**, then use the **Copy pattern** button, which will copy the existing pattern of 356 threads in the **Yarns** field.

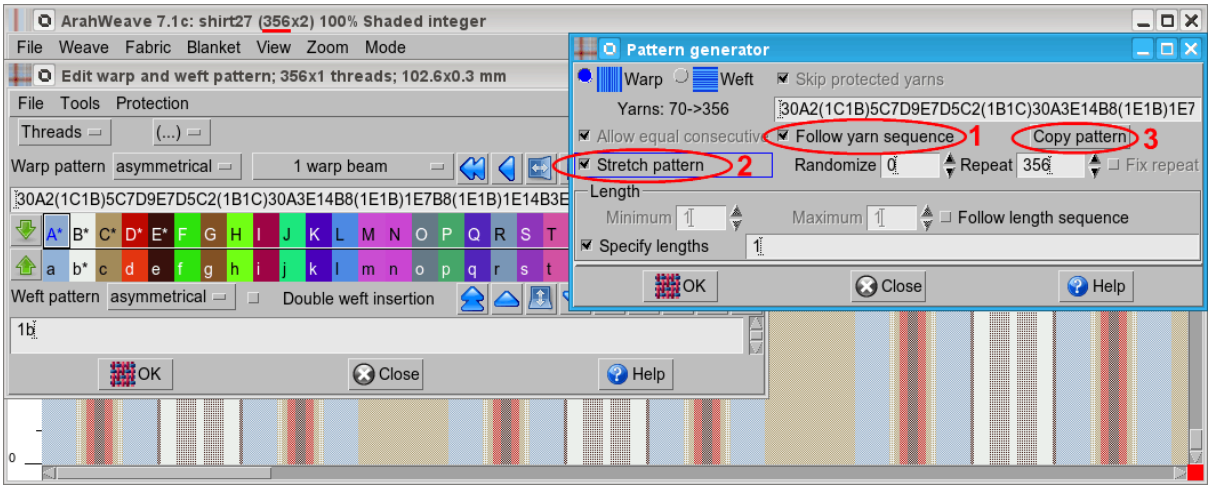



*Figure 206: Fabric before stretching the pattern*

Then set the **Repeat** number to 220 and click **OK**. This will proportionally resize the pattern. If you wish, you may still use the **Randomize** option with this function, or instruct the program to rewrite the pattern with specific lengths, for example by two threads, instead of one thread.

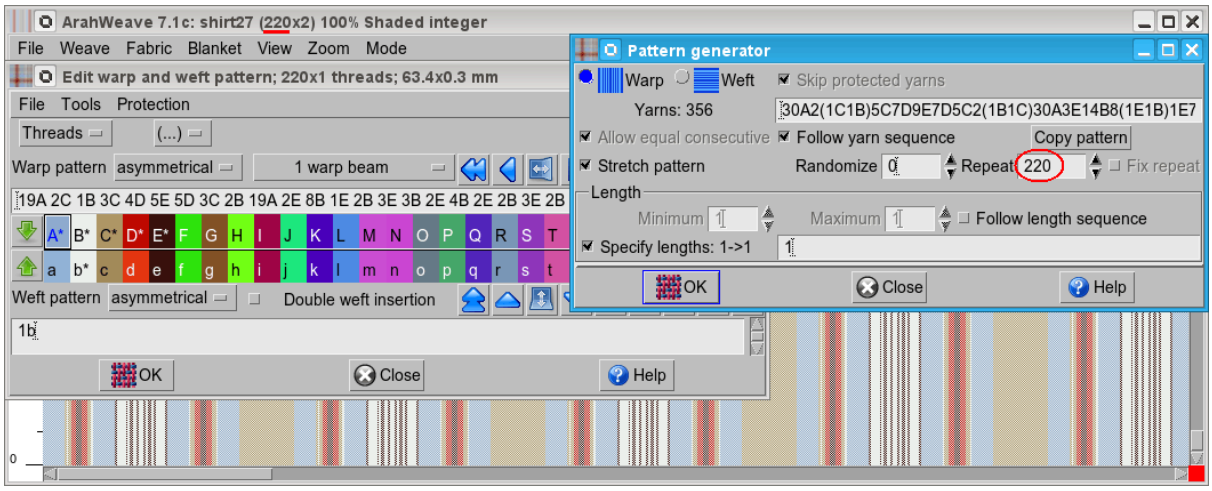



*Figure 207: Fabric after stretching the pattern*

### 7.16.3 Pattern generator and protected yarns

An important feature of the Pattern generator is, that it doesn't overwrite the protected yarns, if you have them in the pattern. Figure 208 shows a fabric with extra wefts, where we want to modify the ground weft. Normally, this is quite difficult, since ground pattern is all interlaced with the extra weft, in an irregular way, depending whether the extra wefts are present at certain area or not.

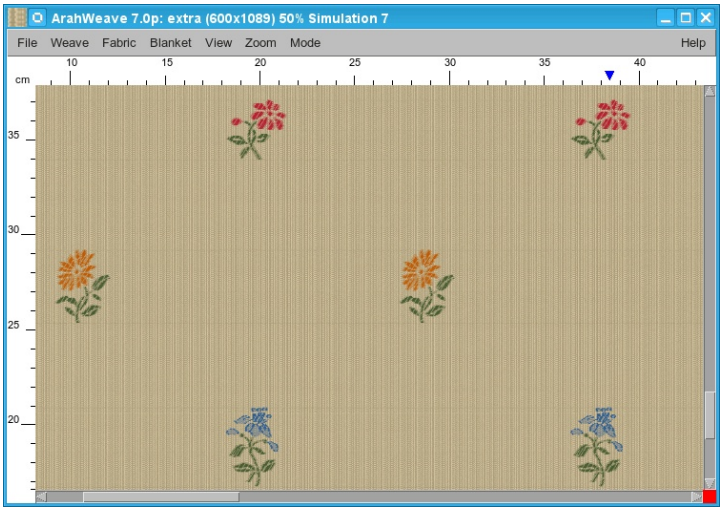



*Figure 208: Extra weft fabric with solid ground weft*

Use double mouse click in the **Edit warp and weft pattern** window to protect the extra weft yarns (these are: b, c, d, e, f). Once protected, they will be marked with an X.

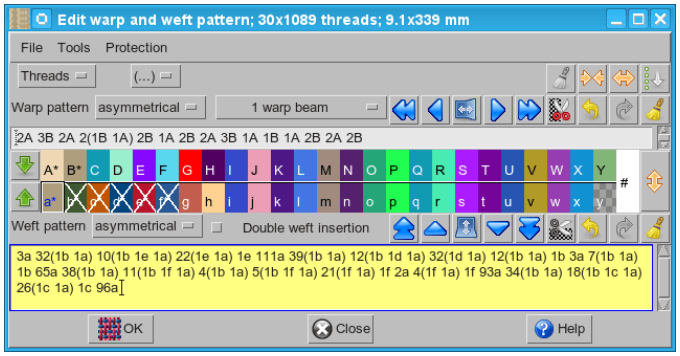



*Figure 209: Protected yarns*

In the **Pattern generator** window you may now set the toggle button **Skip protected yarns**, which will continue the sequence as if the protected yarns were not there. This will cause the ground pattern to

have the same statistic properties in areas with and without extra wefts. Otherwise, the ground will look different on areas with extra wefts.

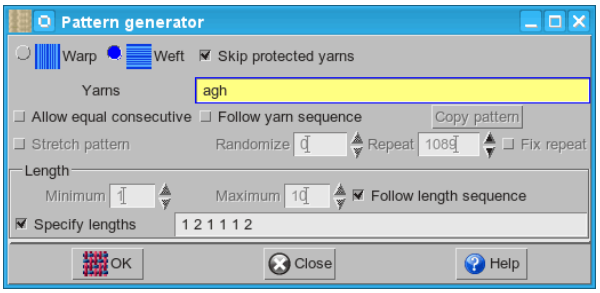



*Figure 210: Skip protected yarns option*

After clicking **OK**, you get a new extra weft fabric...

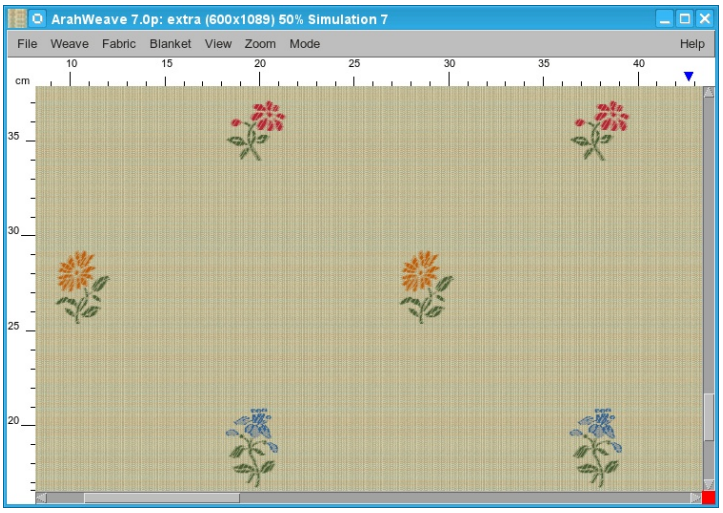



*Figure 211: New ground weft pattern*

...with a complex weft pattern (Figure 212).

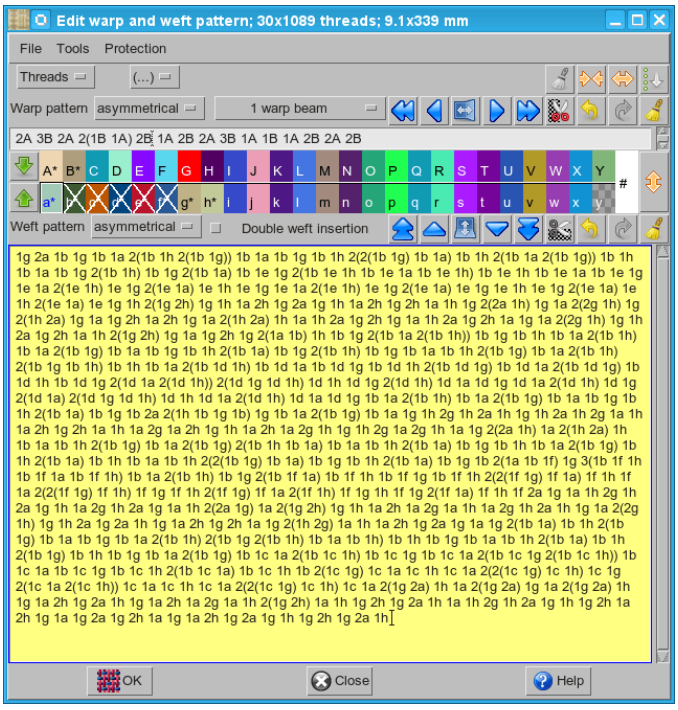



*Figure 212: A complex pattern after splitting the ground weft*

## 7.17 Getting warp/weft pattern from image

*ArahWeave* has a function to get the warp/weft pattern from an image. *ArahPaint* has some great tools for drawing random line patterns, so maybe it is easier for some designers to draw the image than to write parametric pattern in *ArahWeave*. The number of used yarns in the pattern is equal to number of used colors in the image. The program takes the first pixel column from the left to generate a weft pattern, and first pixel row from the top of the image to generate a warp pattern.
To use the function, load the image in the jacquard conversion (**Weave** > **Jacquard conversion**), and then choose **Tools** > **Get warp/weft pattern from image**. Select **warp** or **weft**, and the length of the final repeat (number of threads in the repeat). If you enable toggle button **Yarn colors**, the colors from the image will also be copied into yarn colors, for easier orientation.

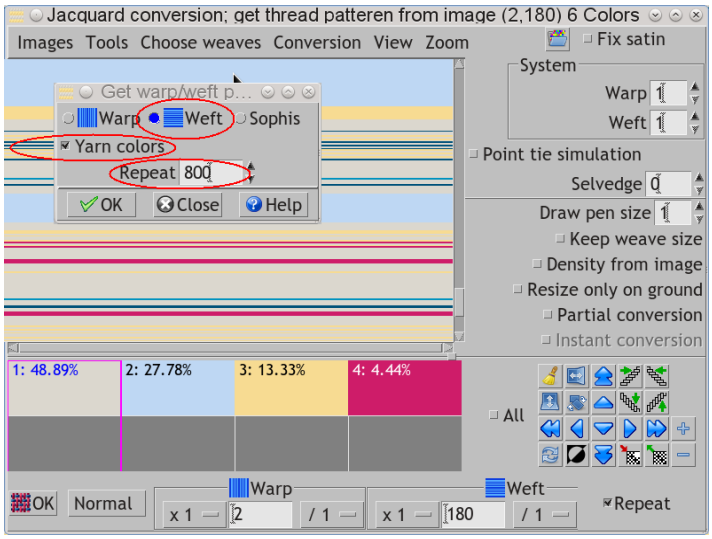



*Figure 213: Getting warp/weft pattern from image*

After clicking **OK**, the thread pattern is applied to the fabric.

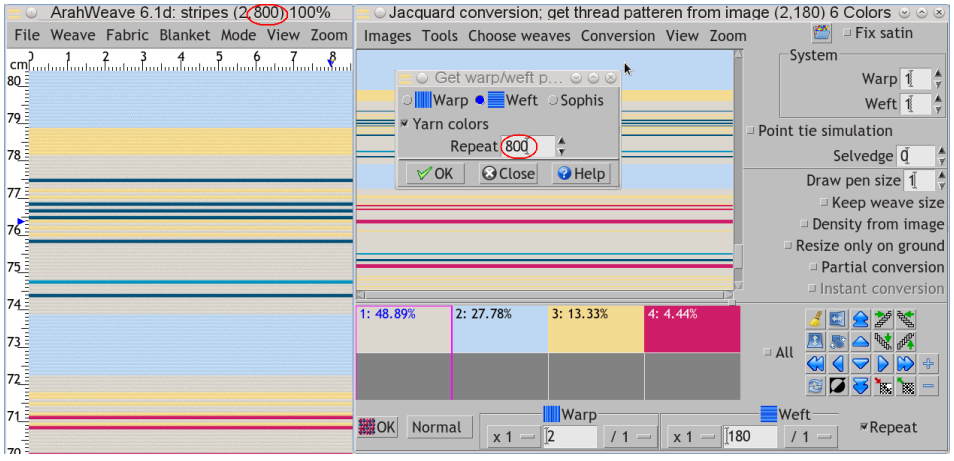



*Figure 214: After applying Get warp/weft pattern from image – the yarn colors are taken from the image*

You can use same image to generate warp pattern. Click  icon from the **Images** menu to flip the image for 90 degrees. Select **Warp**, set the repeat size, and click **OK**.

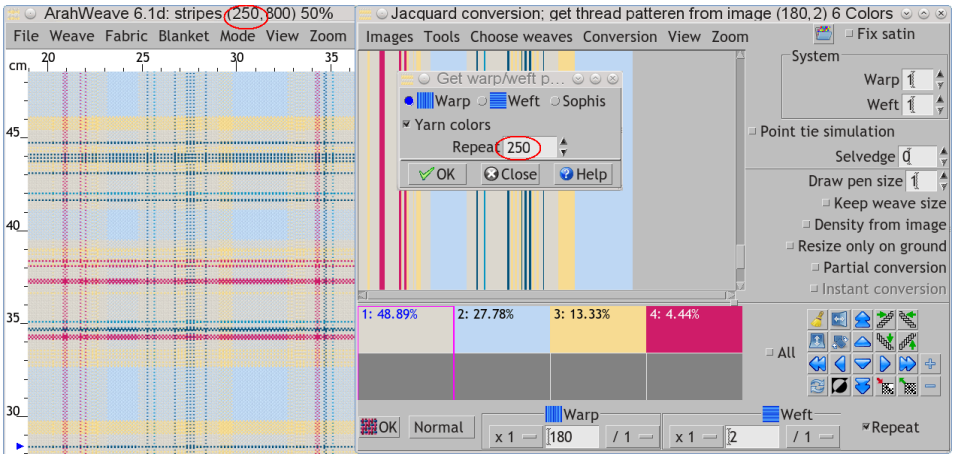



*Figure 215: Getting warp pattern from same image as weft pattern*

## 7.18 Square designs with different warp and weft densities

First enter the warp pattern in any way you like. Then set the warp and weft density. Convert the pattern from **Threads** to millimeters (**mm**), and click  icon to copy warp to weft. Then convert mm back to Threads.

## 7.19 Exchanging warp and weft (rotation by 90°)

In the **Fabric** menu, there is a function **Warp<->weft** which swaps warp and weft. It also exchanges all colors, yarn parameters, densities, denting / regulator pattern and rotates the weave by 90 degrees. The function is reversible, which means that applying it twice will give you the initial position. You will not lose any data if you apply it. Unfortunately, for fabrics with denting / regulator, it is not possible to exchange densities for warp and weft in automatic way, since we have weft density on one side, and raw width, final width, reed number, etc. on the other side. So in these cases, some manual editing is necessary to put things in a sensible relationship, if you would really want to exchange warp and weft.

# 8 Colors

*ArahWeave*® uses three different color models for displaying fabrics: **RGB** (red, green, blue), **HSL** (hue, saturation, and lightness), and **CIE Lab.**

CIE L*a*b* (CIELAB) is the most complete color space specified by the International Commission on Illumination (French Commission internationale de l'éclairage, hence its CIE initialism). It describes all the colors visible to the human eye and was created to serve as a device independent model to be used as a reference. Unlike the RGB and CMYK color models, Lab color is designed to approximate human vision. Its L component closely matches human perception of lightness. A large portion of the CIELAB coordinate space cannot be generated by spectral distributions. These coordinates therefore fall outside of human vision and are not truly "colors".

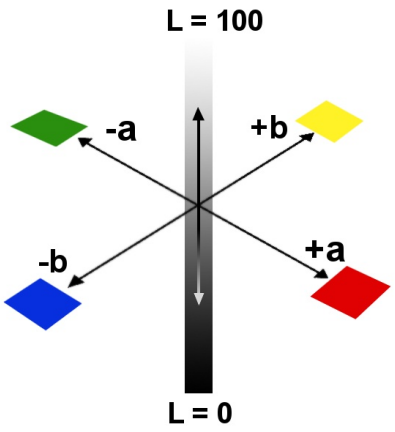



*Figure 216: CIE Lab color model*

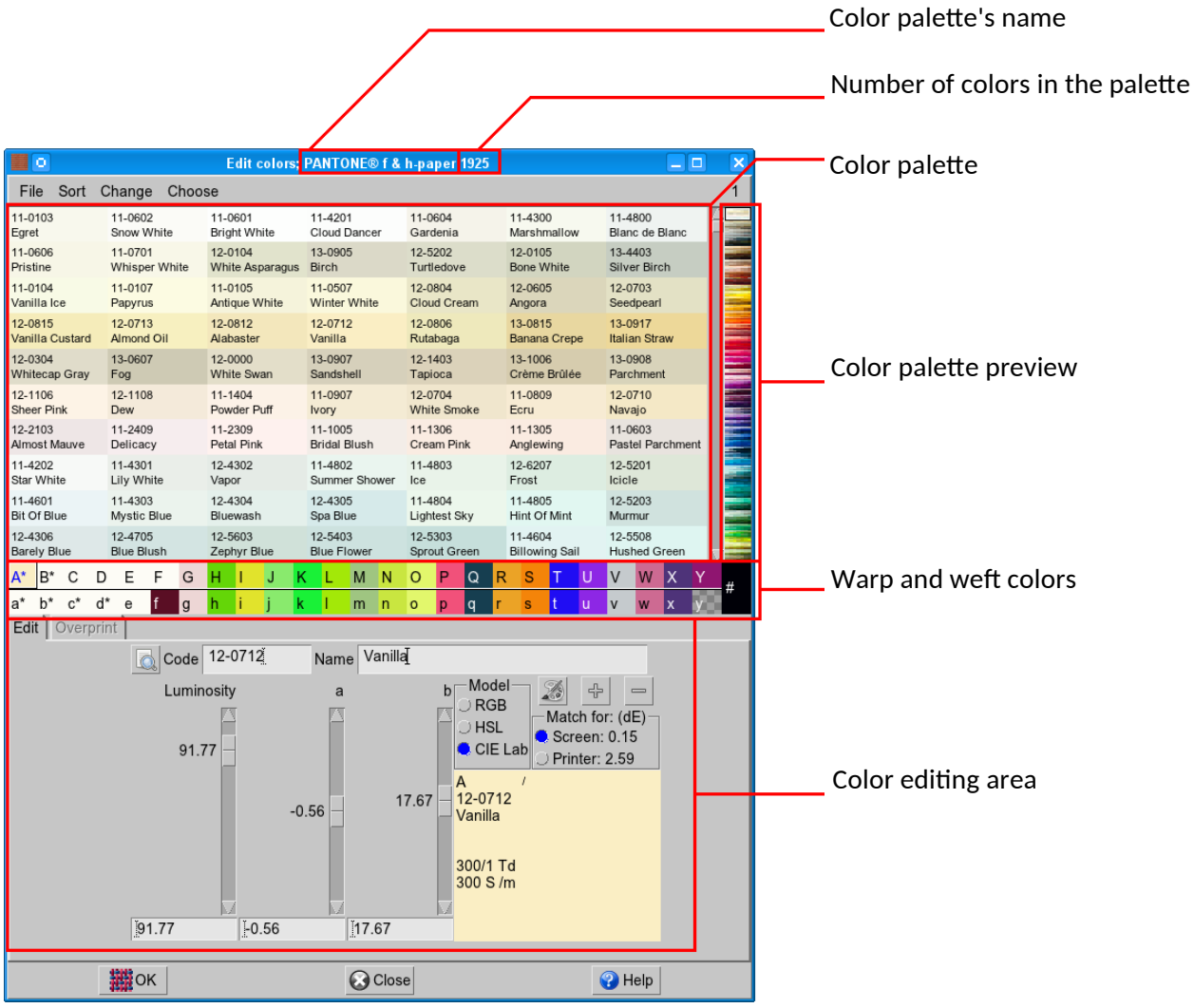
In ArahWeave, screen RGB colors and print RGB values are matched for a particular printer / screen based on CIE Lab values that provide device independent color matching. The word “match” which is

used later in the text, always means match within the limits of a particular color generation technology and the parameters / capabilities of the device where the color is being rendered (monitor, printer), not a perfect match against either PANTONE® -identified solid color standards or a particular color specified in the CIE Lab color space.

## 8.1 The Color Editor

Chose **Fabric** > **Colors** to open the Color editor. It consist of five sections:

- the title bar information (the name of color palette and the number of colors in it)
- the color palette
- the color palette preview area showing all colors from the palette
- warp and weft colors
- the color editing area




### 8.1.1 Loading/Saving a Color palette

When you open the Edit colors window, the default color palette is already loaded in the window. To load a different palette in the Edit colors window, just choose **File** > **Load** colors, and select a color palette file from the Load colors dialog. Alternatively, you can use **Choose**, which lists all files from current directory, and you just click a file from the drop down list to load it into Edit color window.
If you make changes in the color palette, you can save it under new (or old) name with **File >Save colors**.

### 8.1.2 Changing the number of colors in the palette

The number of colors in the palette is displayed in the window's title bar. You can change the number of colors in palette with **Number of colors** from the **Change** menu in the Edit colors window. If you increase the number of colors, new colors will be added at the end of palette. If you decrease the number of colors, colors will be deleted from the end of palette.

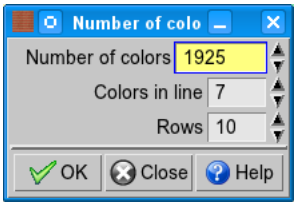



*Figure 218: Changing number of colors*

### 8.1.3 Adding or deleting color from the palette

You can add new color next to the selected color in the palette by clicking button in the Edit colors window. To delete selected color, click or press the Delete key on keyboard.


*Figure 219: + and – for adding or deleting color from the palette*

### 8.1.4 Changing the number of colors in the palette display area

In the Number of colors dialog you can also change the appearance of the color palette—the number of color tabs in the row, and number of rows in the palette display area.

### 8.1.5 Copying colors from the palette to the pattern color bar

If you want to copy currently selected color to another entry (warp, weft or palette color) just point to it and press right mouse button. If you want to swap them, do the same; just press middle mouse button.

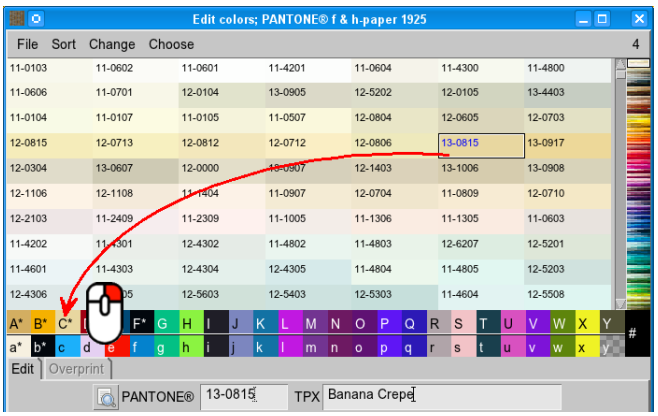



*Figure 220: Copying color from palette to the yarn color bar with right button click*

### 8.1.6 Creating a custom color palette from the existing palette

You can create a custom color palette with a help of the Variants dialog window.
Open ArahWeave. Load a fabric which has at least six different colors in weft, or simply change the weft pattern to something like **1a1b1c1d1e1f**. Choose **Blanket** > **Variants** to open the Variants dialog window.

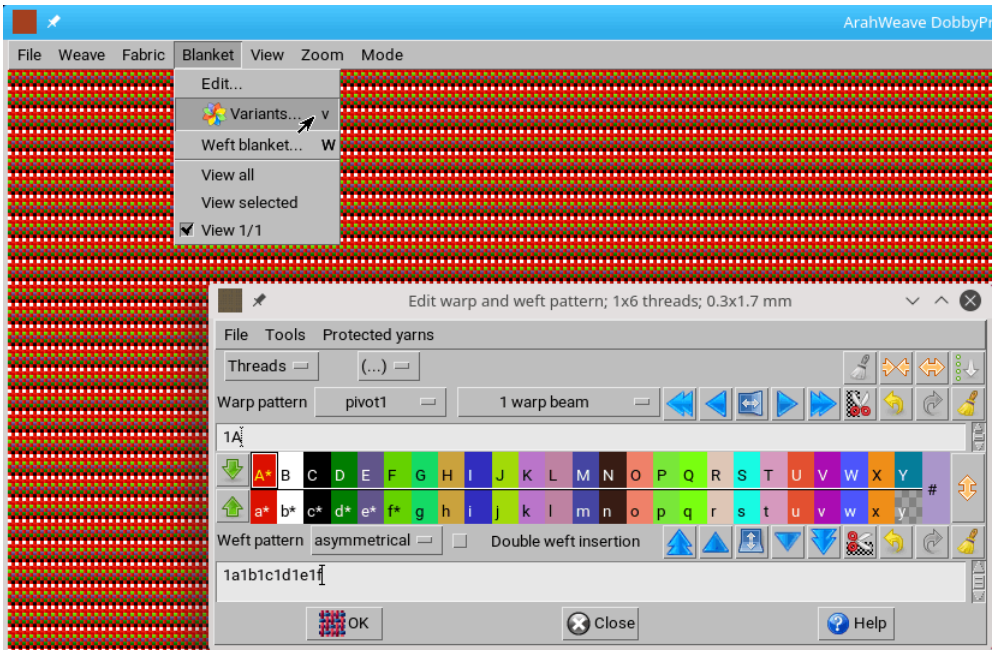



*Figure 221: Opening the Variants dialog*

The number of variants is set to 1 by default. Make some room for the color palette you will create by increasing the number of variants. We got 48 boxes for colors in the Variants dialog in Figure 222. If you need more colors, just increase the number of variants.

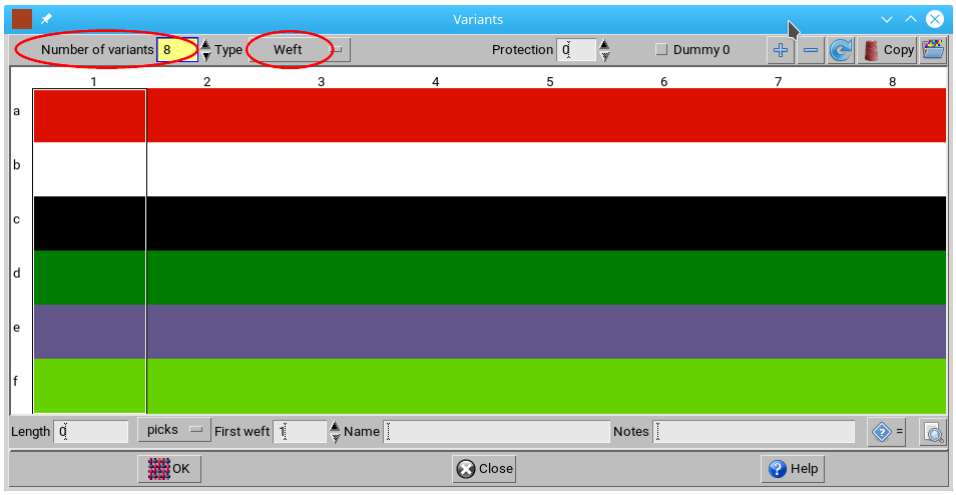



*Figure 222: Setting the number of variants*

Open the Edit colors dialog window (**Fabric** > **Colors..**). If it is not already there, load a color palette you want to choose colors from. Click the **Variants** tab. Select the color with left mouse click; paste it into the Variants with the right mouse click.

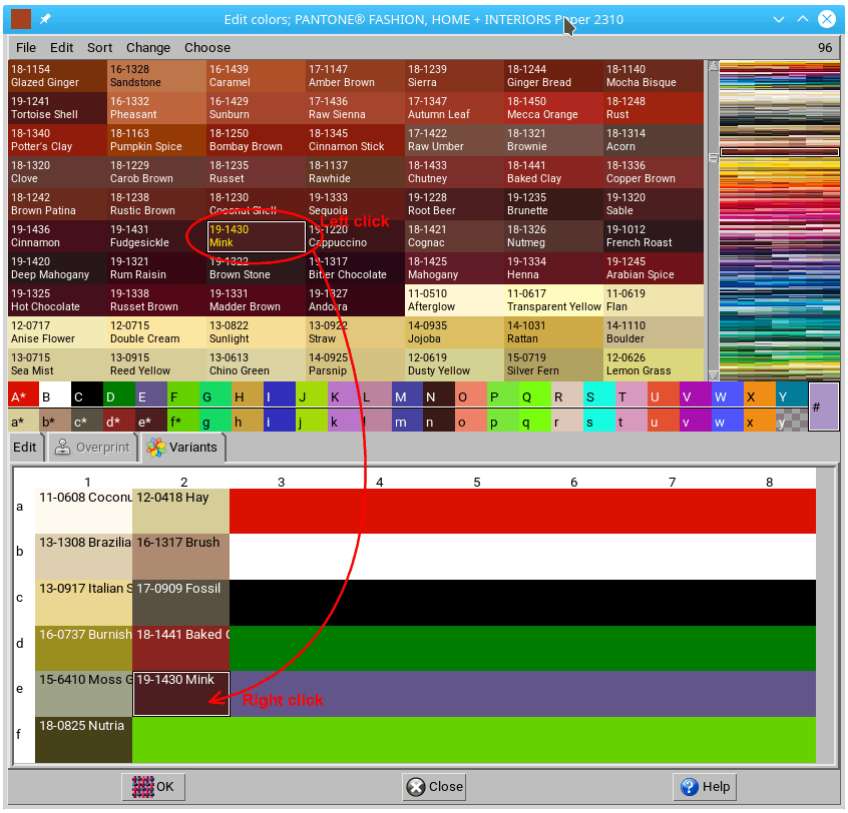



*Figure 223: Pasting colors from the color palette to the variants*

Continue until all color fields are filled with your selection. Then choose **Change** > **Make color atlas from variants**.

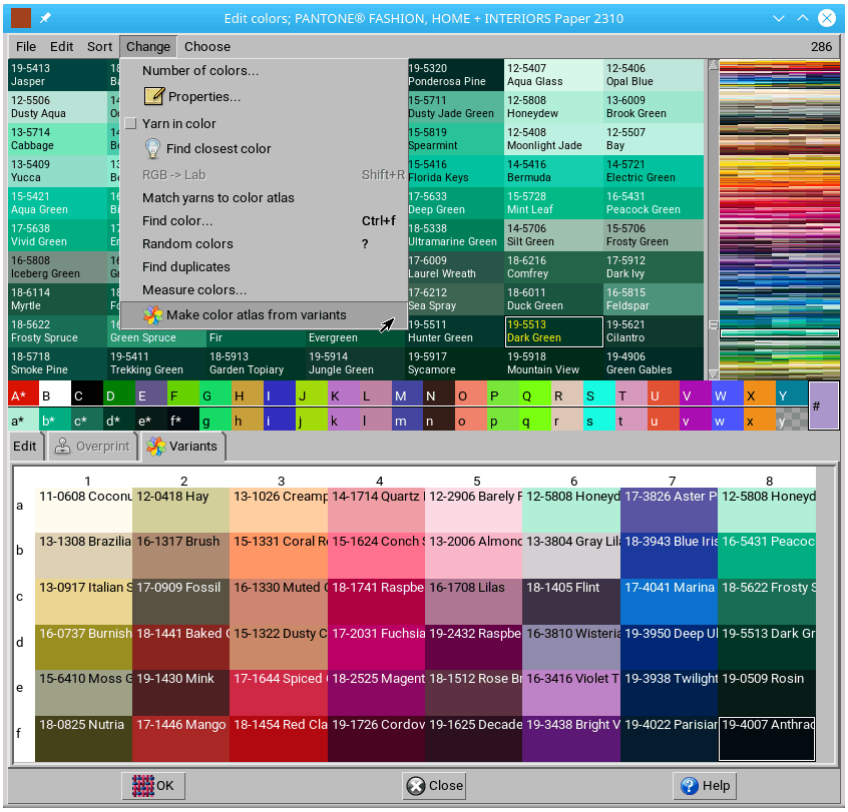



*Figure 224: Creating a new color palette*

Before you save it, be sure that it doesn't contain properties (especially the name which is displayed in the Palette title-bar) from the previous palette. Open the Color properties dialog window (**Change** >

**Properties**), and enter new data in the properties window. The **Name** will be displayed in the window title bar.

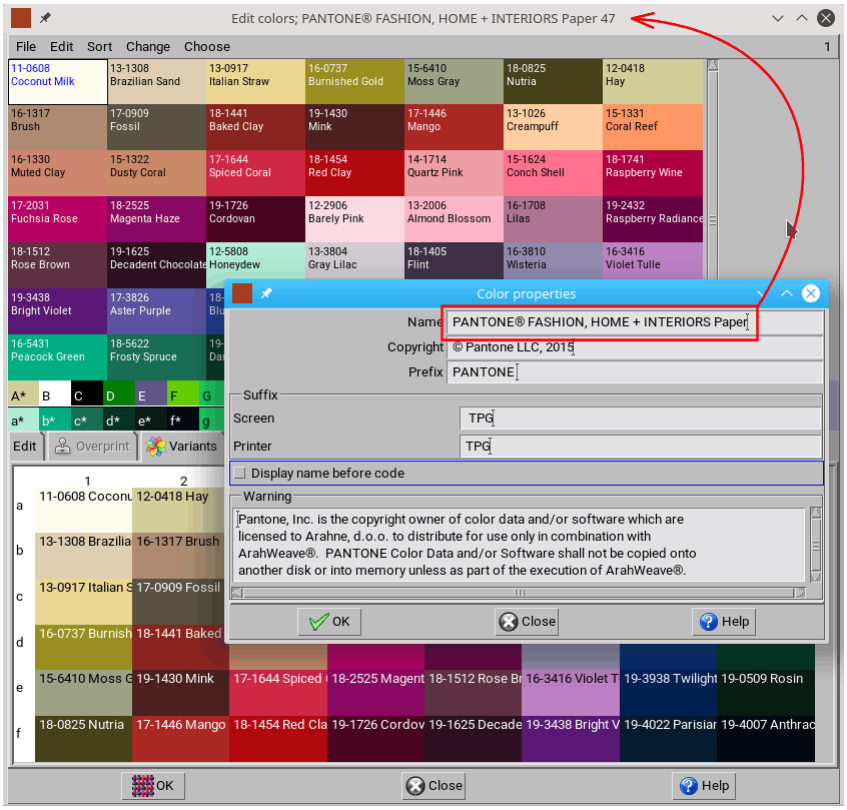



*Figure 225: Editing the color palette properties*

Save the color palette for future use (**File** > **Save colors...**). Type in the new filename and click OK.

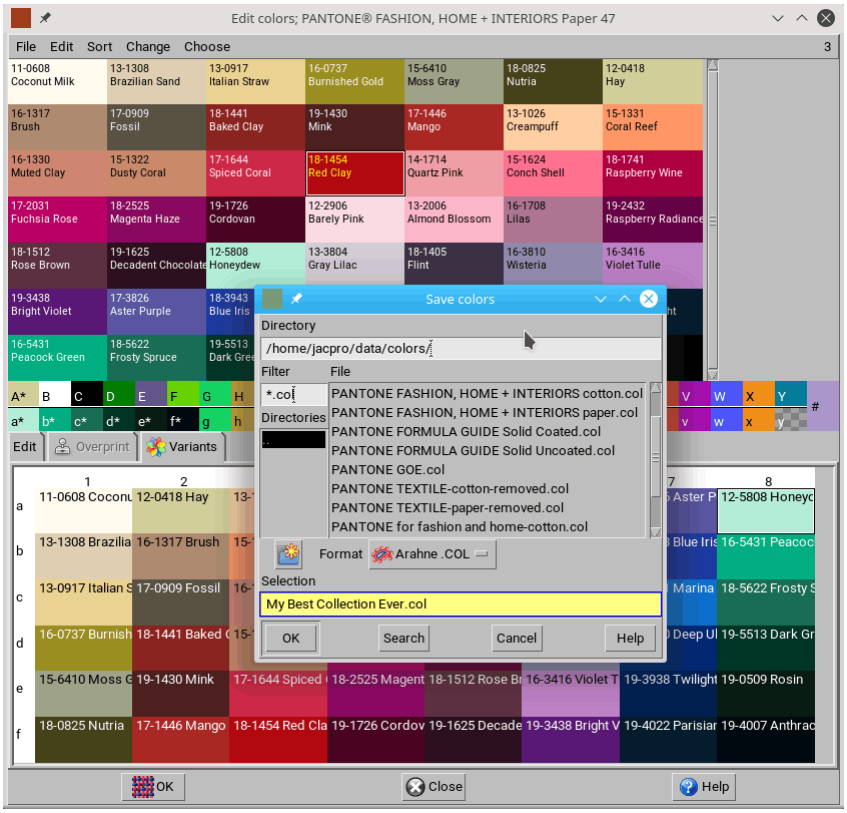



*Figure 226: Saving the color palette*

## 8.2 Editing a color

Select the color that you want to edit (warp, weft, or a palette color) by pointing to it and pressing the left mouse button. The currently selected color is displayed in the lower right angle of the Edit colors window.

*ArahWeave* uses two fundamentally different color models: the CIE Lab model and the RGB model. Whatever model you prefer, the editing of color is the same: entering the values in the text fields or changing them with sliders.

1. The CIELab model: select it and enter Lab values or set values with sliders for the desired color. Press Enter after entering the value (or just click into another field). When the CIE Lab value is entered, the most appropriate color is generated automatically based on the currently selected printer and screen profile.

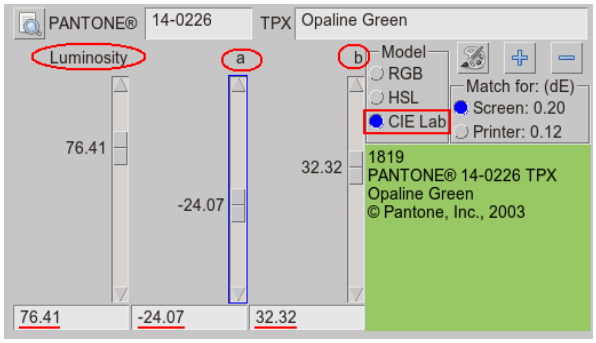



*Figure 227: Editing Lab values*

***If you want to switch back to the RGB model, you must put all three values (L, a, and b) to zero, then switch to the RGB model and edit the RGB values.***

2. The RGB model: color can be entered in either RGB (Red, Green, Blue) or HSL (Hue, Saturation, Luminosity) model. The RGB model is natural for monitors and all three values can be varied from 0 to 255. The HSL model is just another view at the same color, where Hue is the angle of the color on the color wheel from 0 to 359, while Saturation and Luminosity vary from 0 to 1000.

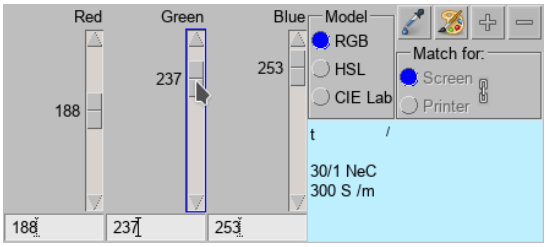



*Figure 228: Editing RGB values*

Besides changing the RGB values with a slider or typing them manually, you can use the Color Picker dialog to choose a color. Click the Color picker icon to open the Color picker window. You can modify a color using one of the following ways:

- Choose a color from Basic colors, which becomes your selected color.
- Drag a cursor in and to define the color in the color space.
- Getting a color from any pixel on your screen: click the Eyedropper icon in the Edit colors window or the color picker window. By clicking a point on a screen, you change the color to that which is located under the pointer. It is useful if you have a scan of fabric or yarn, and you want to use the same colors in *ArahWeave*.

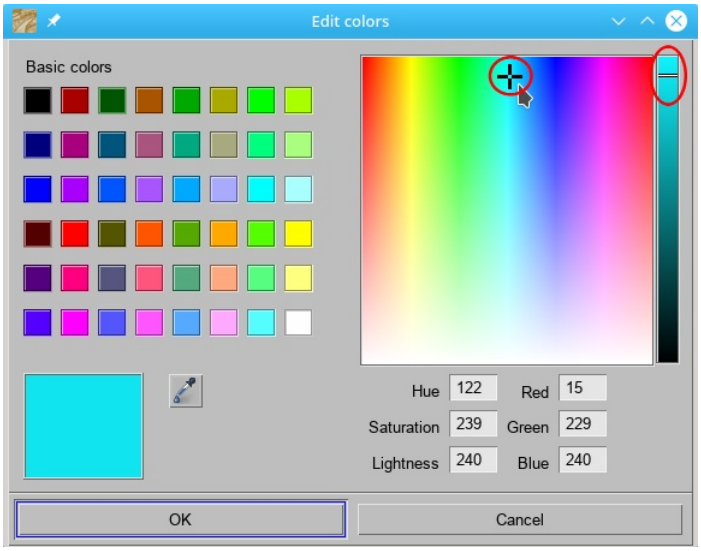



*Figure 229: The color picker dialog*

## 8.3 Matching yarns to the color atlas

Use it (**Change** > **Match yarns to color atlas**) when you want to replace colors of the yarns used in the currently loaded fabric with the closest matching colors from the color library. It is useful when you have set the colors in RGB, for instance with the **Eyedropper** tool ,and you want to replace them with colors from your production color library, or your customer's color library or with PANTONE® colors.

## 8.4 Color difference (dE)

One of the unique features of ArahWeave is that the program gives you feedback on the screen and print accuracy of the selected color. This is indicated by the dE values on the right side of the color edit window. If it displays a value of dE smaller than 2, it means that you are within the color gamut and that color is reasonably accurate. If you have a dE of 15, you know that you will not get the desired color. In this way, you can at least warn your customer that this particular color is not correct, and attach a yarn sample to the printed fabric simulation. Note that the predicted dE is usually overly optimistic since it represents the difference of the desired color and the color found by the color matching engine of ArahWeave. We did an experiment and printed out our simulation of all PANTONE® colors, remeasured them, and compared the predicted color with the actual simulated color. The dE was smaller than 2 for 92% of colors and smaller than 3 for 99.5% of colors. There were no prediction errors bigger than dE 4. So you can be reasonably confident in the program's prediction.

## 8.5 Finding closest color

We suggest using the Lab model for your color libraries. But sometimes it is easier to set the color in RGB mode, or for instance, you find an interesting color on your Desktop or in some other application and you have just RGB values of that color. Enter those values in ArahWeave and use the **Find closest color** function from the **Change** menu. The program will find the closest color in the currently loaded color database. It will also display the dE value if both colors are CIE Lab based. Otherwise, it will perform the comparison only based on screen RGB values.

## 8.6 Background color

The last color at the right end of the warp / weft color bar, labeled #, represents the color of the background, and is used to render empty space on transparent fabrics in simulation view. It is saved along with fabric data.

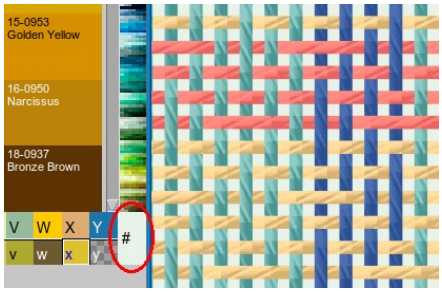



*Figure 230: The color of the background*

## 8.7 Sorting colors in a palette

You can sort colors in the Color file by the following criteria: Code, Name, CIE L (Luminosity), CIE a-redness, CIE b-yellowness, CIE H-hue, CIE C-chroma, CIE dE-the color matching error in print).
You can also sort colors manually by drag-and-drop.

## 8.8 Finding colors

If you have got a color name or code and you have loaded the color atlas that contains the color with that code / name, you can use the **Find** color function. You can activate it by pressing the lens icon at the right of the color name entry box (middle right of the color edit window), or from the menu. Type in the window text of the code or name (or just some part of it), and press Enter. It will find the first occurrence for that color and highlight (select) it. You can then click on the OK button again to find other colors. Use a forward or backward arrow to search forward and backward. Capital and small letters do not make a difference in search.

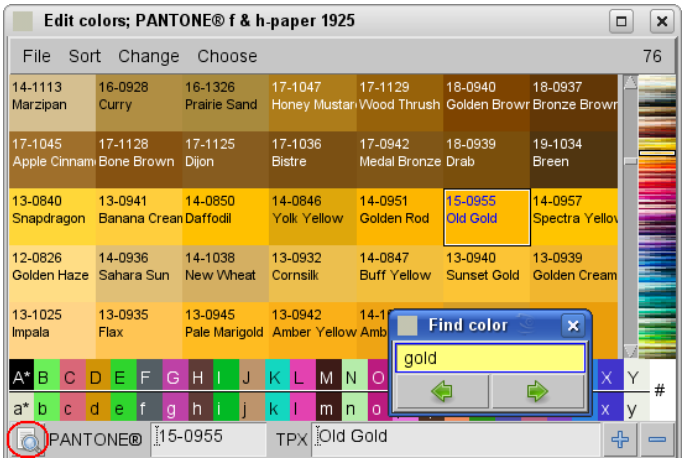



*Figure 231: Finding color in the color library*

The Color bar at the right side of the Edit colors window is additional help for fast finding a color in a color file. The Color bar shows all the colors from the currently opened file. If you click on a color in the Color bar, it becomes the selected color in the color display area.

## 8.9 Printing Color databases

You can print the Color databases by selecting the function **Print colors** from the **File** menu in the **Edit colors** window. You will be prompted by the print window, where you will be able to select the printer type and size of your print, as well as a number of lines that you want to print. The number of colors per line will be equal to your screen settings (Figure 232), and the starting line (row) of your color database print will also correspond to your position on the screen. To simplify your orientation in a big color database, the line number of the currently selected color is displayed at the top right position of the **Edit colors** window.

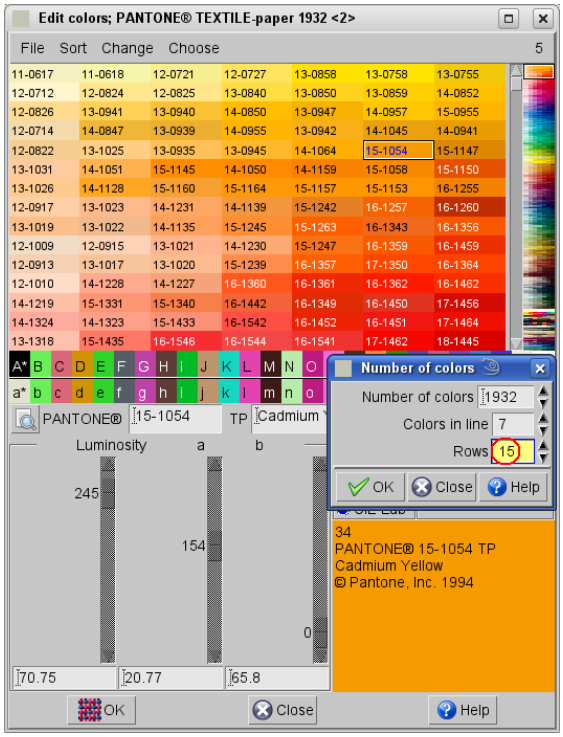



*Figure 232: Setting number of colors (rows)*

By enabling the **Title** toggle button in the **Print colors** window you get a color name and code printed below each color. Then you must decide about the number of printed rows: in Figure 233 the number of printed rows is 15.

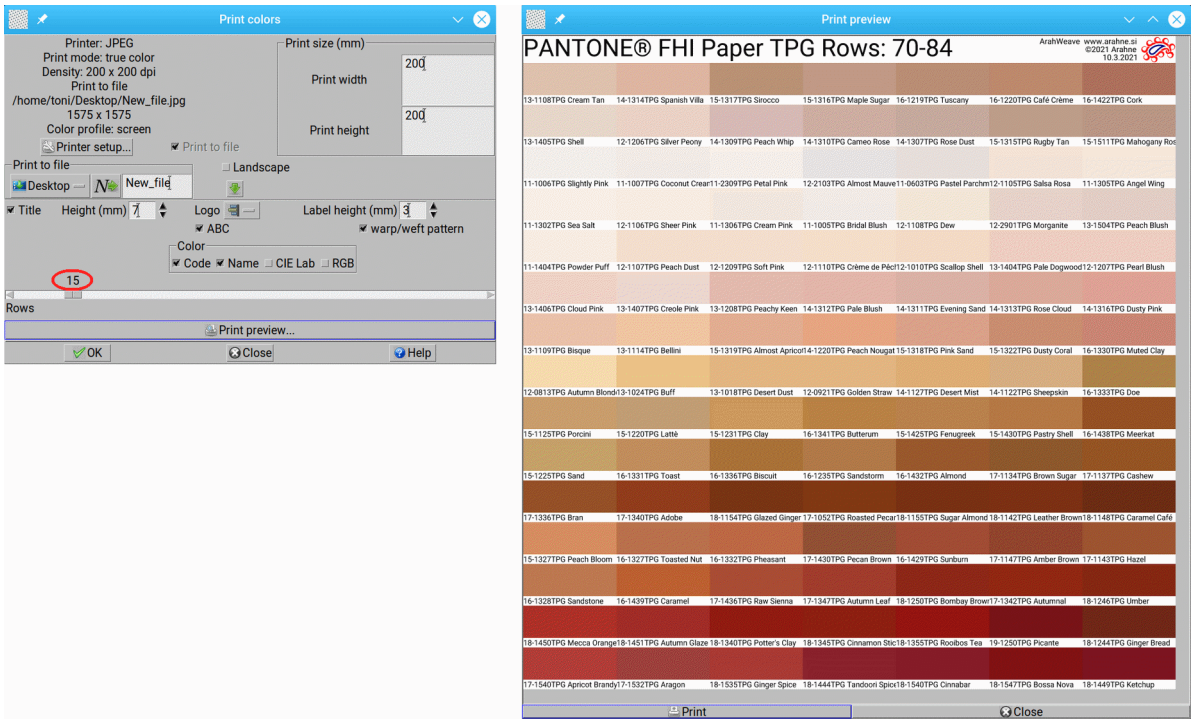



*Figure 233: Print color window and Print preview*

*PANTONE Textile Color System*® palette is a standard part of ArahWeave distribution. PANTONE® Computer Video simulations or printed simulations may not match PANTONE®-identified solid color standards. Use current PANTONE® Color Reference Manuals for accurate color. Same applies for the printed simulation of PANTONE®-identified solid color standards. The suffix CVT is used to indicate screen simulation, while CHT indicates printed simulation, of the PANTONE Textile Color System©.

### 8.9.1 Understanding color gamut

To avoid any misunderstanding regarding color accuracy, you should understand the notion of color gamut.

One common mistake is to link the actual number of displayable colors with color accuracy. When we were making the transition from 8-bits graphics cards with 256 colors to 24 bits per pixel graphics card, we said we now have 16 million colors at our disposal—in a sense—we can do any color we like. Surely, it was a big step forward, but it has nothing to do with color accuracy. Actually, we could have 16 million levels of gray between black and white. We need much more for color accuracy—primary colors that have the most extreme values in CIELab space, then a method of color mixing which makes them as predictable and linear as possible. And finally, a method of finding the desired color out of those we can generate.

*ArahWeave* will find the best possible color, but it cannot make a color, which is not within the device's color gamut. In the following pictures, you can observe the gamut of two commercial color atlases and one ink-jet printer. Notice how the areas which they cover are quite different. First group of colors represents a projection of L versus a, second is L versus b and third is a versus b. Since we want to reproduce them on the ink-jet printer, we can indicate out of gamut colors (dE > 5) with a small point.

All measurements were executed using GretagMacbeth Spectrolino, D65 light, 2 degrees angle.

If you observe the color gamut of all PANTONE Textile Color System® colors, you will note that PANTONE colors are really a collection of colors without strict ordering in a mathematical sense. In fact, some colors have very extreme out-of-gamut values, which makes them impossible to reproduce on any ink-jet printer.

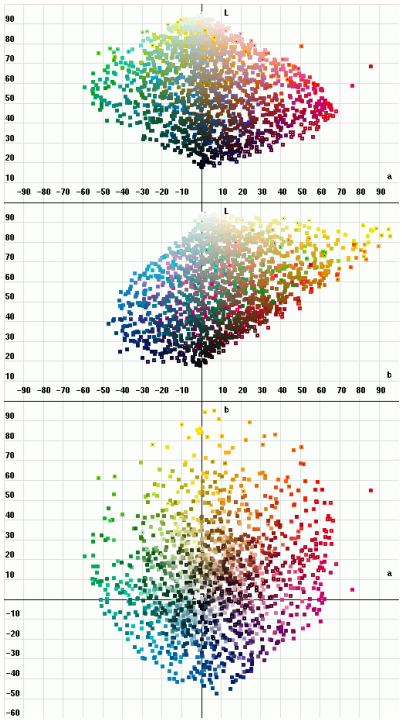


*Figure 234: PANTONE Textile Color System®*

The color gamut of all RAL© colors demonstrates that most of its colors are within the gamut of the ink-jet printer. Note that RAL's method is really based on CIE Lab, since you can see the geometrical distribution of colors, which enables you to specify intermediate colors with RAL.

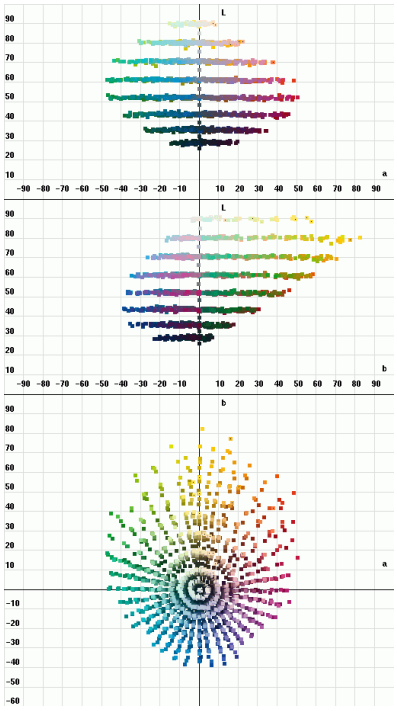


*Figure 235: RAL Design System©*

Figure 236 shows the color gamut of Epson Stylus Photo 750/1200, a 6-color ink-jet printer, represented by 5832 colors, which are the basis for our printer's color profile. Note that the color gamut of ink-jet printers depends a lot on the printer driver. We have developed our own printer drivers, which aim for large color gamut and linearity in color reproduction. The supplied drivers, which we have examined, mainly aim for reasonable reproduction of screen RGB to printed output, and score poorly both on linearity and color gamut.

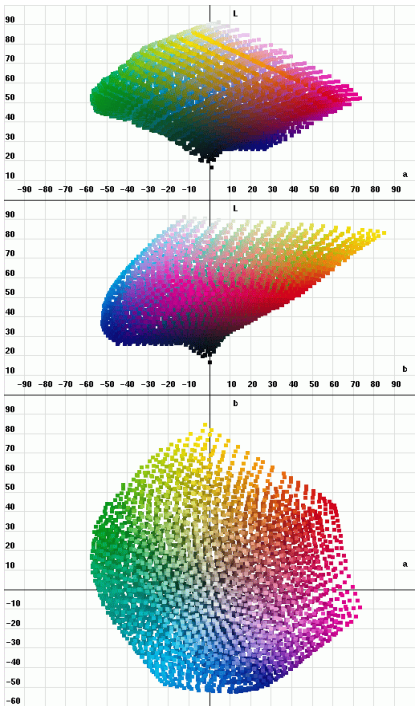


*Figure 236: Epson Stylus Photo 750/1200*

## 8.10 Saving colors from library as images

To enable this function, you have to switch to **Expert** mode (**Mode** > **Expert** in main ArahWeave window). Then open the Edit colors window (**Fabric** > **Colors**), and choose **File** > **Save colors as images**. When you open the Textures browser, there will be a folder with the same name as the color library file and all the colors from the library will be in graphics format, so you can load them as textures in *ArahDrape*.

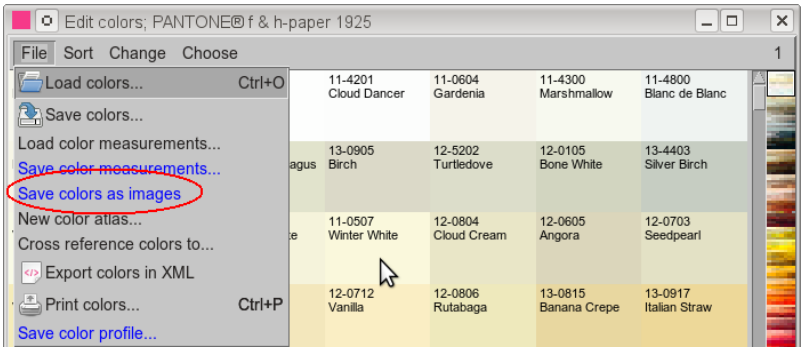



*Figure 237: Saving colors as images*

## 8.11 Importing colors from a text file

If you have a¸ spectrophotometer, which can write measured colors as CIE Lab values to a text file, you can import color measurements to create ArahWeave's color library file. The text file must have the following format (you can edit it with any common text editor):

#COLOR_SAMPLES=4

| | | | | |
|---|---|---|---|---|
| 34.25 | -17.32 | -3.25 | Code1 | Name1 |
| 64.87 | 37.01 | -14.15 | Code2 | Long_name2 |
| 55.01 | 12.67 | 23.55 | Long_code3 | Name3 |
| 42.68 | -6.81 | -13.87 | Code4 | Name4 |

The first line contains the indicator on how many colors are in this file. Then we have one color in each line. The first three numbers are CIE L, a, and b values, then there is optional color code and name. If you want spaces in color name or code, use underscore `_`. It will be transformed to space character when the file is read. You can have up to 250000 colors in one file, which should be sufficient for most cases. The file name must have the `.cm` suffix, so the program will know that this is color measurements.

**You must copy the text file with CIELab values to the colors folder, where the colors are held.**

**Typically, this would be:**

`/home/user_name/data/colors/myYarns.cm`

Once you make such a file, you can load it with the function **Load color measurements** from the **File** menu in the **Edit colors** window. Before you do this, you should increase the number of colors in the **Change** menu, so you will have enough space for these newly loaded colors. Colors will be loaded to the position of the selected color in the color database. In this way, you can easily add new colors to existing databases. Colors will be matched for screen and printer automatically as you load them, based on current screen and print profile.
To use the newly constructed color database in another work session, save it by selecting **Save colors** from the **File** menu.

## 8.12 Random colors

You can use this function, if you want to discover new color combinations of your existing design. Load the color database that contains the yarn colors of your current collection. If you have too many colors, copy the ones you want to use to the few first places of the color palette, and reduce the number of colors in the palette to the desired value. If you then call the **Random colors** function from the **Change** menu, the colors from the palette will be copied at random to the warps / wefts which are used in the pattern. When you find something that you like, just save the fabric.

## 8.13 Color cross-reference

Sometimes it is useful to compare two color databases and map one to another. You might want to find the closest colors from a commercial atlas for your yarns, so you could communicate them to a business partner, who does not have your yarn database. Just load your yarn color database, select the **Cross reference to** function from the **File** menu in the **Edit colors** window, and select the other color database. Program will find the closest colors and replace the names of your colors with the codes of the other database. The original codes will stay in place, and color values will not change.

# 9 Converting image into Jacquard weave

## 9.1 About Jacquard conversion

The Jacquard image conversion enables the user to convert an image into Jacquard weave. To open the **Jacquard conversion** window choose **Weave** > **Jacquard conversion** from the main *ArahWeave* window. If there is already an image saved in a fabric file, then the image, its corresponding weaves and settings are displayed in the Jacquard conversion. If there is no image saved in the fabric file, then the image and weave sections in the dialog window are empty (Figure 238).

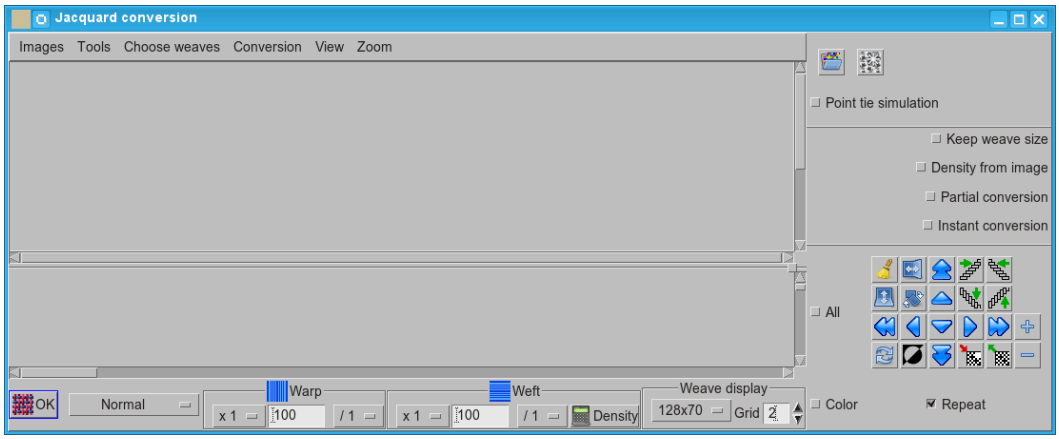



*Figure 238: Default Jacquard conversion dialog*

The **Jacquard conversion** window has its own menu bar. To load a picture choose **Images** > **Load image** or **Images** > **Browse**.

*ArahWeave differs from some other CAD programs, since the image does not contain weft control fields, such as weft selector information, in the image. ArahWeave takes this information from a fabric file: regulator from the **Weave editor**, weft change from the **Edit warp and weft pattern** window, **variable weft density** from the **Set weaving density** window.*

There are four ways to change zoom level in the **Jacquard conversion** window (similar to main *ArahWeave* window, and Weave editor):

- Press the plus key **+** to zoom in, or press the minus key **−** to zoom out
- Press Ctrl on the keyboard and roll the mouse wheel up or down
- Use the **Zoom** menu
- If you press any number from 0-9 on the keyboard you will change zoom directly to that level (1 means 100%, 6 means 600%, 0 means 1000%).

As usual in *ArahWeave*, mouse coordinates in the image are displayed on the right edge of the menu-bar. Window title displays image filename, number of colors, dimensions and current level of zoom.

Beside **Normal** Jacquard conversion (default type—you have to select a weave for every color), there are five additional *ArahWeave* types of jacquard conversion: **shading, extra weft, fil coupé**, and **weave blanket**.

## 9.2 Loading an image into the Jacquard conversion window

To load an image into the Jacquard conversion window, use the Image browser. Open it by **Images** > **Browse** from the **Jacquard conversion** window. Thumbnails (reduced-size versions of pictures, used to help in recognizing and organizing them) of image files are displayed to identify each image. Do one of the following to load the image into the **Jacquard conversion** window:

- double click in the thumbnail of the image.
- select the thumbnail of the image and then click **OK** or press **Enter**.


*Figure 239: Browsing images*

The text labels below the image icons have different background colors. Currently selected image has a text label in yellow, so you can quickly find it. Bi level (black and white) images have a light gray background of the filename area, and true color images have a background in light pink. Color palette (8-bit) images have it in white. So you can quickly distinguish jacquard cards or weaves (black and white), scanned images (true color) and cleaned up palette images.
The meaning of icons in the toolbar is described in the table below.

 one directory up

 back

 forward

 reload

 default directory

 switch to detailed view, switch to icon view

 sort order

 find image

 create new directory

 rename image

 delete image

 open selected image with ArahPaint4 (same as middle mouse button click on image icon)

**Filter** option allows you to search for particular images by **size x**, **size y**, **size xy**, **number of colors**, **date of creation**, and **file name**. If you use the file name filter, the program will interactively change the display to show you only the pictures, which match the search filter. In this way you will find your image very quickly.
To preview an image, position the pointer over a thumbnail and click with the right mouse button. The **Preview** window in a full screen mode will appear.

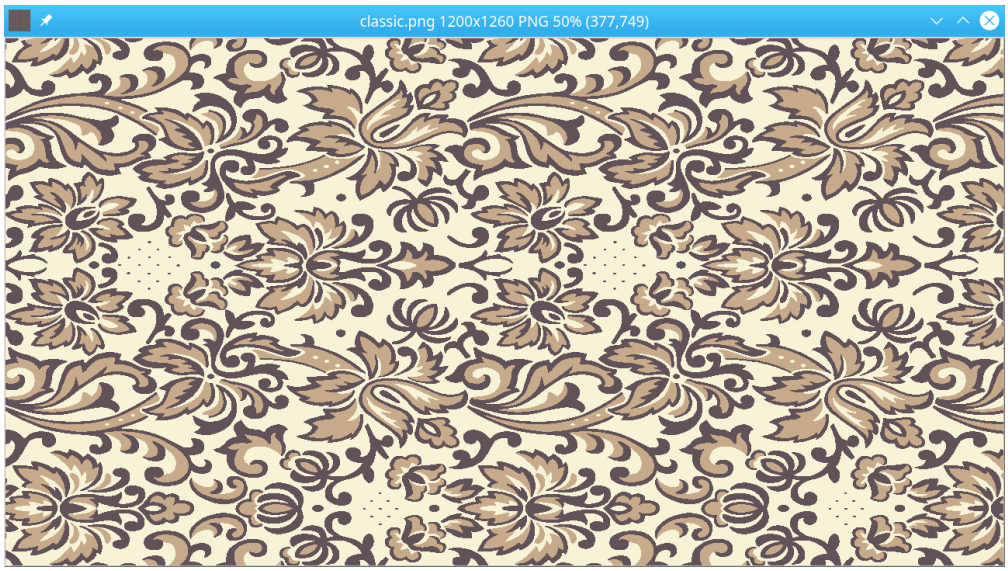



*Figure 240: Full screen preview of selected image*

The arrow keys (← ↑ → ↓) move the image in the window in the desired direction. Default view size is set to 100%, the repeat view is on. Press **F** on the keyboard to fit the image in the window. Use **+** and **–** or Ctrl+mouse wheel to zoom in or zoom out (or **1**,**2**,**3**,... for zoom 100%, 200%, 300%...). **R** toggles between the single image view and the repeating image view. The **Page Down** key loads the next image, the **Page Up** key loads the previous one. The **Home** key loads the first image in the directory, the **End** key loads the last one.

To close the **Preview** window press the **Esc** key, or click with the right mouse button in the window.

*When you navigate to the image directory for the first time, the image browser has to recognize images and create image thumbnails from the images. When you scroll up or down, it instantly creates icons for files which appear in the visible area. If the files are big, the thumbnails' creation time may increase. That might cause some lag while scrolling. To avoid a lag—press* ***Alt+Q****. The browser will create all thumbnails at once, even for files, which are not in the related display area. Note, if you have a lot of files in that folder, you may have to wait some time for the program to finish creation of thumbnails. The next time, when you enter that image directory, the image browsing will be much faster, because the thumbnails were already created.*

### 9.2.1 The Details View

The image browser also supports the details view, which displays each file in a separate line, as a file name followed by information about the image: **Name**, **Date**, **File type**, **Size x**, **Size y**, **Colors**, **dpi X**, **dpi Y**, **File size**. You can sort images by any of these criteria. To change the sort key, click in the title of the list. A column of this property is highlighted in yellow. To switch from icon view to detailed view click  icon, to go back click  icon.

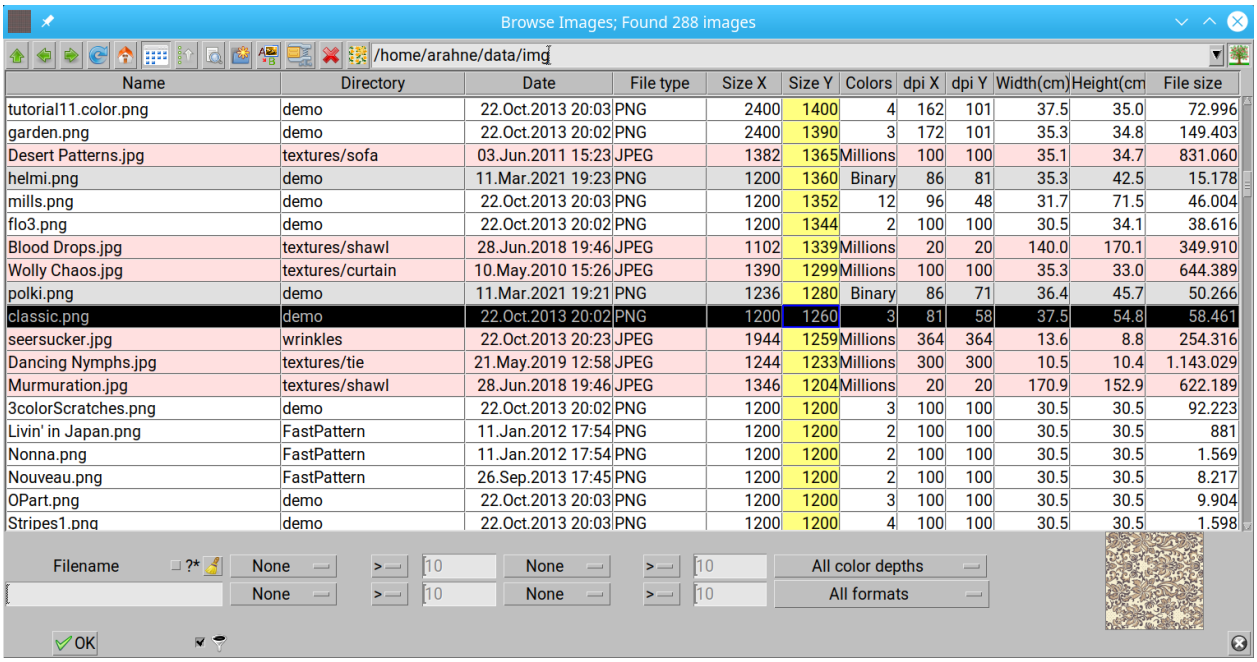



*Figure 241: Detailed list view of images*

### 9.2.2 Browsing subdirectories

*Arahweave's* browsers have a capability of showing files in sub-directories. This is very useful, when you search for a file, and you don't know in which directory you have saved it. If there are sub-directories in your parent directory, then the Image browser displays the "leafless tree" icon  in the upper right corner of the window (in the same line as a directory path). To display all files from sub-directories, click the tree icon. It changes to the "tree with leaves and fruits" icon  , which means that the Image browser shows all files from the parent directory and its sub-directories. If the image is in the sub-directory, then the name of the sub-directory appears in the image icon.
*You should be careful when using this option, since it may take a very long time to finish and display the images. Especially if you enable it at the start of your disk (/). The program will not crash, but it will read all the files on your hard disk, and this can take a lot of time. You should only use sub-directory browsing of directories which actually contain the images.*

## 9.3 Inserting weaves in Jacquard conversion

Each color of the image gets a tab in the color bar below the image area. By default, the color tabs are sorted by the relative percentage of a color in the image. *If you want, that ArahWeave sorts colors like they are written (saved) in the image file, disable the Sort Jacquard image colors by the popularity option in the Weaving section of the Save setup window.*
The **Normal** conversion is the default setting of the Jacquard conversion dialog. In that type of conversion you should load a weave for every color. There are two ways to choose a color, in which you load a weave:

- click a color in the palette bar below the image
- click a color pixel in the image in the **Jacquard conversion** window

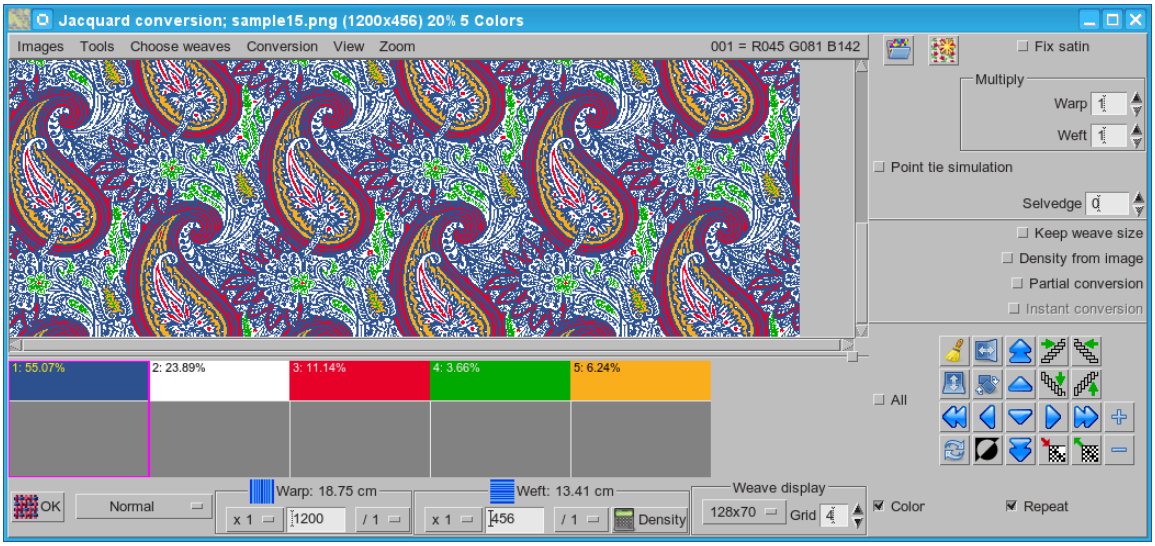



*Figure 242: Jacquard conversion window prior loading the weaves*

To load a weave into the selected color, use **Choose weaves** > **Load weaves**. You can also **Browse** the weaves graphically, as in weave editor. The weave browser is accessible through **Choose weaves** > **Browse** or you just double click on the weave area in jacquard conversion, and the program pops up the weave browser. If you double click the weave, it loads into the currently selected image color. If the size of the weave doesn't divide the size of the final jacquard image, its name is displayed in red. So you should choose only weaves whose names are drawn in black, or be really sure of what you are doing.
Weaves, which will replace the particular color in the image, is graphically displayed below the color tab. In the color tab, there is the number of the color and the **percentage** of this color in the image. Below that, you have the **weave name**, **weave repeat** and **maximum floats** of the weave.

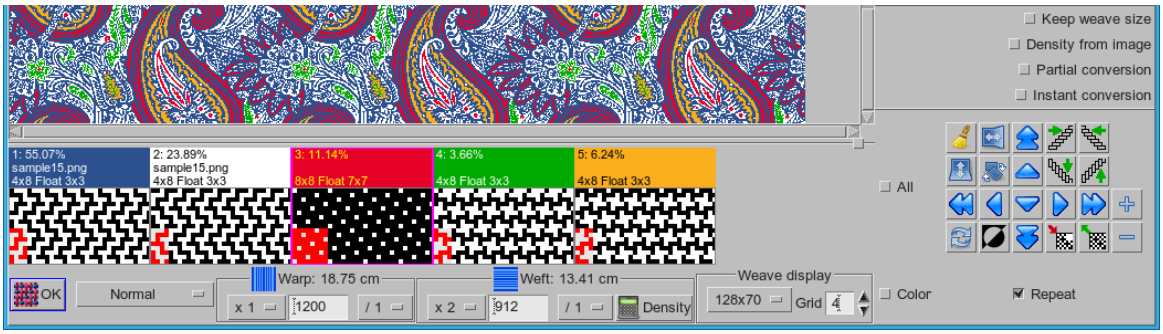



*Figure 243: Weaves in the Jacquard conversion*

*You can copy or exchange the weave as in other parts of the program: copy with right mouse button, exchange with the middle button*.
You have a choice of grid size, so they can be displayed bigger or smaller. Weave repeat is marked as a red-gray points combination. If you click on the **Color** toggle button (Figure 244), you can see the weave in the colors of warp / weft pattern in the view mode and the zoom level of the current fabric in the main *Arahweave's* window.

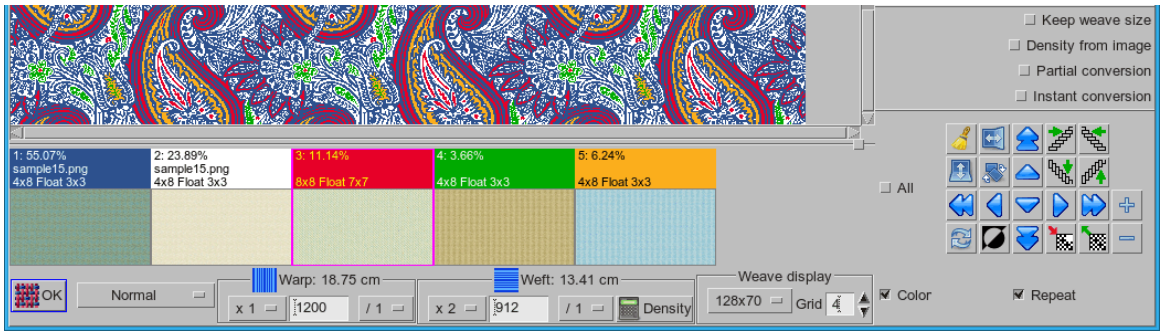



*Figure 244: Color option in jacquard conversion*

The **OK** button in the lower left corner of the window serves for applying the weaves and generating the full jacquard weave.

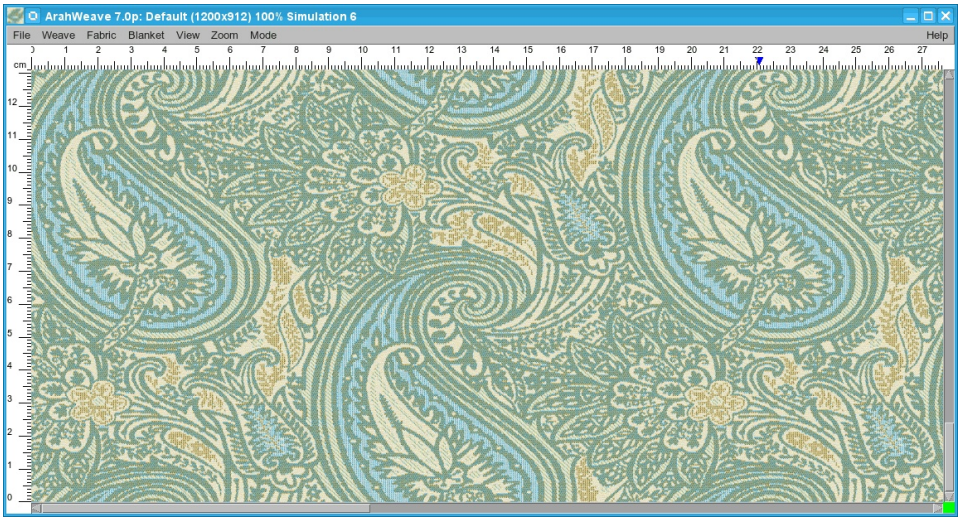



*Figure 245: Fabric simulation of the Jacquard fabric after conversion*

## 9.3.1 Modifying weaves in Jacquard conversion (Toolbox)

On the right edge of the weave selection window, you have the usual weave modifying tools: negative, shift up, down, left, right, rotate 90 degrees, mirror horizontal, mirror vertical, clear. These functions are the same as in the weave editor. When you use them, you modify selected weave in the **Jacquard conversion** window.

If you need to apply the same type of change to all weaves in the **Jacquard conversion** window, enable the **All** option. For example, you have a selection of 200 weaves in jacquard conversion, but your weaves need to be shifted by one, because of a different warp sequence. Now you can simply enable **All** and shift them by one thread using a single mouse click.


*Figure 246: The All option*

## 9.3.2 Editing weave from Jacquard conversion in Weave editor

Sometimes you want to modify the weave which is already loaded in the Jacquard conversion window with the powerful tools of the Weave editor, like copying, editing decomposed etc. So you need to move the weave into the weave editor, and to do this, click the Weave-to-editor icon  . Your selected weave is copied to the weave editor which pops up. After you finish with editing, click the Weave-from-editor icon  to put A weave back into selected weave position in jacquard weave selection. In this way, you can quickly change the weave without needing to save it under a new name, and loading it again in weave selection.

## 9.4 Options and settings in Jacquard conversion

### 9.4.1 Type of Jacquard conversion

Besides common conversion (**Normal**), where you replace one color with one weave, there are five additional conversion modes, accessible through the drop down list: **Shading**, **Extra wefts**, **Fil coupe**, and **Weave blanket**.

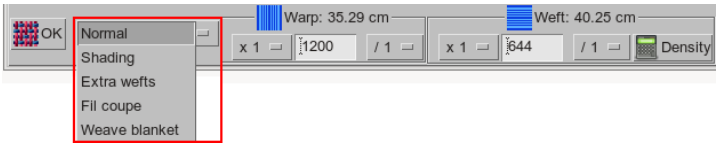



*Figure 247: Choosing type of conversion*

### 9.4.2 Jacquard weave size

Two text fields below the weave area, one for warp and one for weft, determine the size of the Jacquard weave. Usually, the weave size is equal to the size of the image, loaded into the **Jacquard conversion** window (Figure 248).

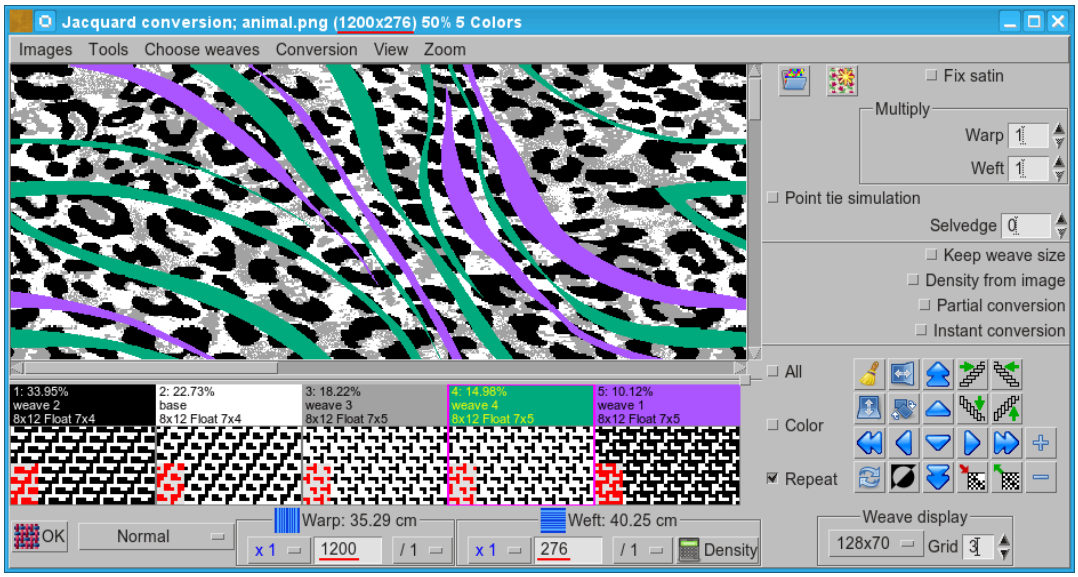



*Figure 248: Jacquard weave size is same as image size*

### 9.4.3 Changing the Jacquard weave size

You can change the Jacquard weave size in a two ways:

- Choose the multiplication factor of the original image size from the drop down menu 

. You have a possibility to select any multiplication from 1 to 16. In Figure 249, multiplying by two (x2) is used for warp, and multiplying by three (x3) is used for weft. Blue color of the multiplier factor indicates that it was used to determine the weave size. If we change the number manually (Figure 250), then its color turns to black.

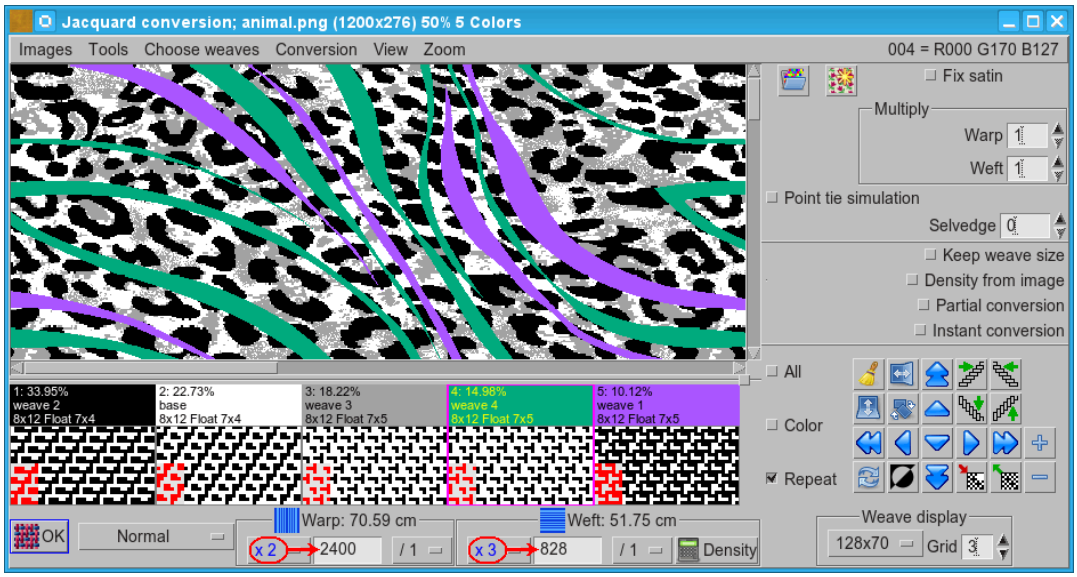



*Figure 249: Jacquard weave size changed by multiplying*

- Type desired size in the fields.

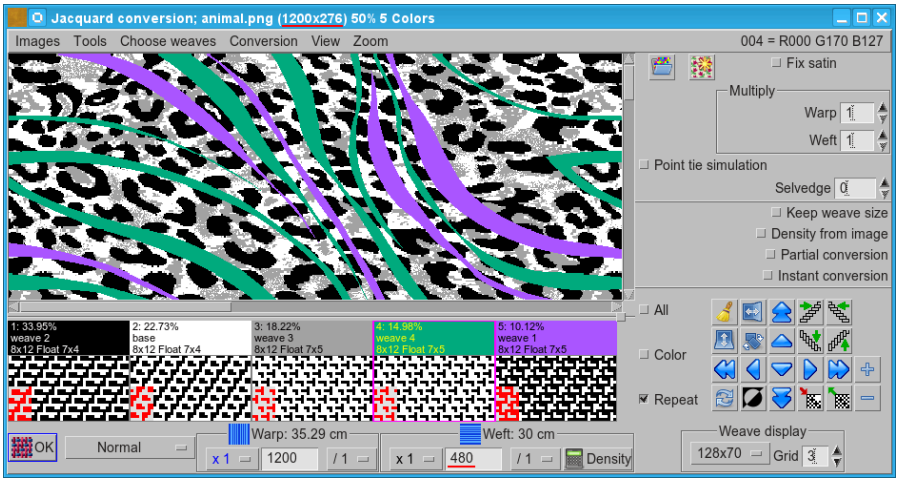



*Figure 250: Jacquard weave size changed manually*

### 9.4.4 Density (changing the weft size)

If you click the **Density** button, the number of wefts (image dimension in vertical directions) is calculated from the fabric density, which is set in the **Set weaving density** window (**Fabric** > **Density**).

### 9.4.5 Divisor option

This option allows easy multiplication of a single design, when we want to repeat it several times into a defined area. The divisor option menu is available on the button /1 besides the final weave size field in the **Jacquard conversion** window. By default, it contains the value /1, which means you only repeat one picture motif in a defined area. But you can change it to **/2**, or **/3**, or **/4**... to force several repeats (2 or 3, or 4, ...) of the picture in a defined area.
This can be handy, when you want to repeat the motif several times by a value, which is not divisible by the hook number. Figure 251 shows an example, where we want to repeat a motif with size of 200 by 200 pixels across the width of 1200 hook jacquard 7 times. Since 7 does not divide 1200 without remainder, you would again have to go in ArahPaint, repeat the motif 7 times, scale the resulting image to 1200, save it, load it in ArahWeave, and only then do the jacquard conversion. But, *ArahWeave* gives a direct solution: set the divisor factor to **/7**. Program will repeat a motif 7 times in the defined area (1200 by 200).

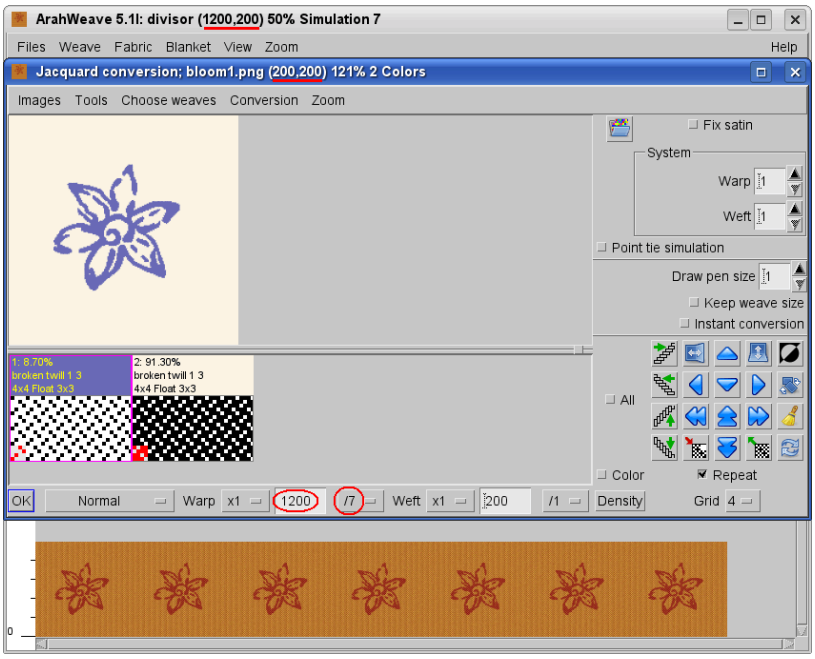



*Figure 251: Using divisor*

This feature is also useful, when you are inserting weaves larger than the original motif. It is quite common to have a motif, which you want to repeat several times across the full jacquard width, for example 2400 hooks. It is very easy to do, since the program does this automatically. But if the weave, which you are inserting, has itself a larger repeat, for example the whole 2400, then it will be cut off at the end of each smaller repeat, although the small repeats will be repeated correctly. Up to now, you had to go in the paint program, repeat the image there as many times as you needed it, load it back in ArahWeave, and load the weaves there. It works both in warp and in weft, and is also saved in a fabric file.
The design multiplication works both on normal conversion, as on extra weft/fil coupe conversion.

### 9.4.6 System option

Some multi-layer fabric construction requires multiplying of image pixels to get nice contours between different weave effects on both sides of the fabric. Normally you have to take care about image size before transforming it into Jacquard weave, but if you have not, here is the **System** option in the **Jacquard conversion** window. Actually, it is some kind of image resizing.
For example, you want to create a design with two layers in the warp, and three layers in the weft. Design repeat is 1200 by 900 threads—so the image size should be 600 by 300 pixels, and you get the final size by multiplying the width of image by 2 to get 1200, and height of image by 3 to get 900.
If the image size is not 600×300 pixels, but you still want to have a 1200×900 design, there is another way: In the System section enter 2 for warp, and 3 for weft. Enter 1200 in the **Warp** field, and 900 in the **Weft** field. Click **OK.** Program first scales the image to 600×300 pixels, and then multiplies it by 2 in warp directions, and by 3 in weft directions to achieve a final size of 1200×900 pixels.

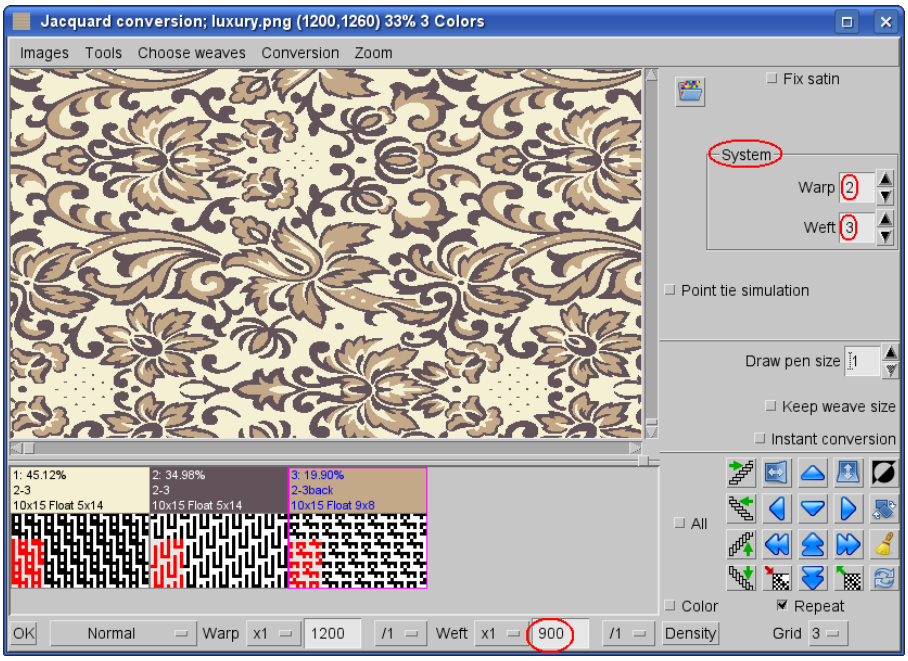



*Figure 252: System option*

### 9.4.7 Instant conversion

If the Instant conversion toggle button is on, then the program calculates and redraws the Jacquard weave after every single change of the weaves in the weave selection area, so you don't have to click on the **OK** button. You mostly need this feature when you shift weaves for one point for getting nicer or more regular boundaries between warp and weft satin weaves.

### 9.4.8 Keep weave size

If you enable the **Keep weave size** toggle button, then the size of the jacquard weave (written in the **Warp** text box and the **Weft** text box in the **Jacquard conversion** window) stays the same after loading a new image. Otherwise, the size is reset to the size of the loaded image.

### 9.4.9 Point tie simulation

Instead of simply repeating the pattern side by side, you can, using a special harness on a loom, mirror a design to create a symmetrical design, which appears twice as wide. The image is just a half of design, because mirroring is done on a loom.
If you want to see the simulation of a fabric, as it will be woven, switch the Point tie simulation toggle button on, and enter the hooks (threads) order in the **Point tie simulation** field. In Figure 253, we have 300 hooks, which are mirrored into the repeat size of 598 hooks. The point tie simulation should be written as `1-300 299-2`. You can also have more complicated settings.

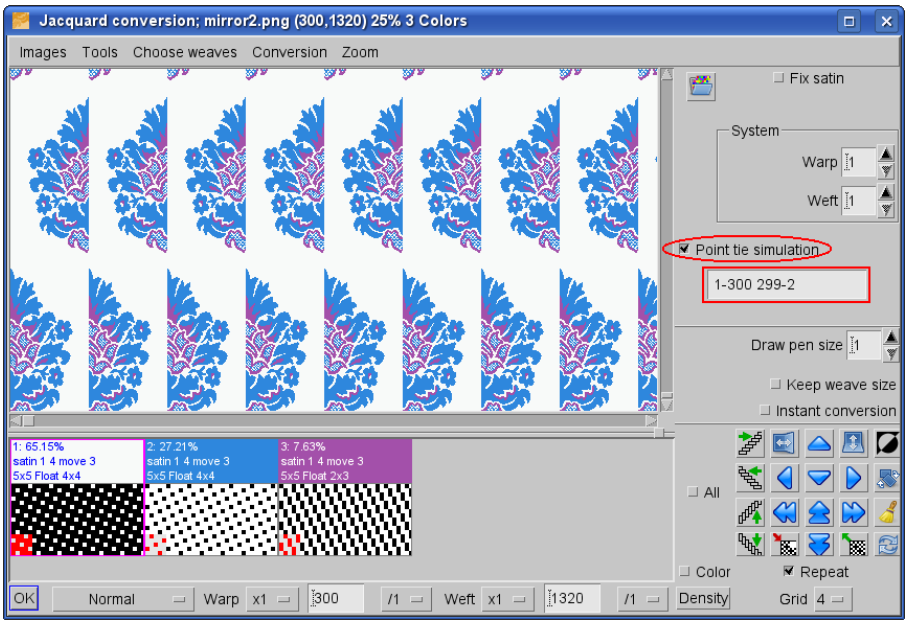



*Figure 253: Setting the Point tie simulation*

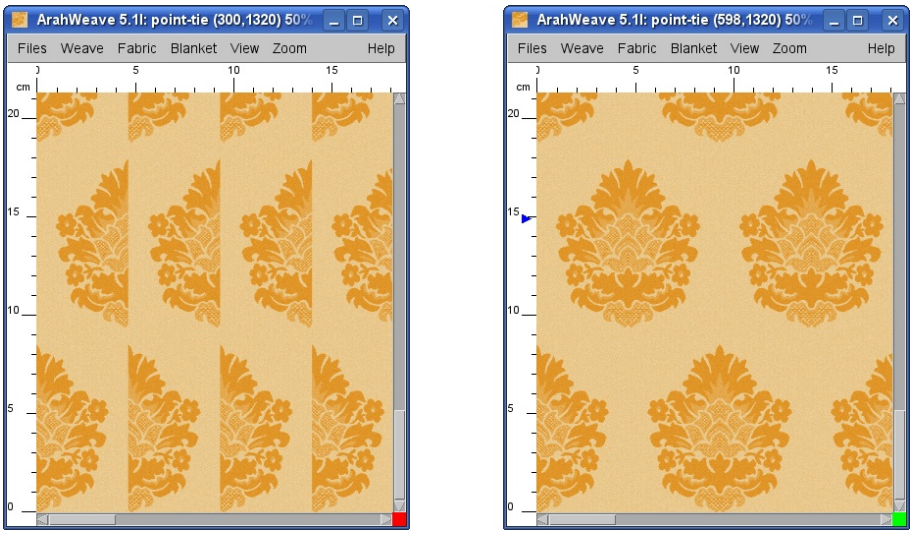



*Figure 254: Point tie fabric simulation*

### 9.4.10 Fix satin

Sometimes, using two opposite satin weaves (warp and weft effect) doesn't give the desired result: boundaries between two weaves are jagged or uneven. You may try the **Fix satin** option, maybe you will get a better result.

## 9.5 Grayscale shading

When you are using grayscale shading, you only need to load one weave, even if you have many shades in the image. Image should be in grayscale mode, which uses up to 256 shades of gray. You can convert both indexed-mode (8-bits per pixel) and true color (RGB) images to grayscale, either in ArahPaint or in Jacquard conversion (**Images** > **Mode** > **Grayscale**).

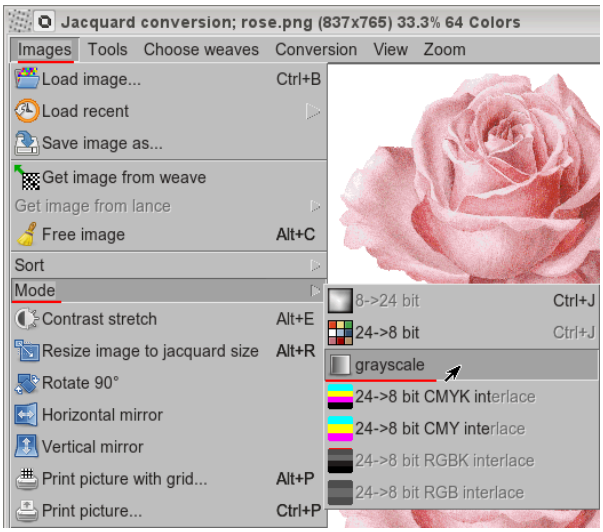



*Figure 255: Converting image to grayscale mode*

Then load one weave, which must have exactly one black point on each weft and at least on black point on each warp. Any weft satin weave will do the job. Choose **Shading** as a type of conversion, choose the direction of adding points (  ), you can modify a brightness, and click **OK**. Program transforms the image into Jacquard weave.

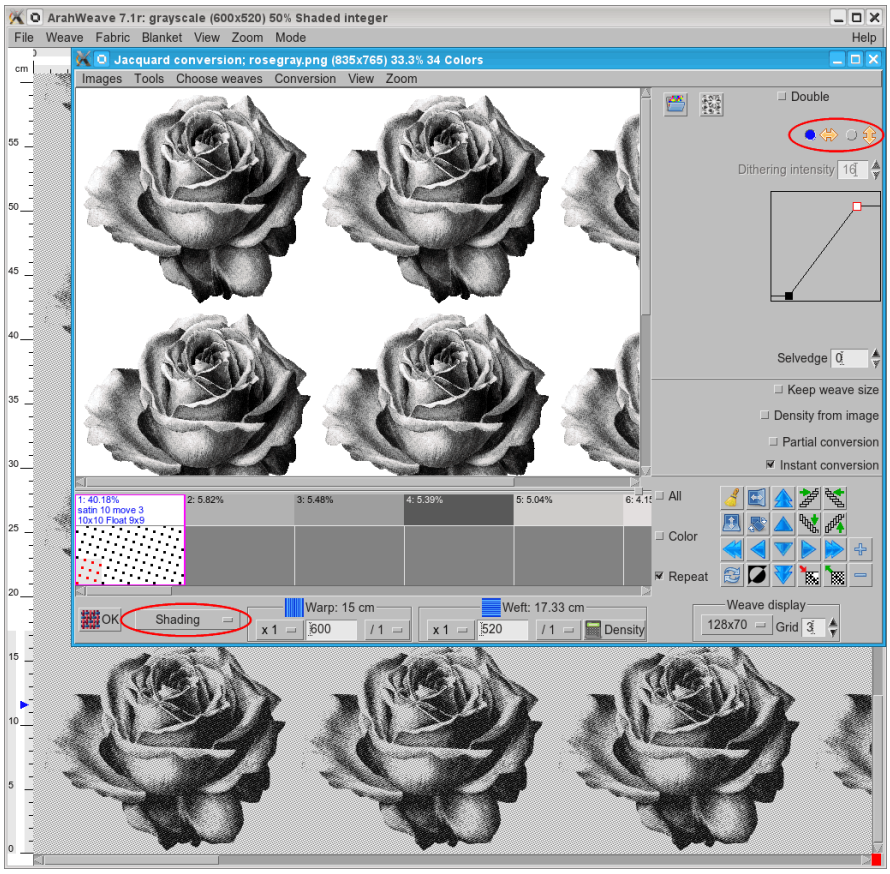
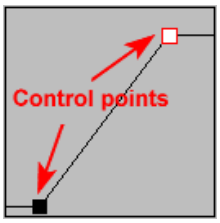



*Figure 256: Grayscale image to weave conversion*




You can adapt the level of brightness in the generated weave with modifying the line in the brightness tool. To alter the brightness line, click one of the little squares that indicate control points of the line, and drag it to the desired location. Please note, that the brightness change will not affect the image itself, it will manifest in the generated weave. Every time you change the brightness, apply the conversion by clicking the OK button (or just have the Instant conversion enabled – the program will recalculate the weave every time you move the control point of the brightness line).

### 9.5.1 Combining grayscale and normal Jacquard conversions

You can use grayscale shading in some parts of the image, and normal weave insertion on other areas. Type of conversion should be **Shading**. For "gray part" of the image, *ArahWeave* constructs a weave, based on loaded weft weave, but for the rest non-gray colors, you have to load a weave for every color.

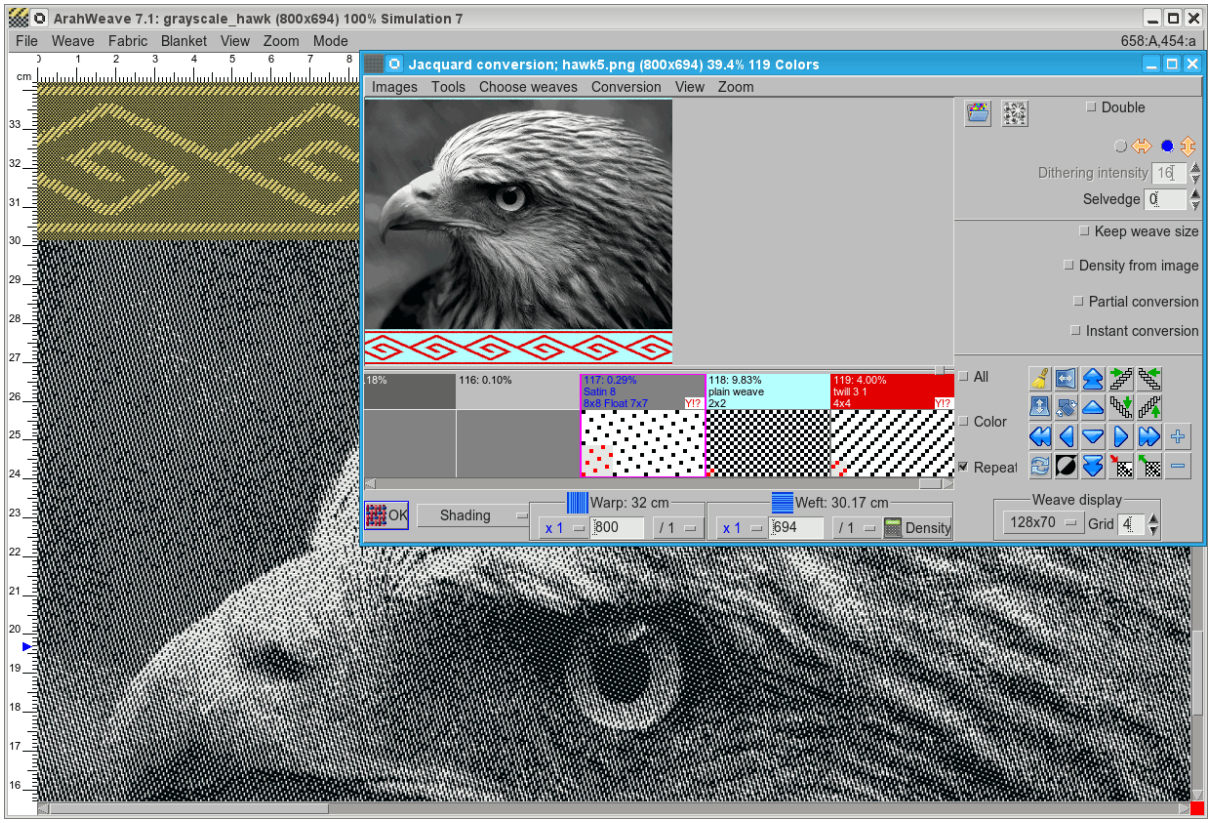



*Figure 257: Grayscale shading, combined with "normal" Jacquard conversion*

### 9.5.2 Double option

The Double option enables creation of two color shading effects on fabrics, which have only weft threads on the surface. Generally it means blanket fabrics with two weft systems. Warp is completely hidden in the middle of two wefts, and is usually quite thin with respect to the weft; it does not contribute to the color effect at all.

The first step is to set a warp and weft pattern, with one color in warp, and two colors in weft, using alternating weft change **1a 1b**. The two weft colors should be contrasting, usually light and dark, while the warp color is unimportant, since it will be invisible in the finished fabric.

Then select **Random shading** as the type of conversion and enable the **Double** toggle button. Load a one layer weave, which fulfills the criteria for grayscale shading (one point in each line; satin weave). ArahWeave will construct a double layer Jacquard weave from this input weave. You can set the **Offset** parameter, which determines the number of threads, for which program shifts the backside weave in respect to face weave.

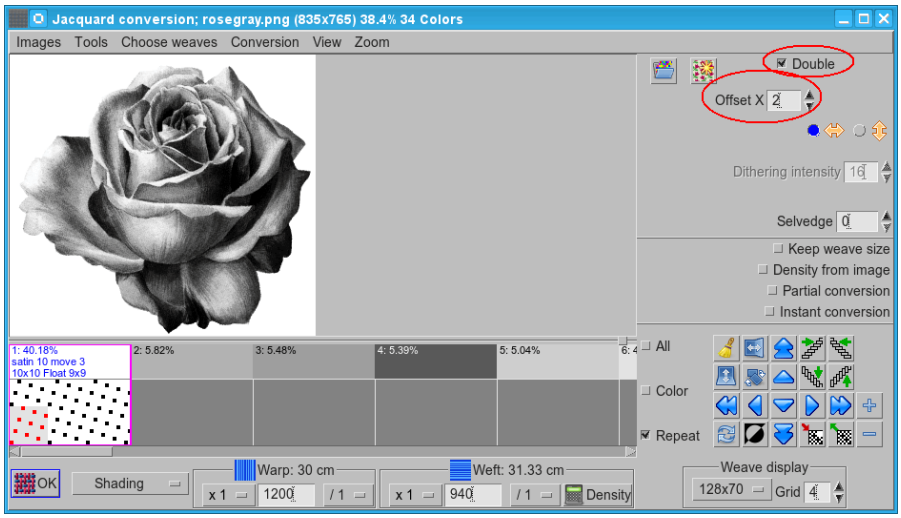



*Figure 258: Random shading for blankets*

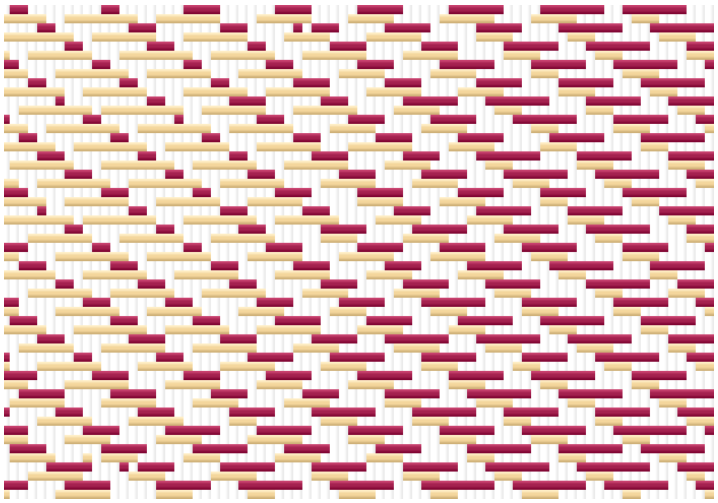


*Figure 259: The detail of double shaded fabric*

*Figure 260: Face and back of the shaded fabric*

## 9.6 Color shading

During training of designers with experience in textile printing and with little weaving background, we often get requests like: *"I draw a red flower and a green leaf on a blue sky, so how do I get these colors in fabric?"* Then we know we have a bumpy road ahead. We start all the talk about warp and weft colors, density, multi-layer weaves, how you can only have colors which are present in the warp or in the weft, assuming you have constructed the weave in the correct way. We were haunted by this problem for a long time, but there was always something more important to do. And after 7 years in business, several lucky factors met (a little break from customers' requests, a programmer who understood weaving and a weaver who twisted the weaves until his head was spinning) and we came up with a solution.

### 9.6.1 How does it work?

*ArahWeave* calculates the color effect of every weave, currently loaded in the jacquard conversion window. The color depends on weave, warp and weft pattern, and yarn colors. Then it shifts every weave in all directions to generate new weaves (or we may say colors). When ArahWeave calculates all possible weave combinations, it examines the image, and replaces color pixels in the image with most appropriate weaves, based on color similarity.
Example in Figure 261 presents the most simple case – just one weave in the Jacquard conversion window.

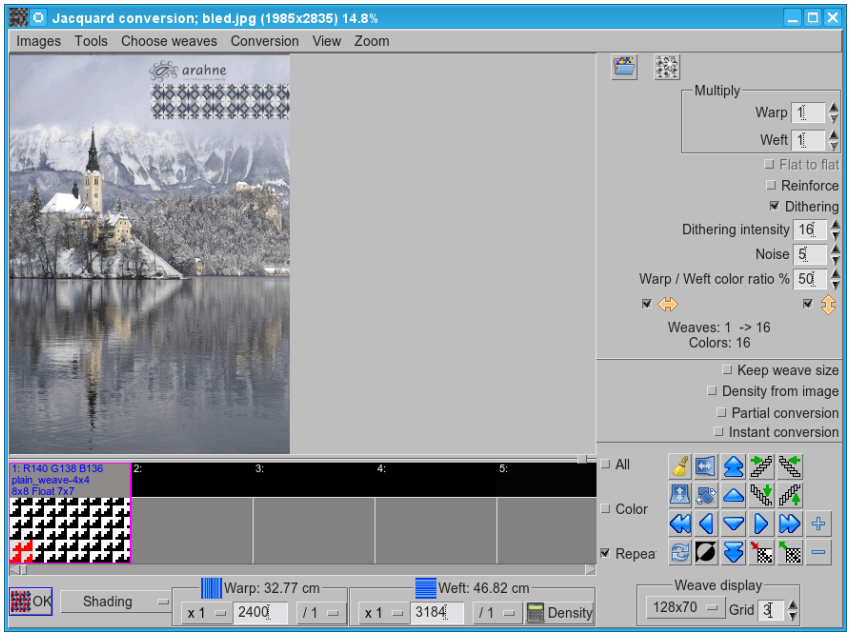
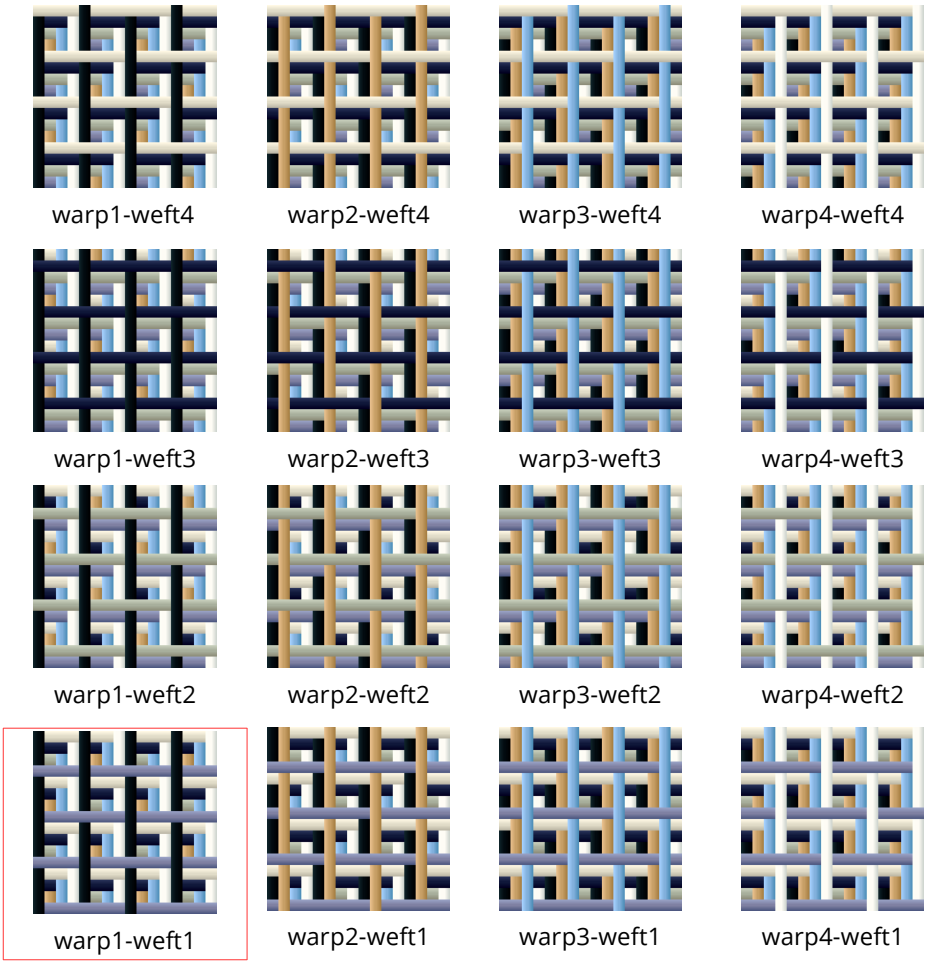



*Figure 261: Color shading conversion*

Fabric has 4 different yarns in warp, and four different yarns in weft. Weave structure will force only one warp and one weft thread at a time (out of four) is on the fabric surface. Thus sixteen different weaves / color combinations are possible (warp1-weft1, warp1-weft2, warp1-weft3...warp4-weft3, warp4-weft4)).
Table shows the basic weave (bordered with red line) and its derivatives. Weave derivatives are created internally by ArahWeave—program shifts them left to right, and up and down to get all possible color combinations—and you don't need to load them into the Jacquard conversion window. Then save the fabric, which now becomes your template fabric for color shading.




Then load the picture, which you want to weave, in the Jacquard conversion window. *The picture must be in full color – 24 bits per pixel, for example in JPEG image format. If you load a palette image in the jacquard conversion window (also called indexed image or color-mapped image), you lose the weaves which are intended to do color shading. If you load an indexed image by mistake, just reload the fabric template again.*

The next step is to specify the desired weave size, which usually depends on the number of hooks of your jacquard. Enter the number in the **Warp** field, and click the **Density** button. The number of wefts is calculated from the fabric density, which has to be set in the **Set weaving density** window (**Fabric** > **Density and control**).

Different options are on the right side of the image. They determine the transformation of the image into fabric.

First you have to choose whether the program should use the **Dithering** technique to reduce the number of colors in the image to match the number of weaves, or not. Dithering is a technique used in computer graphics to create the illusion of color depth in images with a limited color palette (color quantization). In a dithered image, colors not available in the palette are approximated by a diffusion of colored pixels from within the available palette. In Arahweave's color shading, the number of colors is equal to the number of weaves.

If you decide not to use dithering, there is the **Noise** option, which makes a smoother color transition between shades. The value goes from 0 to 99 (Figure 262). There is no rule, which technique works better (dithering or non-dithering), you can try both, check the fabric simulation, and choose which one will go into production.

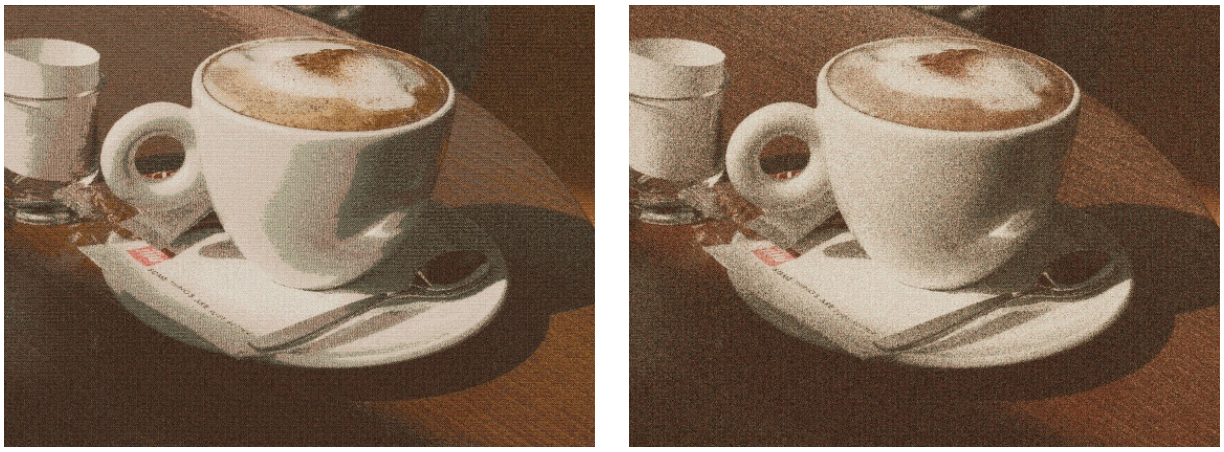


*Figure 262: Fabric on the left was made with noise option set to 0, on the right noise was set to 40*

The other options are:

- **Reinforce**: with reinforce turned on, the program makes additional weaves from the base ones to achieve even more color accuracy. This option will only work on some weaves, not all weaves are suitable for use with this option.
- **Flat to flat**: sometimes you want the text labels or borders in color shading to remain unaffected by the noise, which is usually added to the picture to achieve a smooth shading. If the **Flat to flat** button is turned on, the program will search for areas of flat color in the true color image and will not apply any dithering noise in that area. The flat color areas must have perfectly equal color, not just visually equal with small differences inside (as it would result from a JPEG image). This parameter is also saved in conversion and fabric file. Note that this option does not yet work together with the **Dithering** option.
- **Warp / weft color ratio**: you can specify the relative importance of warp and weft effect in the calculation of color shading weaves, expressed as %. Default value is 50, which means that the importance of warp is equivalent to that of the weft. If you have colored yarns in warp, and black and white yarns in weft (as you would in a tapestry), by putting the parameter to 60, the program will calculate more colorful (saturated) weave colors, and a normal image with largely mid tones will be desaturated in the final shading rendering. Inversely, if you put the parameter to 40, weft will become more important, the program will calculate duller (less saturated) weave colors, and in the color shading conversion, the program will pick stronger weave colors, resulting in a more saturated final rendering.
-  ,  If you don't want to use shifted weaves in your color shading fabric, uncheck these options. If you are using tapestry weaves, you normally don't want to shift the weaves vertically (because of the binder thread), only horizontally (where all warps have the same yarn count).

Then click the **OK** button to start the transformation. You can save a fabric file and use it later as a color shading template.

The only remaining task is to remove the float errors and save the Jacquard file. Figure 263 shows the input image, and the resulting fabric. Normally we use more than one basic weave, so the result should be even better.


*Figure 263: Image and fabric simulation*

The algorithm itself is flexible, and is not limited to 4 warp 4 weft systems, or to one particular weave system, nor to these particular warp and weft colors. In fact, it is a good practice to change warp or weft colors into colors which are actually present in the image, and you get even more accurate color rendering. To check which RGB colors are present in the image, move the mouse over the picture and look in the upper right corner of the window, where they are displayed. Write down the colors you think are most significant for your image, and change your yarn colors into these colors, and click on the **OK** in the conversion window one more time. Of course, for a weaver, it is much easier to change the weft colors.

### 9.6.2 Color shading with tapestry weaves

Figure 264 shows color shading with tapestry weaves. We expect better results, since we use more weaves in the Jacquard conversion. Warp tapestry weaves should be shifted just in horizontal direction ( ), because normally you have yarns with different yarn counts in weft, so shifting them vertically would produce wrong weaves.

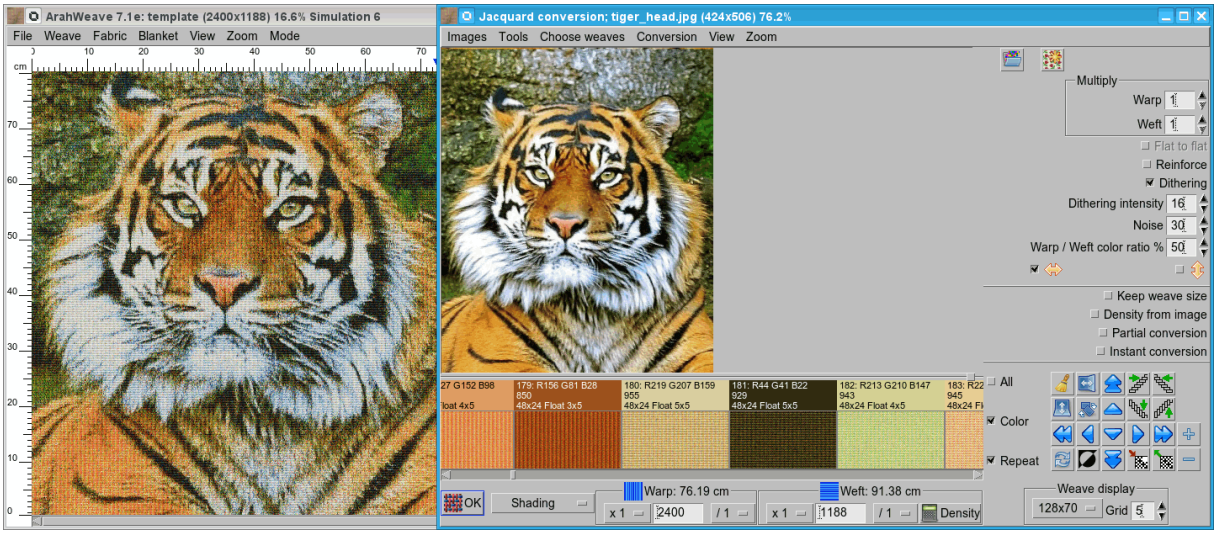



*Figure 264: Image for color shading and the resulting color shaded fabric simulation*

### 9.6.3 Loading / Saving all weaves

Sometimes you need to load more than one hundred weaves in the Jacquard conversion. There is a tool to load them all at once. Use **Load all** from the **Choose weaves** menu, and the program will load all

weaves from the current weave directory into Jacquard conversion. This means you must navigate the weave browser to the desired directory, before calling this function.
From the same menu, you can use **Save all**, in order to save all weaves from Jacquard conversion to current directory.

### 9.6.4 Reverse shading

The **Reverse shading** function enables you to check the internal picture of the color shading conversion. Choose **Tools** > **Reverse shading**, and the program changes the initial true color image into palette image, which consists of colors, defined by currently loaded weaves in the jacquard conversion window. The size of the palette image is the size of the jacquard weave, divided by warp repeat and weft repeat. In Figure 265, the jacquard weave size is 2400 by 1188 points. Program will internally use an image of 400 by 396 pixels, because the weave system is six threads in warp, and three threads in weft (400 x 6=2400; 396 x 3=1188). One pixel in the image represents six warp threads, and three weft threads, and its color is calculated based on these threads. A reverse shaded image is easier to understand than fabric simulation, so it is easier to notice any irregularity or wrong colors. If you find a color pixel in the image, whose color effect you don't like, or you think is wrong, just click it. It will select the corresponding color (and weave) in the weave selection area of the window. You can then modify the weave, or even delete it from Jacquard conversion. If color shading uses less than 256 weaves, the reverse image is an 8-bit palette image, otherwise it will be a true color image (but it will use a palette of more than 256 colors).

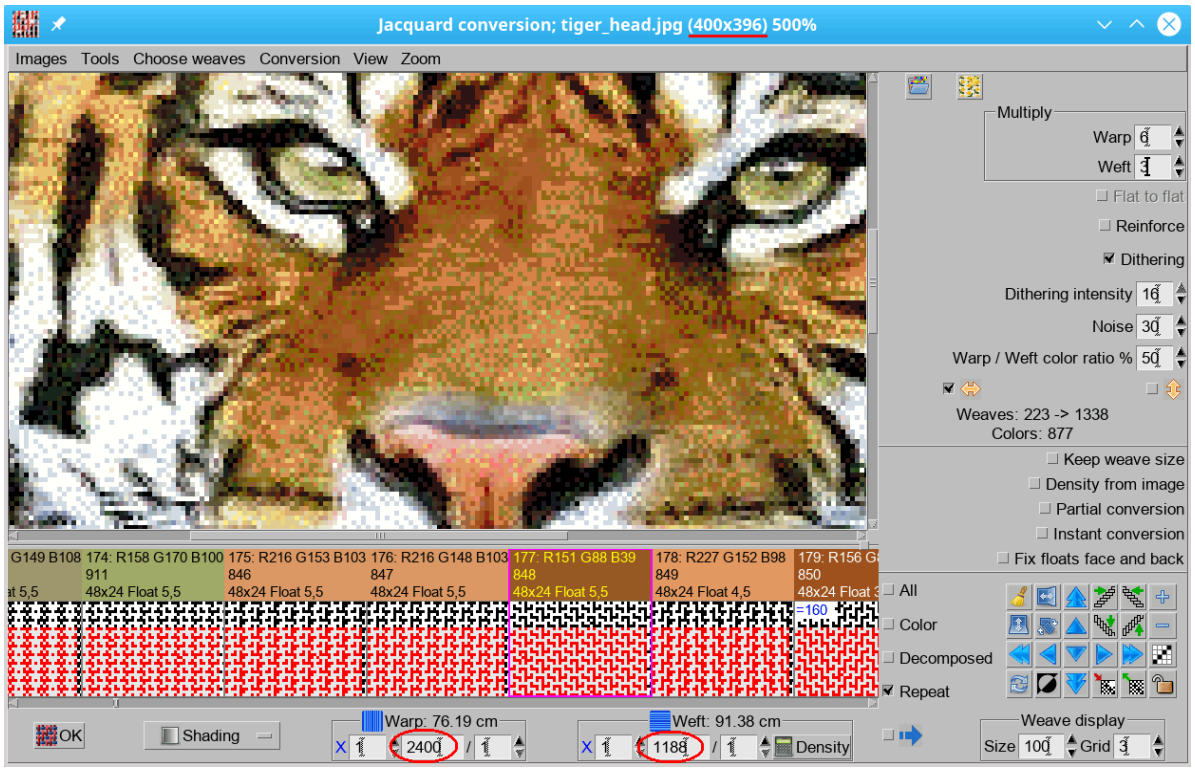



*Figure 265: Reverse shading – a tool to check correctness of color shading*

To go back to the true color image in the Jacquard conversion, click the undo icon in the window's toolbox.

### 9.6.5 Show color gamut

The **Show color gamut** function helps to predict the result of color shading. It has three viewing modes: it shows colors of the image, colors of the weaves, and overlap one over another to easier see how colors from weaves match (or usually mismatch) colors of the image.

### 9.6.6 Modifying weaves in Jacquard conversion by remapping yarns

The **Remap yarns** function from the **Tools** menu of the **Edit warp and weft pattern** window enables you to change all weaves in the jacquard conversion by shifting the treads. It is useful if you have a set of weaves made for a particular colored yarns sequence like 6-color warp, but then for some reason the warp you want to use has different color order. So you would need to change all weaves to follow thread pattern, but it is faster if you do this in the Jacquard conversion window by using the Remap yarns function.

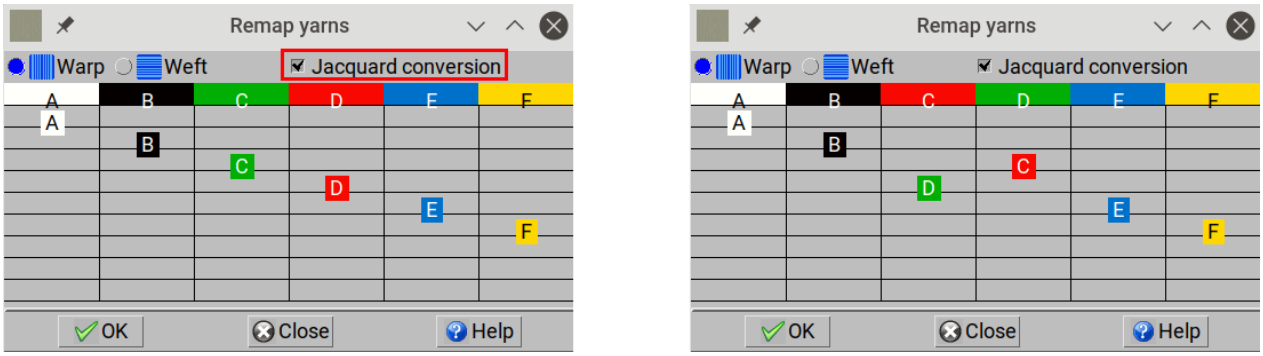



*Figure 266: Weaving points of warp 3 (green) will change the position with warp 4 (red)*

## 9.7 Extra wefts (Figuring weft)

In an extra weft fabric one weft yarn is used to weave a ground fabric and additional wefts are inserted at intervals to create a decorative pattern on the fabric surface.
The higher weft density on the figuring portion than on the ground fabric may be achieved by two means:

- Stopping the regulator (fabric take-up) on extra weft pick. When the regulator motion is deactivated, the cloth beam does not advance, and we effectively double the weft density on that point of the fabric.
- Weaving at different (variable) densities.

The weaves must be appropriate – we must “force” the picks to go on top of each other by using appropriate weaves. For example, weft satin for the pick that needs to be at the top, and warp satin for the pick that needs to be on the back.
ArahWeave’s Jacquard conversion dialog has a special mode, which helps you to create an extra weft design. To activate this mode, set the **Extra wefts** as a type of conversion, using a button on the lower left area of the window.

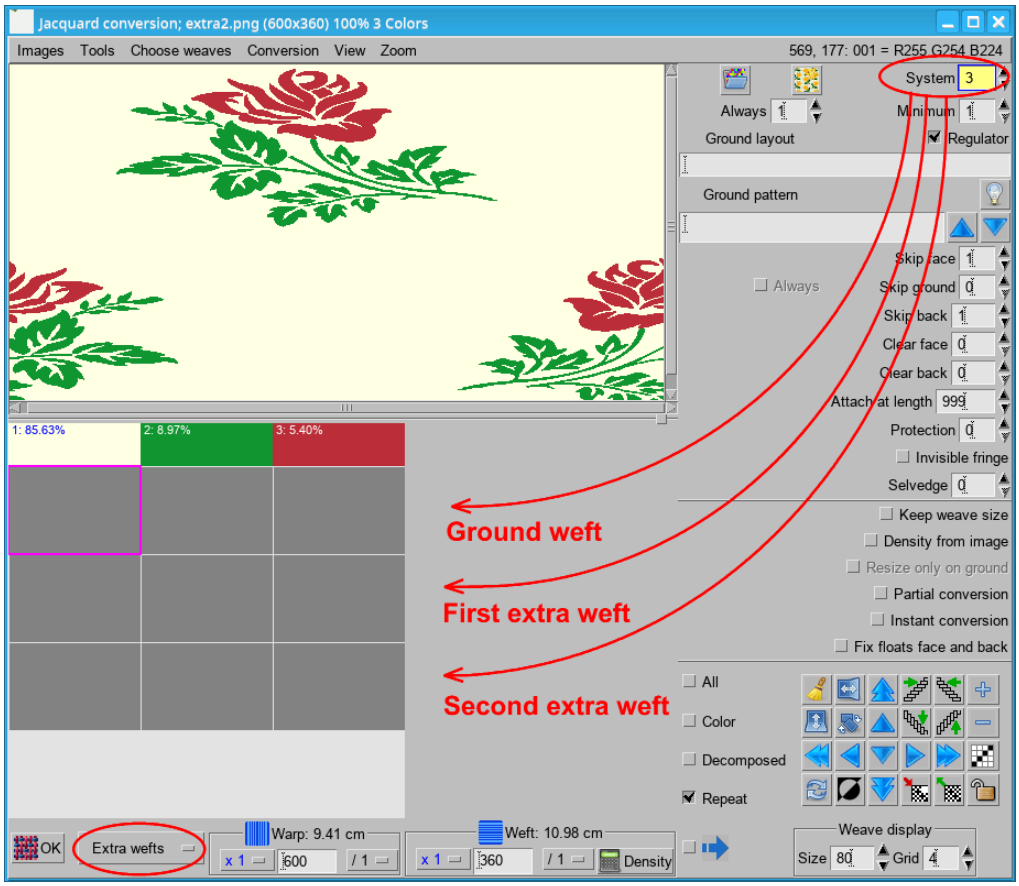



*Figure 267: Jacquard conversion; extra weft mode; system set to 3*

### 9.7.1 Setting the Number of extra wefts

You need to set the number of weft systems in the fabric. For instance, a ground weft plus two extra wefts means a system of three. The system field is in the upper right corner of the Jacquard conversion window (see Figure 267).

### 9.7.2 Loading weaves into Extra weft jacquard conversion

After you have set the System number, you have to load weaves. Every color in the picture requires **System's** number of weaves. The weave area of the **Jacquard conversion** window is divided into Number of colors by Number of wefts (system) fields. There is also one additional weave row, which shows the combination weave for every color. Figure 268 shows the weave display area from Figure 267; you have to load three weaves (because we set **System** (number of layers to 3) for every color in the image – one weave for every weft.

To load a weave into weave area, select it with left mouse click, and load a weave from the file dialog, or from the **Browse** window.

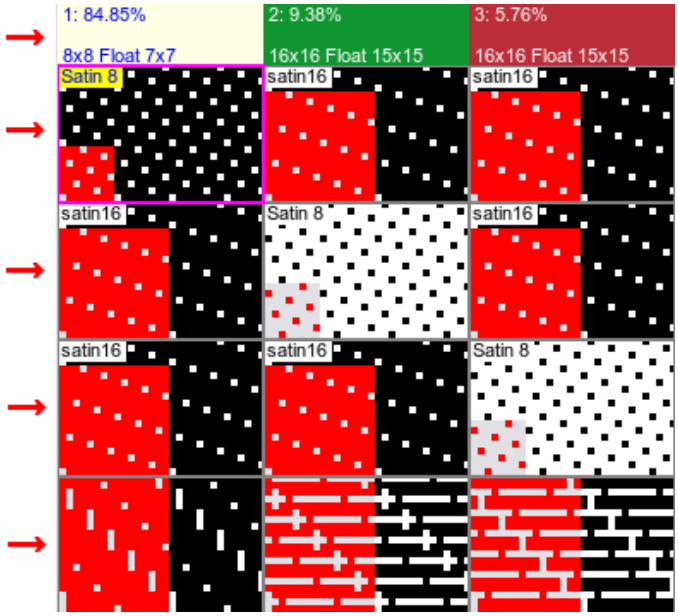



*Figure 268: Extra weft weaves*

After you load all the weaves, click **OK** and you will get the full jacquard weave.

### 9.7.3 Weft pattern of extra weft design

The program automatically writes the weft pattern according to the arrangement of colors in the jacquard design image. The ground weft gets the letter a, the first extra gets the letter b, and so on.

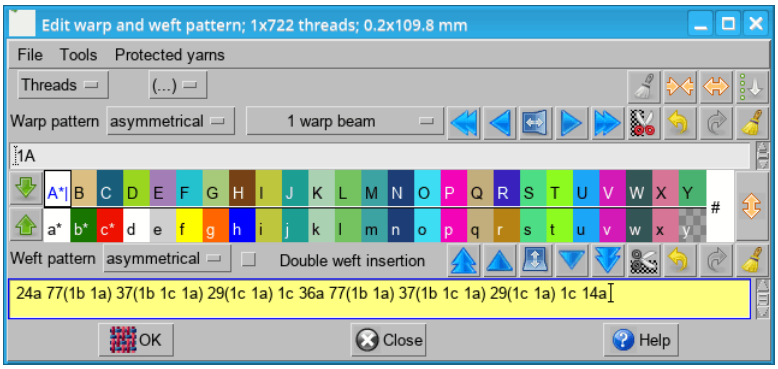



*Figure 269: Automatically generated weft pattern*

If you want to use other yarns instead of those determined by the program, follow the procedure described in Chapter 9.8.1.

*Sometimes you change the weft pattern after Jacquard conversion. If you repeat conversion for some reason, for instance you want to change one of the weaves, the program overwrites your old weft pattern. To get it back just click two times the undo icon*  *in the weft section of the Edit warp and weft pattern window. Or use a function explained in Chapter 9.7.6.*

### 9.7.4 Density of the extra weft fabric

The program automatically puts the stop-regulator points on the appropriate wefts or—if you decide so—writes a variable weft density pattern. By default, the program writes the regulator pattern. If you want to use the loom variable weft density as a method of creation of different densities across the fabric length, uncheck the **Regulator** check box in the Jacquard conversion window.

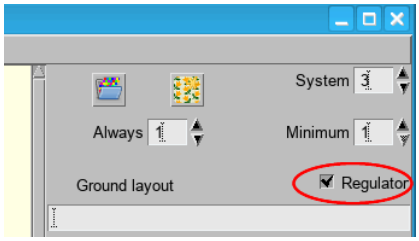



*Figure 270: The regulator check box in the Jacquard conversion window*

The following two figures show the same design, but we have used a regulator to vary the density of the figuring weft area in the first figure, and the Variable weft density in the second figure. The woven design should be the same in both cases regardless of technology we have used to produce it.

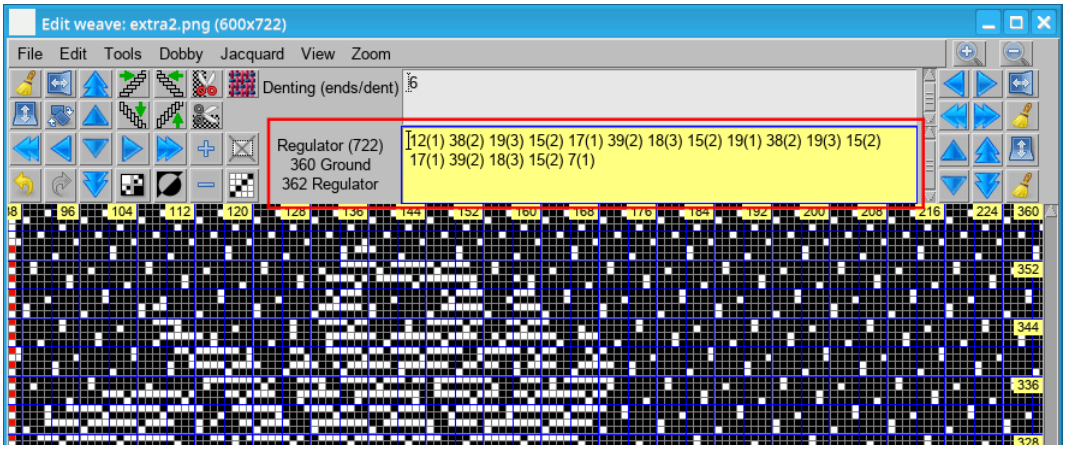



*Figure 271: The regulator pattern, generated by Jacquard conversion*

When we use the variable weft density, we need to enter the density in threads/cm (or inch) for each density we use. There are three densities in sample in Figure 272: the first density is for weaving with ground weft only, the second one is used for weaving of ground weft and one extra weft, and the third one is used when all three wefts are used.

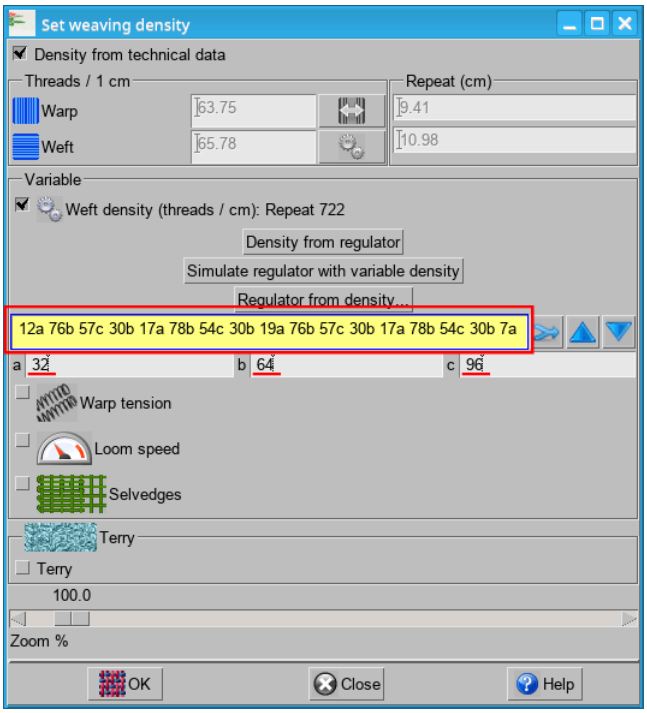



*Figure 272: The variable weft density, generated by Jacquard conversion*

To display simulation of extra weft design, the **Density from technical data** in the **Density** window or in the **Consumption** window should be enabled (number of threads in fabric width, reed number, reed width, and denting should be correct, otherwise the simulation will be wrong!).

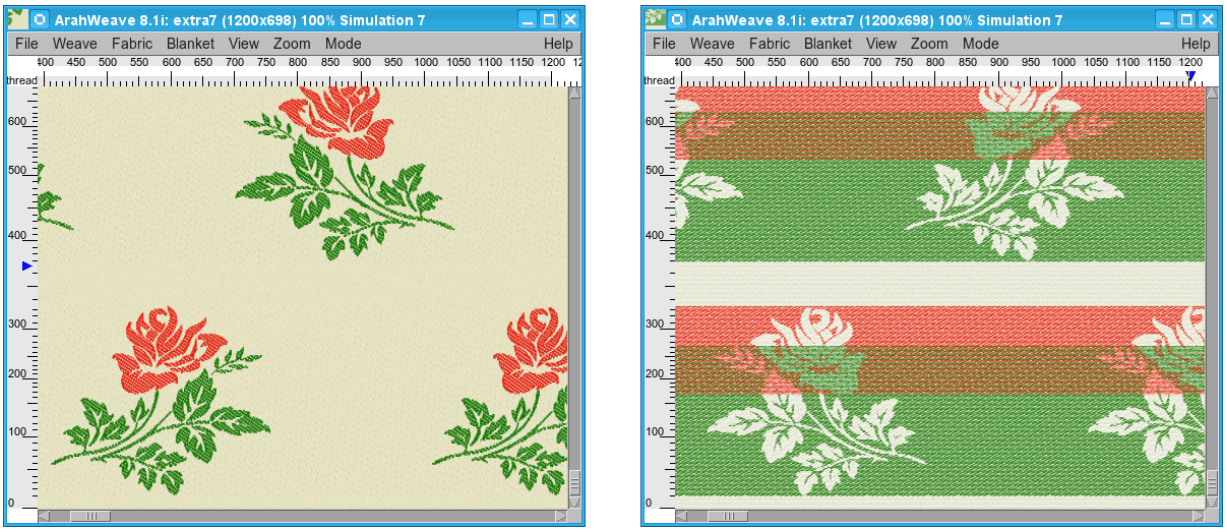



*Figure 273: Simulation on face and back of the fabric*

## 9.7.5 Parameters of extra weft conversion

There are ten new parameters on the right side of the window, which enable you to control and get desired result:

1. **System**: means the number of layers – in most cases it is a ground plus number of extra wefts.
2. **Always**: this parameter tells the program how many wefts you want to have in a ground fabric. For instance, if you set the Always parameter to 3, the program takes the first, second and third weft to form a ground. So the second and third weft (which are extra wefts by their function) are used also to form a ground fabric. If the **Always** parameter is set to the same number as the **System** parameter, then the program sets the regulator to 1 (it means no regulator at all).
3. **Minimum** works a little different than **Always**; while Always means the number of wefts used in ground fabric, the **Minimum** option declares number of wefts (ground +extra) in one insertion, so the number of ground wefts may vary (depends on the number of extra wefts in one insertion).
4. **Ground layout** is a powerful feature for setting different densities (number) of wefts in each layer. If the field is empty, than program takes simple order of wefts, like *ground weft*, *1st extra weft*, *2nd extra weft*, *ground weft*, *1st extra weft*, *2nd extra weft* and so on (as it is a default, you don't need to write it in the **Ground layout** field; empty field simply means the layout of 1234..). Figure 274 shows ground and two extra wefts in simple order 123 (*ground weft*, *1st extra weft*, *2nd extra weft)*, and more complex **ground layout**, written as 1213, where 1 means ground, 2 and 3 are extra wefts (so order is *ground weft*, *1st extra weft*, *ground weft*,*2nd extra weft*).

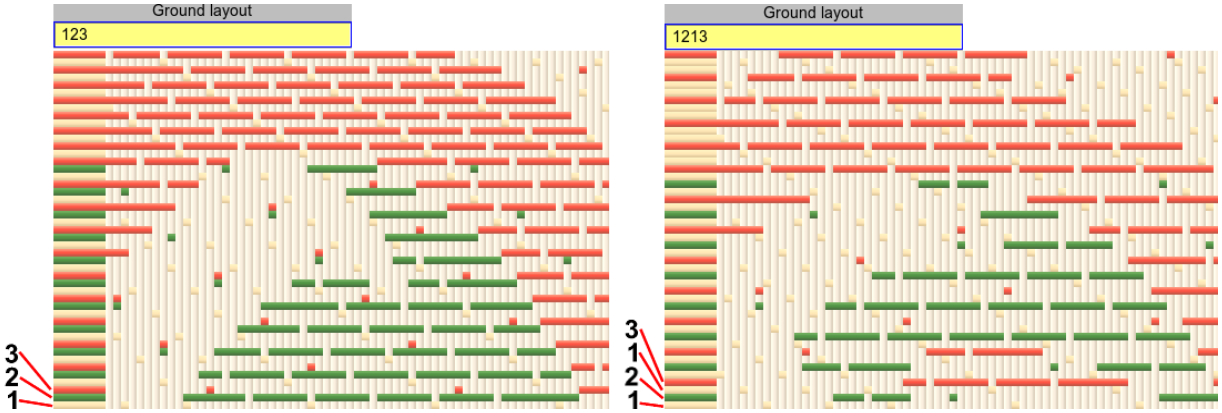



*Figure 274: Simple ground layer, and two ground wefts per layer (ground weft is yellow)*

*Ground layout can also be written with repeats and parenthesis (similar as thread pattern), to allow extremely complex irregular extra weft insertion.*

5. **Ground pattern**: by default, the program puts the weft yarn **a** in the weft pattern as a ground weft. But if you write a custom ground pattern, then the program will use it instead of the default one.

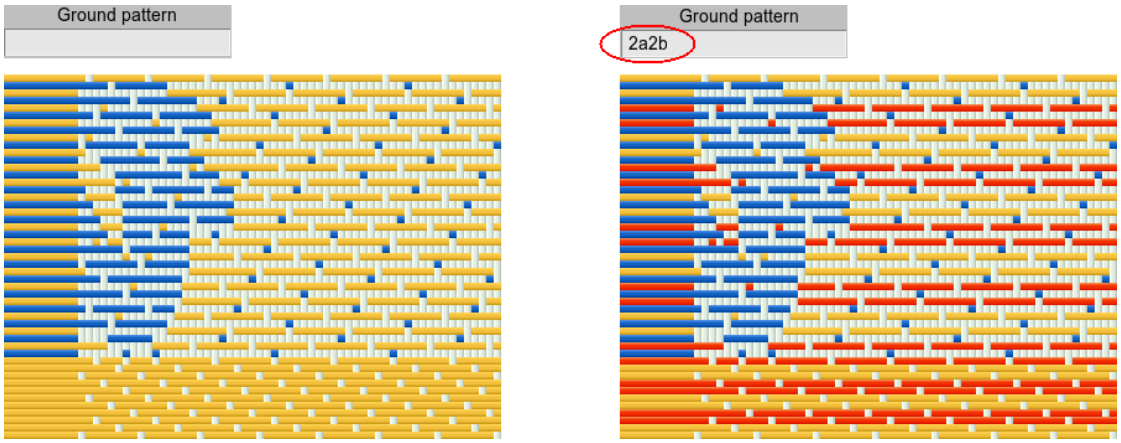



*Figure 275: Fabric on the left uses default ground pattern, repeating yellow weft a; fabric on the right uses a pattern of 2a2b for the ground weft; in both cases the extra weft is the blue one.*

6. **Skip face**: to achieve smooth borders, define the shortest distance between the closest binding point and the border of the extra weft effect. If Skip face is set to 3, the closest binding point will be three points away from the border.
   *By default, this feature works also on the ground weft on areas, where it is on the face of the fabric. If this is undesirable, mark the weft-effect weave of the ground weft with a letter "Z", which leaves the weave as it is, without applying any of the smart extra weft parameters (skip face, skip ground, ...). For detailed description with images, see Chapter 9.8.2.*
7. **Skip ground**: same as skip face, just it works on ground weft. It has the additional option **Always** (it is a button next to the Skip ground field)– if it is enabled, then the function works between all wefts; if it is disabled, it works just between extra wefts.
8. **Skip back:** same as skip face, just that it works on extra weft backside weaves.

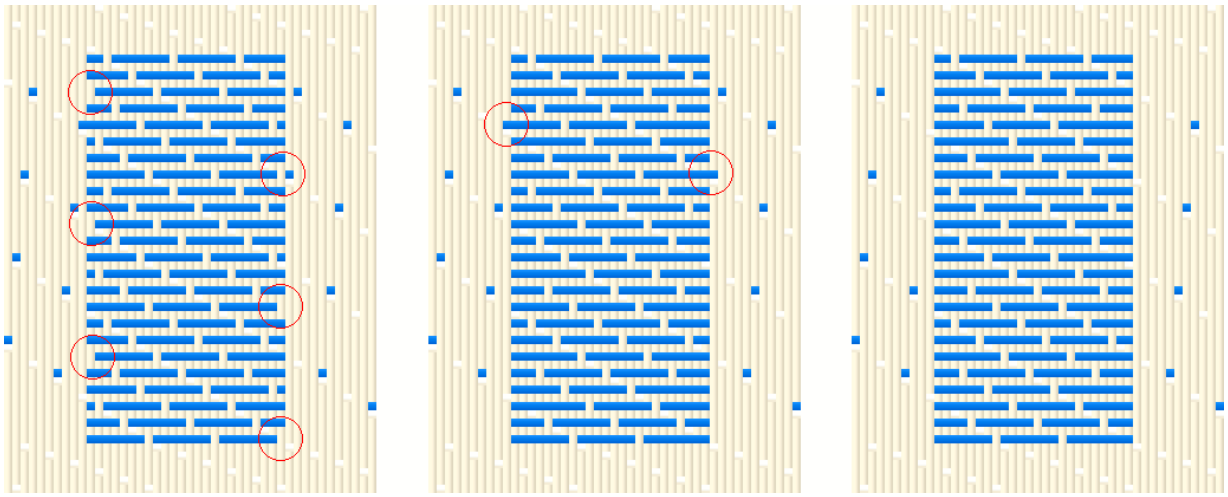


*Figure 276: Rectangular motif, made by extra weft conversion; the image at the left shows motif made with all parameters set to 0; "errors" at the edge are circled in red; the image in the middle uses Skip face set to 2, and one at the right was made with Skip face 2, Skip back 2*

9. **Clear face**: It doesn't put any binding point if the length of weft passage on the face is shorter than the declared **Clear face** value. If it is longer than the value number, then the program does nothing.
10. **Clear back**: It doesn't put any binding point if the length of weft passage on the back is shorter than the declared **Clear back** value. If it is longer than the value number, then the program does nothing.
11. **Attach at length**: to prevent long floats at the back of the fabric, which sometimes occur due to summing up floats, you can set, what is the maximum long float of extra weft.

12. **Protect**: sometimes it is necessary to continue with a few extra threads, even if they are not needed in the motif formation; they just hold the last threads in the design firmly in their place. Figure 277 shows the same design, made without protection threads, and with three protection threads.

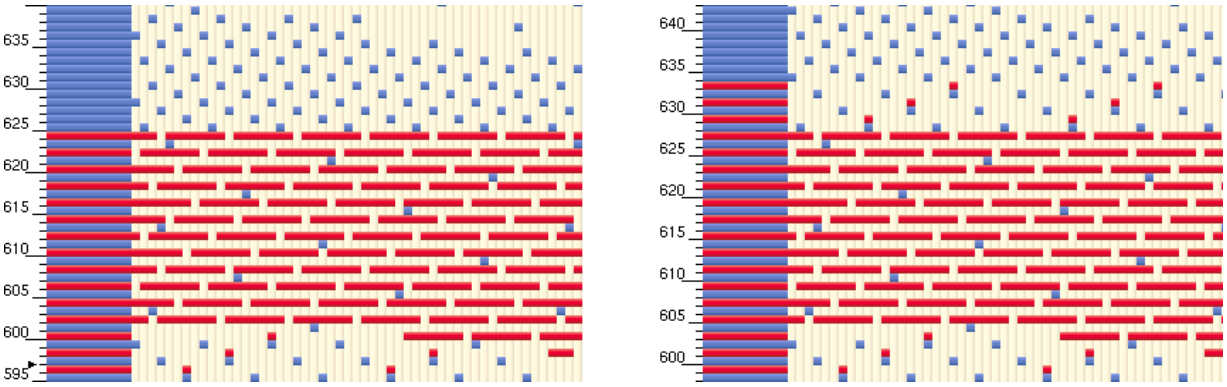



*Figure 277: Protect function in extra wefts*

### 9.7.6 Getting a ground pattern from a modified weft pattern

When you apply an extra weft jacquard conversion, *ArahWeave* writes a weft pattern automatically. If you later modify a weft pattern manually, this change may be lost, if you for some reason, apply a jacquard conversion again. So it is a good practice to store a modified ground weft pattern for future use in the fabric in case you would apply a jacquard conversion again. To do this, click the bulb icon next to the **Ground pattern** title, which extracts a ground pattern from a complex weft pattern, and writes it into the **Ground pattern** field. When you apply a jacquard conversion on that fabric next time, it will use a stored ground pattern, and you will not need to modify it again.

Figure 278 shows a fabric that we got after converting an image into jacquard weave. The weft pattern consists of two weft threads, a light green yarn a, and an extra weft – a dark green yarn b. The pattern is quite simple and was written automatically by jacquard conversion.

*Figure 278: After converting an image into jacquard weave*

Now we manually, or by drawing or typing, modify the pattern. We got the fabric, displayed on Figure 279. In some areas, the ground weft a was replaced with weft c and weft d.

If we need to change a weave for a particular color in the image and apply the jacquard conversion again, we will lose the thread pattern that we have just edited, because the jacquard conversion's automatically generated pattern will overwrite it. But there is a tool, which prevents this. After you have modified the weft pattern, store it in the jacquard conversion window: click the bulb icon next to the **Ground pattern** title, which extracts a ground pattern from a complex weft pattern, and writes it into the **Ground pattern** field. When you apply a jacquard conversion on that fabric next time, it will use a stored ground pattern, and you will not need to modify it again.


*Figure 279: After manual modification of the weft pattern*

## 9.8 Advanced extra weft conversion control with yarn letters

### 9.8.1 Define yarns in Jacquard conversion window

By default *ArahWeave* takes the first weft yarns from **Edit warp and weft pattern** to write weft pattern; if your **System** is 3, it will use yarns **a**, **b**, and **c**. If you want to use different yarn, just select the extra weft weave field in the **Jacquard conversion** window, and press the desired yarn letter on a keyboard. A small rectangle in that particular yarn color and yarn letter will be drawn in the upper right corner of the extra weft weave. The program will use that yarn instead of the default one. To remove the yarn color letter from the weave selection area, select that area and press the **Escape** key on the keyboard.

This function has a powerful extension. Let's say that you want to have a second line of roses in Figure 273 in different colors, and want to achieve this without time consuming editing. You just need to paint those roses in different colors in the image, and define yarns for these new colors. Figure 280 shows the sample, where the ground weft will be in default color **a**, weft for green color will be **b**, for red color **c**, and for two new colors, orange and blue, will be wefts **d** and **e**.

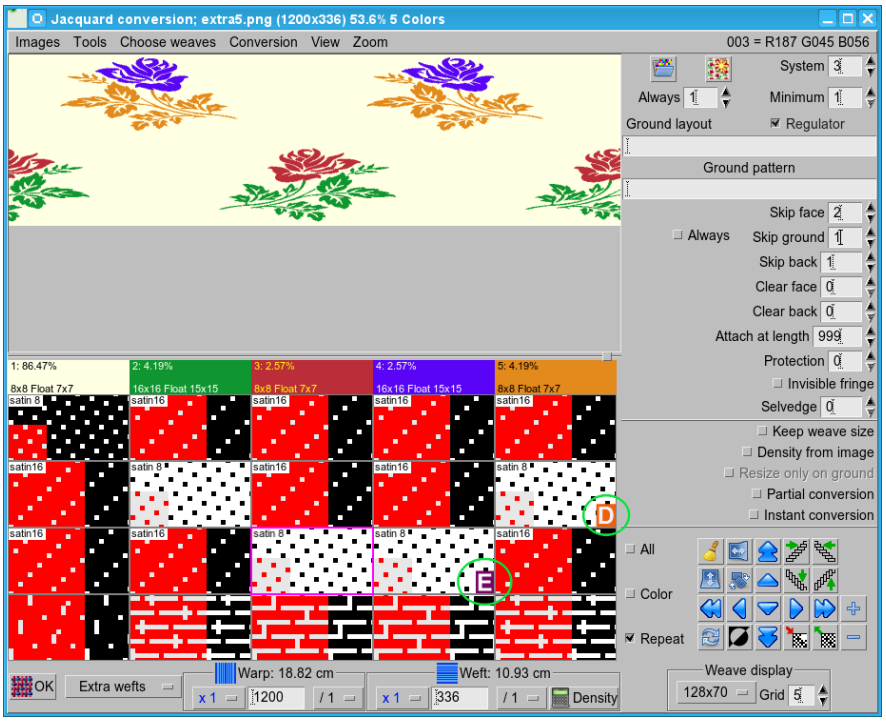



*Figure 280: Defining yarn colors in Jacquard conversion window*

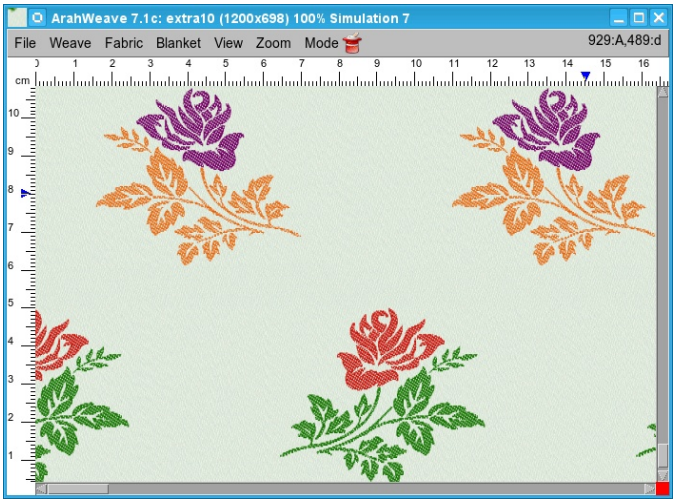



*Figure 281: Simulation with two extra wefts in four colors*

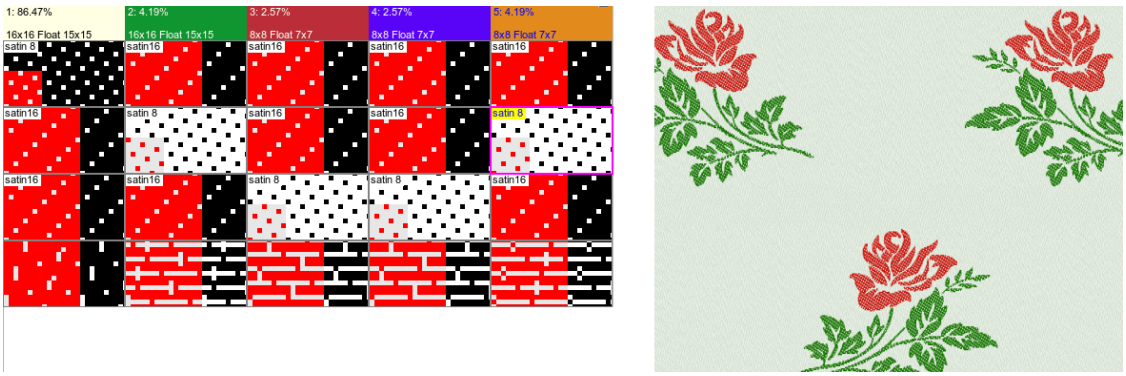


*Figure 282: Same jacquard conversion as on Figure 280 but without yarn letters produces fabric with only two colors in extra weft.*

### 9.8.2 Disabling extra weft conversion parameters (letter Z)

Program applies parameters, which you set for extra wefts (**Skip face**, **Skip ground**...) to all weft effect weaves that you use in the jacquard conversion. But sometimes this is undesirable. To disable the extra weft conversion parameters for particular weft weave, put a letter **Z** in that weave (select a weave area, and press a Z key on the keyboard; to remove the letter from the weave area, select it, and press the Escape key on the keyboard). ArahWeave will leave the weave as it is, without applying any of the extra weft parameters.

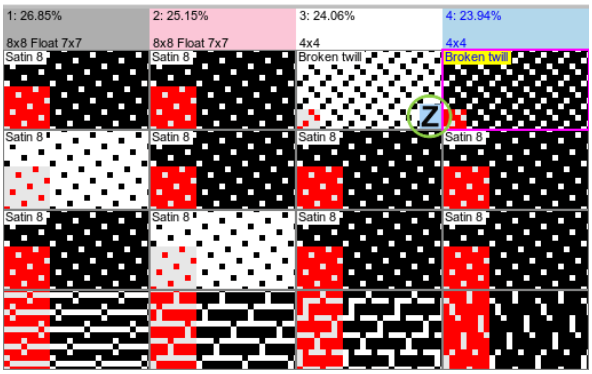



*Figure 283: Letter Z in the ground weft disables the extra weft conversion parameters for that weft in white color region of the image*

### 9.8.3 Extra weft as a warp effect weave

*ArahWeave* writes extra weft pattern based on the weaves, that you define in the **Jacquard conversion** window: the weft effect weave (it has more than 2/3 of "white" points) on the particular color of the image means that you want to have extra weft on that color area. If you need to insert an extra weft, which has only warp effect weave across the whole weft, you have to "tell" to the program that you want to have it even if it doesn't meet Arahweave's standard for extra weft. To do so, specify the weft yarn letter on the warp effect weave, and in this way the weave will be treated as a weave which you want to be present in the jacquard weave as an extra weft. Areas with that weft will not be removed from the final weave. This works both in fil coupe as in extra weft, and is mostly useful for curtain fabrics.

### 9.8.4 Stitching weave as a weft weave (letter Z)

The extra weft is stitched to the ground of fabric in places where it is not required for forming a figure. Normally the stitching weaves are woven in a warp effect (ends up) so that extra weft appears on the back of the fabric. If you use a weft effect weave for stitching weave, the program treats it as an extra weft in that color area, and puts the weft across the whole area, usually the ground of the fabric. But if you want to have it only where it is needed for a designing purpose, mark the stitching extra weft weave in the ground with the letter Z. Now the program knows that you want to have it only where it is needed for designing purpose.

## 9.9 Fil coupé

Literally translated from the French, it means "cut threads". The technique is similar to extra threads, except that extra threads in fil coupe fabric, where they are not in the function of design, are cut off with a special machine. Generally it is a design with extra wefts and some modifications, and back attachment weave is all floats. The main modification is the weave border around the fil coupe weft effect (normally plain weave), which prevents pulling the threads out of the fabric during the cutting process.

Parameters **System**, **Always**, **Ground layout**, **Skip face**, **Skip back**, **Attach at length** have the same meaning as in the Extra weft chapter. Beside **Protection**, which has different meaning than in **Extra weft conversion**, there is new numerical field **Coupe length**, and three option toggle buttons: **Fil coupe on face**, **Protection always**, and **Double**.

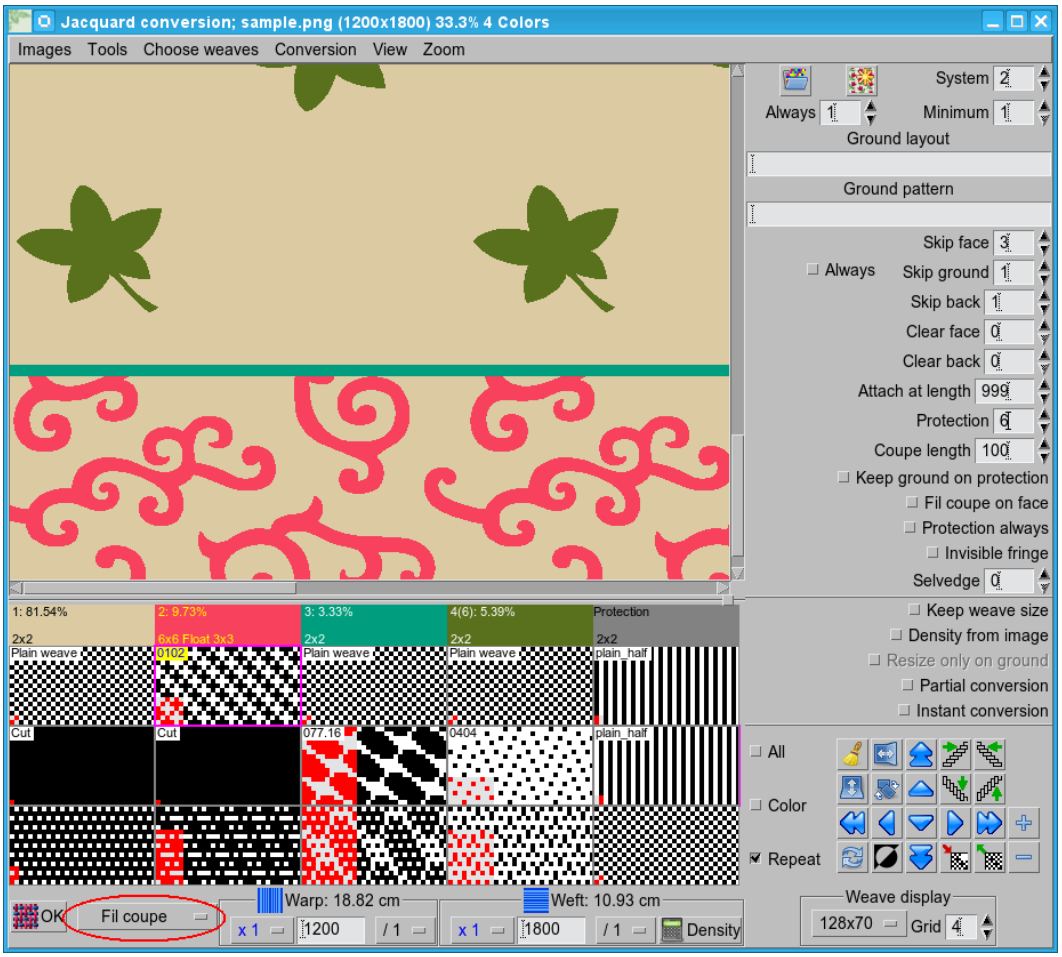



*Figure 284: Fil coupé jacquard conversion*

### 9.9.1 Protection

**Protection** has a different meaning here than in the **Extra weft** conversion: it is the number of points of the border weave, which the program will insert on the left and right side of the extra weft fil coupe effect. Border weave can be specified individually for every weft. The program automatically adds a new color (gray) for protection weave. In the weave display area of the **Jacquard conversion** window the border weave color tab is on the rightmost position (fifth color in Figure 284).

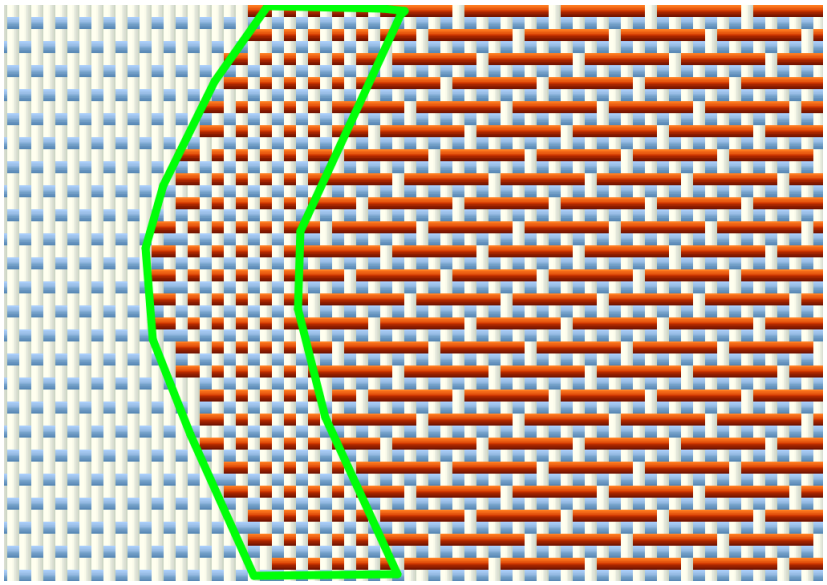


*Figure 285: The green outline indicates the protection weave*

*When you use the weft letters in Jacquard conversion to define the weft yarn for each fil coupe weft, the program adds the protection weave inside the motif if you enter the lowercase letter and outside the motif if you enter the uppercase letter.*
*If you don't want protection on a particular color-weft combination, enter a lower case z into that weave tab in the Jacquard conversion window.*

### 9.9.2 Fil coupé and extra weft in same fabric

If you want fil coupe fabric with some fil coupe threads and others normal extra wefts, put an empty (full weft) weave on protection, and that weft will be treated as a normal, to the ground fabric tied extra weft thread, not as a fil coupe weft.

### 9.9.3 Coupé length

Coupé length means that areas shorter than this length will be attached to the ground, and longer ones will be left floating and later cut off.

### 9.9.4 Fil coupé on face

**Fil coupé on face** enables you to have the long float of the coupé thread on top after jacquard conversion. In this way, the cut-off threads effect will be on the top, together with the weft effect. This is sometimes used for the curtains, or when some funky designers like fil coupé effect and want it on top. The side effect of fil coupé on top is that the **Attach at length** parameter is ignored, since the program would otherwise stitch the fil coupé threads to the fabric at the middle of the float.

### 9.9.5 Protection always

It means that the program will put protection weave on all borders, even there, where technically speaking it is not necessary (on threads, which will not be cut due they are too short and are attached to the ground), but design will look more regular.

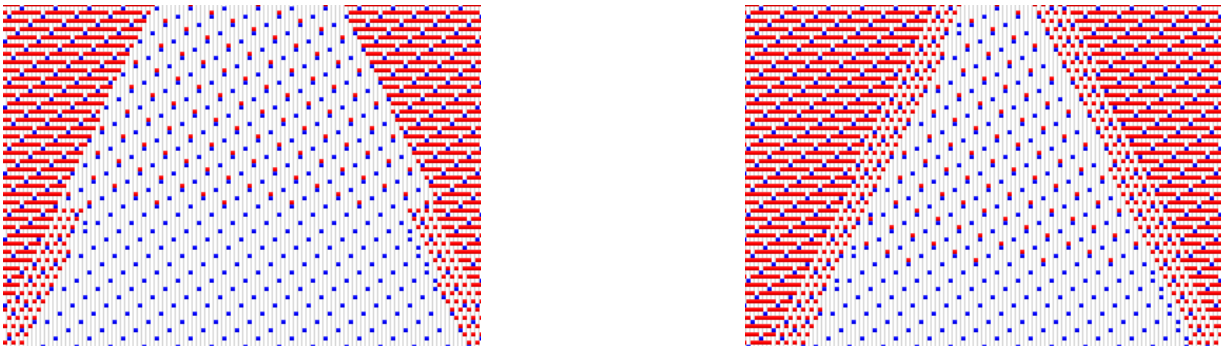


*Figure 286: Fil coupé Protection always – off and on*

### 9.9.6 Double

In the areas, which are too short for cutting, the program automatically inserts attachment weave instead of the full float (Figure 287). But on some fabrics, which need to be extra light, or are partially transparent, this is not desirable, as threads, which are too short to cut, shine through the fabric. In this case, use the **Double** option (to enable this option, the **Protection always** button should be set to on). Program will divide this weft into two wefts, putting some parts of the fabric on one weft, and other parts on another. As a result, all areas are long enough for cutting, so there is no need to attach weft to the back. Obviously, you need even more wefts than on normal fil coupé, so your fabric is more expensive.

Figure 287 shows a fil coupe fabric with normal settings. Inside the circle, where the floats are too short, the program stitched the weft threads to the ground weave. But with the **Double** option, the program divides each weft thread into two threads—one for the left side of the circle, and one for the right side.

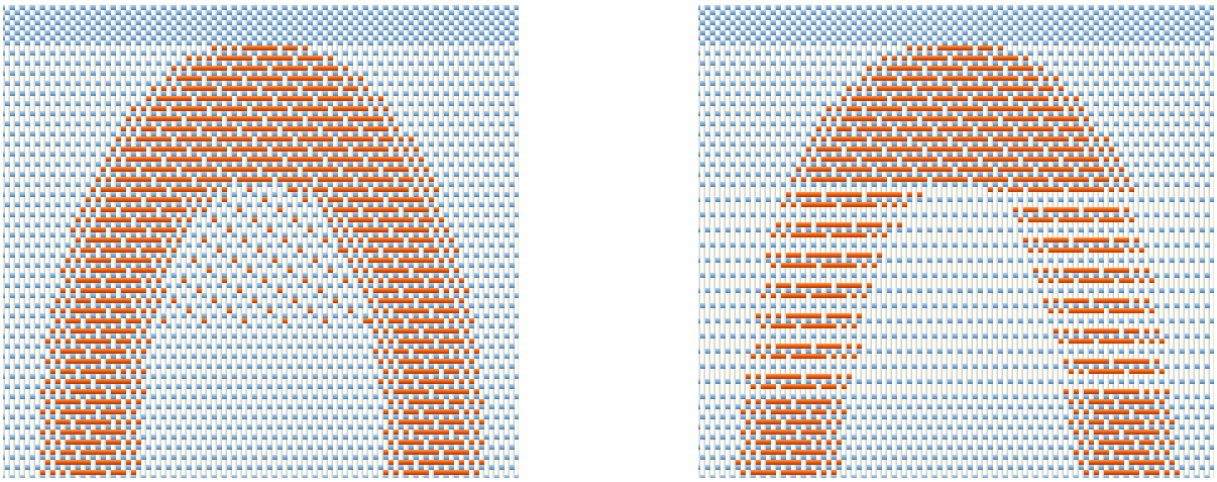


*Figure 287: "Normal" fil coupe, and fabric created with the Double option*

The simulation shows that there is no difference in the shape of motif in finished design, except that all the unnecessary threads were cut in the, made with the **Double** option on.

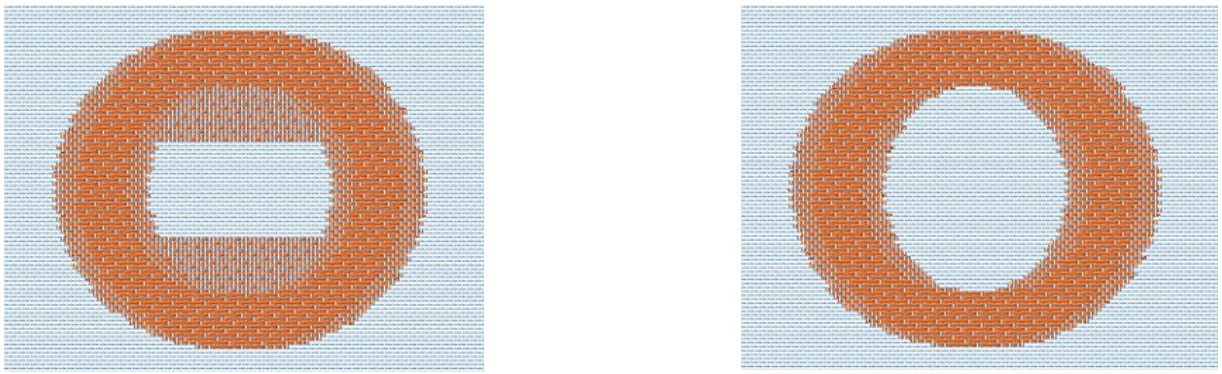


*Figure 288: Fabric simulations of "Normal" fil coupe fabric, and fabric created with the Double option*

### 9.9.7 Fil coupé simulation

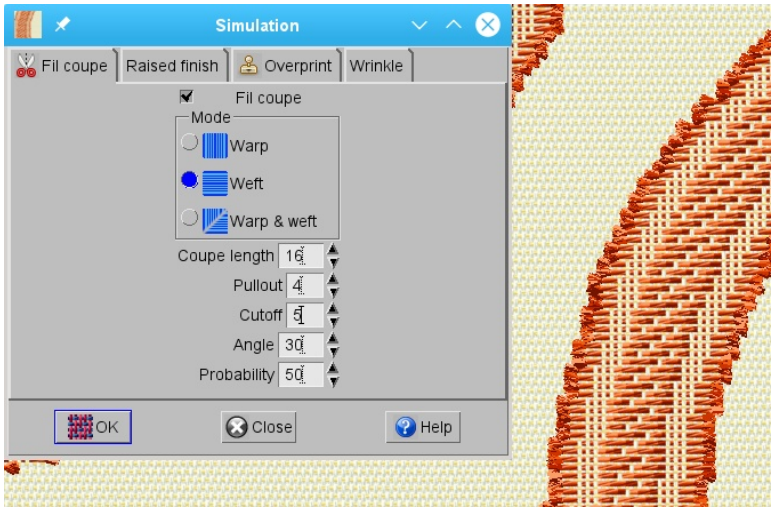



*Figure 289: Fil coupé simulation*

ArahWeave can simulate fil-coupé fabric. In the main ArahWeave window choose **Fabric** > **Simulation**. Select the **Fil coupe** tab, and enable the **Fil coupe** toggle button. The **Pullout** parameter determines length of the thread, which stands out of fabric, after the thread has been cut. You can vary this value between 0 to 60; the unit is a weave point. The **Cutoff** parameter sets the length (from 0 to 30) of hairs coming out of the fil coupé yarn's end. The **Angle** parameters declare at which angle the hairs are coming out of the yarn's end. The Probability option (0-100) sets the amount of hairs; the higher the value is, the hairier look on the edges will be.
*In the Consumption window you can check the difference in weight of the finished (cut-off) fabric with respect to uncut.*

## 9.10 Weave blanket

### 9.10.1 Overview

Sometimes even experience doesn't help to predict what the color, or texture effect of a particular weave on a particular fabric will be. It's been a long time weavers practice to weave a sample fabric, made of different weaves, as a decision making weave selection tool. Each weave section has a name or number woven for a reference.

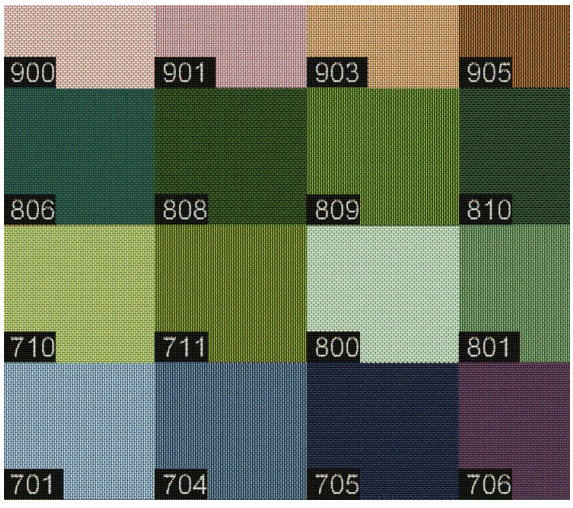



*Figure 290: Weave blanket*

### 9.10.2 Creating Weave blanket

To create a Jacquard weave blanket, load any indexed (8-bits per pixel) image into the **Jacquard conversion** window, and choose **Weave blanket** as a type of conversion.
There are five general settings in the Weave blanket conversion:

- **Filename weaves** Program automatically includes weave file names in each weave section. So, you need to choose a weave for filename letters, and a weave for the file name background. Both weaves should be the same type as the weaves, which will be included in the weave blanket. To load weaves, open **Browse** from the **Choose weaves** menu of the **Jacquard conversion** window. In the **Browse** window navigate to a directory, where the weaves you want to weave are located. Load a weave for background in the first color tab, and a weave for letters in the second one.
- **Number of weaves** You have to decide how many weaves will be included in the Weave blanket. This is done by setting the number of columns in the **Horizontal** field, and the number of rows in the **Vertical** field. Program takes weaves from the current directory displayed in the **Browse weaves** window. If the weaves, which you want to weave, are in separate directories, you have to put them in one directory.
- **Title size** Choose the number of wefts, which will be used for filename in the **Title height** field.
- **Top edge** Enabling it, you add some wefts (doubled title height size), woven with the weave for filename background, creating space for cutting the woven piece off the loom. You can customize this extra space by company name, batch number, whatever, which you type in the field below the **Top edge** box.
- **Weave blanket size** You need to set the number of warp ends (hooks) in the **Warp** field, and the weft threads in the **Weft** field.

Figure 291 shows the example, which has 2400 warps, and 2160 wefts. The weave blanket will have six columns, and twelve rows, so there will be 72 weaves woven in the weave blanket. The size of one weave will be 400 warps (2400:6), and 270 wefts (2160:12). There will be 36 wefts used for filename titles. At the top, there will be the “Made by ArahWeave” title.


*Figure 291: Weave blanket conversion*

Then you need to select the weave in the Browse window, which will be the first weave in the weave blanket fabric (in the bottom left corner).

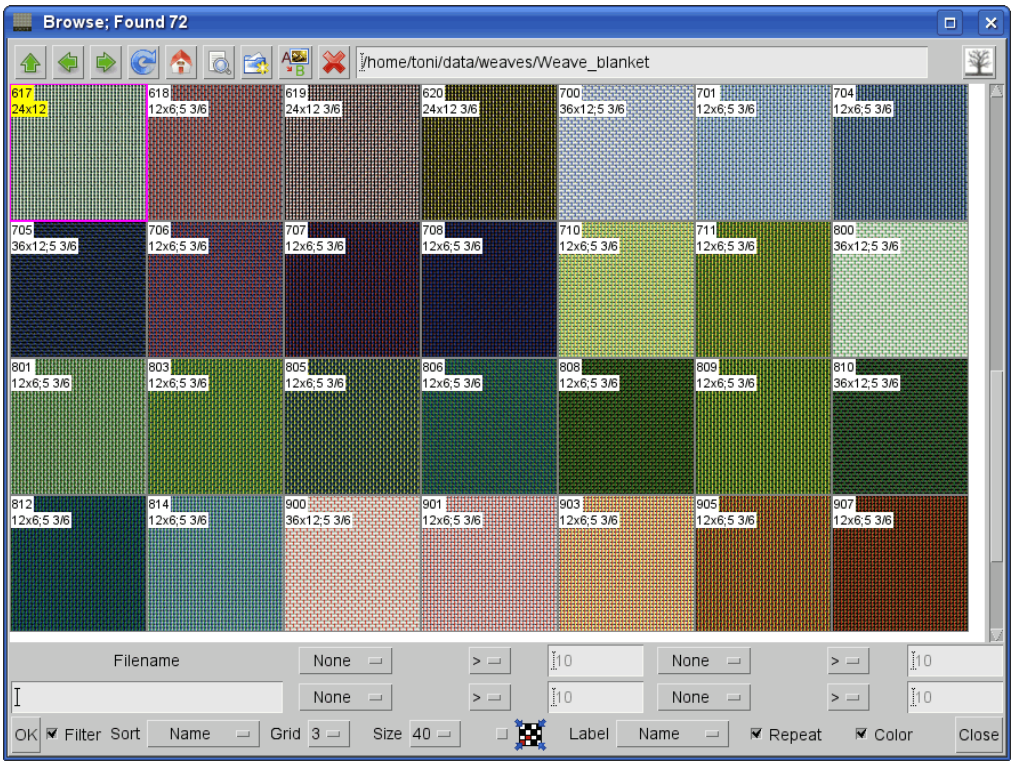



*Figure 292: Weave browser - color view mode*

Then just click **OK** in the Jacquard conversion window, and the program will generate the Jacquard weave according to your specifications. Figure 293 shows the weave blanket simulation. All that remains to be done is to make a Jacquard file for the loom and actually weave it.

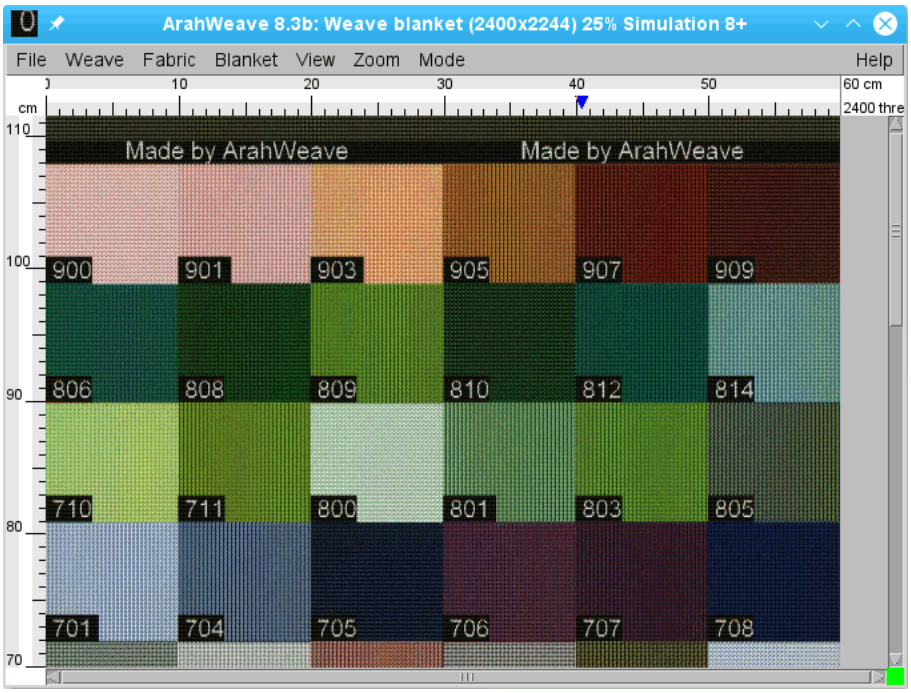



*Figure 293: Weave blanket simulation*

## 9.11 Images menu

The **Jacquard conversion** window has several tools for handling images. They are accessible through the **Images** menu in the **Jacquard conversion** window.

### 9.11.1 Free image

If you do not want to save an image in the fabric file, release the image and weaves from the Jacquard conversion window by choosing **Free image**.

### 9.11.2 Printing image with jacquard weave selection

You can print image with weaves and colors from Jacquard conversion window (usually for documentation purpose). Choose **Images** > **Print picture**. In the print picture dialog box (Figure 294) you have to set the borders and the size of the printout. If you choose the **One repeat** option, the program will fit the image into determined space. Figure 294 shows the Print preview of the image with color and weave selection.

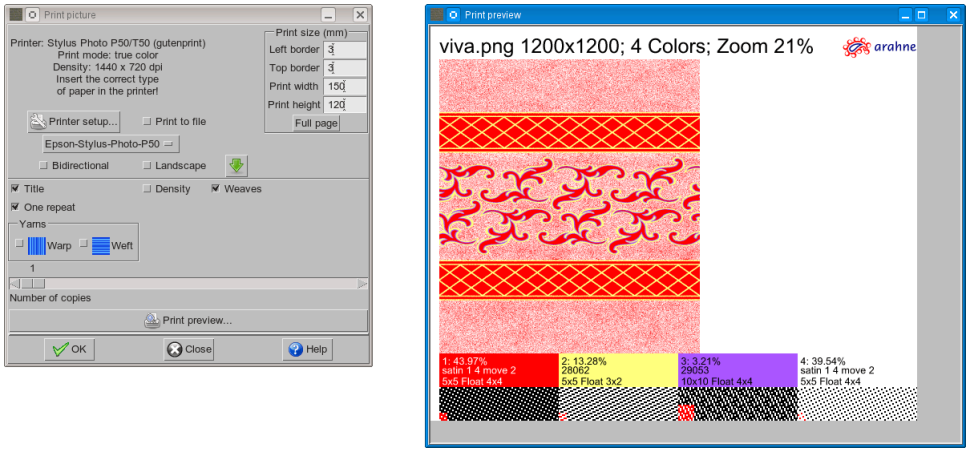



*Figure 294: Print preview from Jacquard conversion*

## 9.12 Tools menu

### 9.12.1 Copy / Paste

You can use copy/paste of images inside one instance of the ArahWeave, or between multiple programs, including ArahPaint. You can also past a weave from the weave editor as an image into Jacquard conversion, and use it as two-color image.

### 9.12.2 Getting warp/weft pattern from image

See chapter 7.17, which describes this feature under warp/weft pattern section.

### 9.12.3 Multi-image convert

As the name suggests, the **Multi image convert** enables conversion of several images into jacquard files within one batch.
Load a template fabric, which has jacquard conversion (image and weaves) already saved in a file. You can use **Multi image convert** with a **Normal** conversion or **Color shading** conversion. If you do **Normal** conversion (palette images – 8-bit per pixel), we advise you to use the same color palette (same colors) in all images, and you should turn on the **Reload jacquard weaves only to equal colors** option in the **Weaving** tab of the **Save setup** window. This option forces the program to load the same weave into the same color, so unwanted weave mapping to similar colors will be avoided. The number of colors in the palette images should not be bigger than the number of colors in the image of initial fabric. Otherwise, the program doesn't know which weave to use for the extra colors, so you receive the error message, and conversion is canceled.
You also need to load the loom layout in the **Save cards for production** window, for the loom on which you plan to weave the jacquard files. Then choose **Tools** > **Multi image covert** from the Jacquard conversion window.

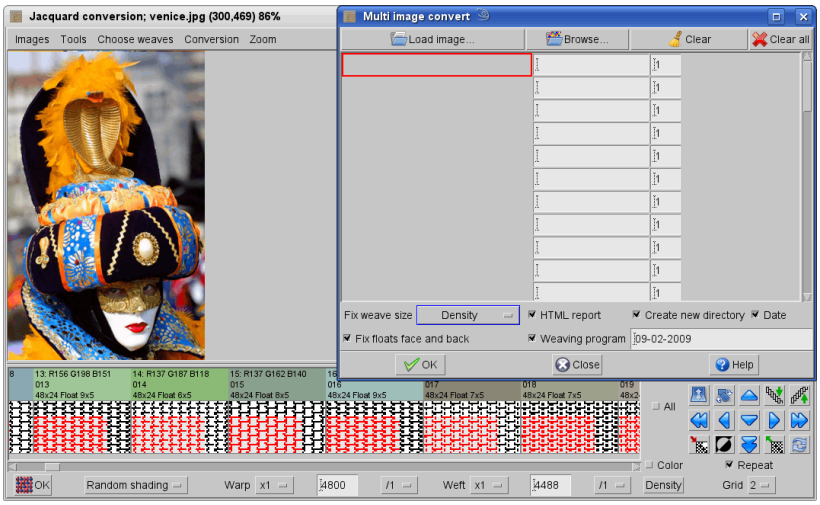



*Figure 295: Jacquard conversion with Multi image convert dialog box*

There are four possibilities of fixing jacquard weave size with respect to image size:

- **None**: program uses image size for jacquard weave size
- **Density**: program sets the weave width to the number of the hooks in the **Warp** field of the Jacquard conversion window, and calculates the number of wefts based on the density of the initial fabric
- **Keep weave size**: program resizes images to match both **Warp** and **Weft** number in the Jacquard conversion window.
- **Multiply**: program will multiply image size with the **System** parameter from the jacquard conversion. This will enable you to use multiple image conversion on different image sizes, as long as they fit on the same loom layout.

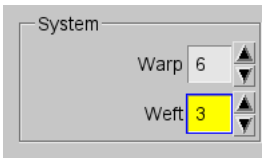



*Figure 296: Setting the Multiply parameter*

The other options are:

- **HTML report**: program creates HTML report with images and fabric simulations, so you can check the result before real production. You can also use it to document your production schedule.
- **Weaving program**: if you use Stäubli JC4, JC5, or JC6, *ArahWeave* can create a weaving program, which specifies the order of weaving, and how many repeats of each design should be woven.
- **Fix floats face and back** fixes long floats based on margins set in the initial fabric before it creates Jacquard files. If the option is on, but the float margins are not set in the **Float** window, the program will cancel the conversion. You can either set the float limits, or to turn off the **Fix floats face and back** option.
- **Create new directory**: *ArahWeave* creates a new directory for storing Jacquard card files, with the name specified in the above field. By default, the program fills this in with the current date.
- **Date** will write today's date in the upper right edge of HTML report
- Use **Browse** or **Load image** to load images into the **Multi image convert** window. You can load up to 50 images. Image loader prevents loading of images, which are not suitable for currently chosen type of conversion – if you use the **Normal** conversion, then you can load only indexed images (8-bits), if you use **Color shading**, you can load true color images. Image filenames are on the left side. The middle text field contains the Jacquard filename. It is automatically filled in from the image name, but you can change it, since sometimes looms do not accept long filenames. If you weave one-piece designs, you can tell the program how many pieces you want to weave, and type this information on the right side of the window. If the image filename is of the form xyz_4.jpg, then the program will automatically fill in a weaving of 4 repeats. To change the number of pieces for weaving you can also point the mouse to the numeric field, and use the wheel of the mouse to change the number. Then click **OK**, and conversion will start.

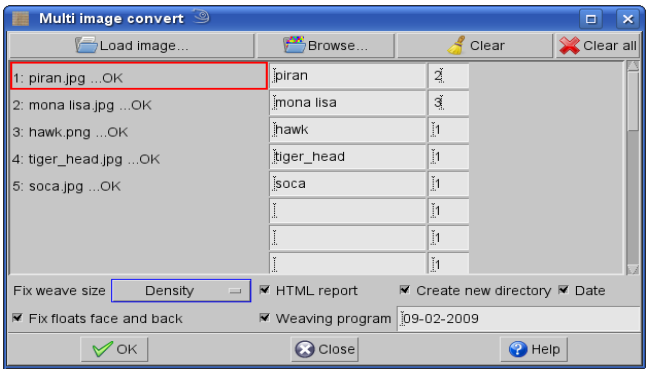



*Figure 297: Images loaded into the Multi image convert dialog box*

- If everything is correct, the program writes OK after every filename, and closes the window. You can observe the progress, as the program is processing the files. The Jacquard files are saved at the location defined in the **Save cards for production** window.

If the HTML report option is on, the default browser opens and displays the report (Figure 298).

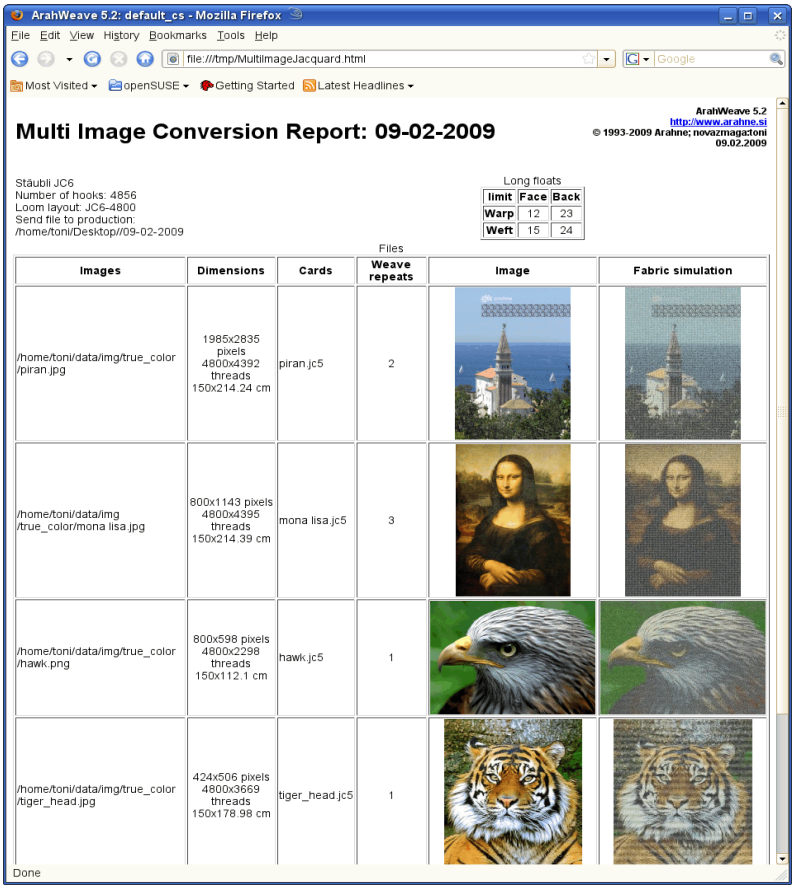



*Figure 298: HTML report of multi image conversion in Firefox browser*

## 9.12.4 Getting image from weave (reverse Jacquard)

The **Get image from weave** function is an extension to Weave editor's **Replace selected weave** (see chapter 4.9). It helps you to get the color image from the Jacquard weave (card image), if you want to use the image for assigning different weaves, or to resize it to different fabric quality. In the main *Arahweave's* window open Weave editor, use the middle mouse button to draw selection in the weave (or use parametric mode **Change** > **Select/copy area**), which you want to replace. Selection must include at least one complete weave repeat. Then choose **Jacquard** > **Replace selected weave**. If your weave replacement mask is satisfactory, click on the **Get image from weave** button in the **Replace selected weave** window. This opens the **Jacquard conversion** window, and puts in the image of the same size as

the Jacquard weave. The mask is replaced by a solid color, while the other weaves remain in black and white.

If you wish, you can select another weave in the weave editor, make a replacement mask by clicking the **OK** button in the **Replace selected weave** window, and then use **Get image from weave** again. Each time you extract a weave into color in this way, the weave is also copied in the weave selection window of the **Jacquard conversion** window.

From the **Jacquard conversion** window, you can save the color image (**Images** > **Save image as**). To get rid of the black and white points from areas, which could not be correctly attributed to one of the weaves (due to complexity of the image, or long float correction), edit the image in *ArahPaint*, and then save it again. It is a good practice to keep the same colors as the one which *ArahWeave* has created in the generation of jacquard color image, so you can reuse the original color to weave assignments. You are, of course, free to change the jacquard image colors, but you will have to reassign the weave afterwards.

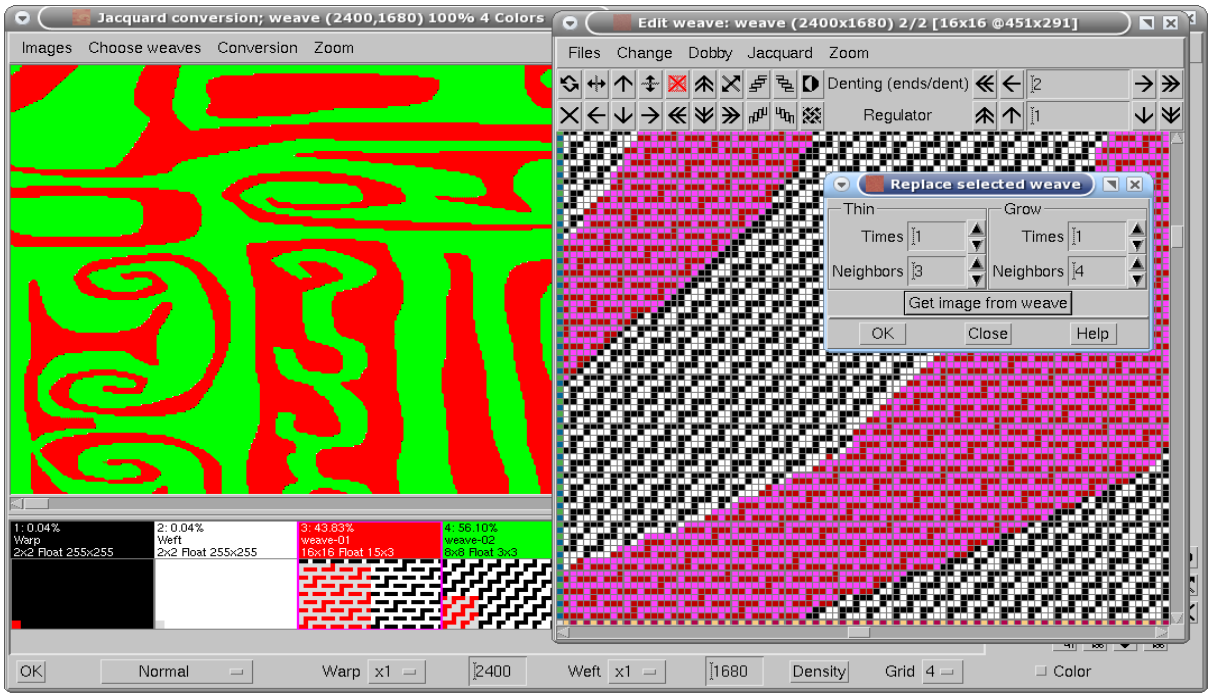



*Figure 299: Get image from weave*

*Note that this function must not be confused with **Guess image from weave** in the **Images** menu of the **Jacquard conversion**. **Guess image from weave** is a function which tries to guess everything in one step – all the weaves, even if they do not have the complete repeat. Probably it tries to accomplish too much, so it does not work well in many cases. Using the combination of **Replace selected weave** and **Get image from weave**, you help the computer identify the individual weave areas and number of weaves, so it gives more accurate results than **Guess image from weave**, but it needs a repeat of all the weaves to work properly. Additional advantage of the **Replace selected weave** approach is that it also correctly handles different weaves, which give the same fabric appearance. **Guess image from weave** works back from the simulation, and is unable to distinguish between those weaves.*

## 9.13 Weave pen in Jacquard conversion

If you middle-click on the fabric in the main ArahWeave window, then the warp (black) point is changed into a weft (white) point and vice versa. But if the Jacquard conversion window is open, then the middle mouse button draws in the fabric with the currently selected weave in the Jacquard conversion window. The size of the drawing area is 3 by 3 points. If you keep the Shift key pressed during drawing, the drawing area size is 5 by 5 points. So you can sign the jacquard fabric, or do fine tuning on weave junctions. But remember that those changes will be lost if you re-apply the jacquard conversion.

You can also use the weave pen to draw with selected weave color directly in the image. You can also do this with the middle mouse button. This is intended only for minor corrections, when you discover some stray spots at the last moment, and do not want to go back to *ArahPaint* to correct them. So you can do this directly in ArahWeave. These changes will be permanent, as they will be saved within the image in the fabric file. So you can re-apply jacquard conversion without losing data.

## 9.14 Loading and saving jacquard conversion

This function from the **Conversions** menu in the Jacquard conversion window enables saving the parameters of jacquard conversion – **association of weave to color, and the type of conversion**.
If you keep one color palette, you can draw many pictures and use the same jacquard conversion on them. During loading of jacquard conversion, the program loads the weaves into the places of the corresponding colors. It can work in two different ways:

1. Default mode: program loads the weaves into the equal colors, or if there are not exactly the same colors, the program maps the weaves to the similar colors.
2. Program loads weaves only to exactly the same colors. If you load the image, which has a different palette (different colors) than the currently loaded Jacquard conversion, then the weave tabs will remain empty (without weaves). To enable this mode, you have to switch on the **Reload jacquard weaves only to equal colors** option (**Save setup** > **Weaving**).

The loading and saving of the parameters of jacquard conversion lost some importance, since *ArahWeave* saves the conversion data and image, from which the jacquard weave is created, in the *ArahWeave* fabric file.

# 10 Weft blanket

## 10.1 Introduction

The weft blanket is a unique *ArahWeave's* tool, which enables the combining of different fabrics into one weaving file. From input fabrics it creates a new fabric by generating variants from yarns and in the fabric length you specify. You can use it as a tool for:

- **Designing**; you can use the **Weft blanket** tool for creating new designs, since you can quickly and easily combine parts of different fabrics into a new design.
- **Sample production**; joining more fabrics into one fabric (weaving) file means that you can produce them all in one step, without stopping a loom to change a weaving file.

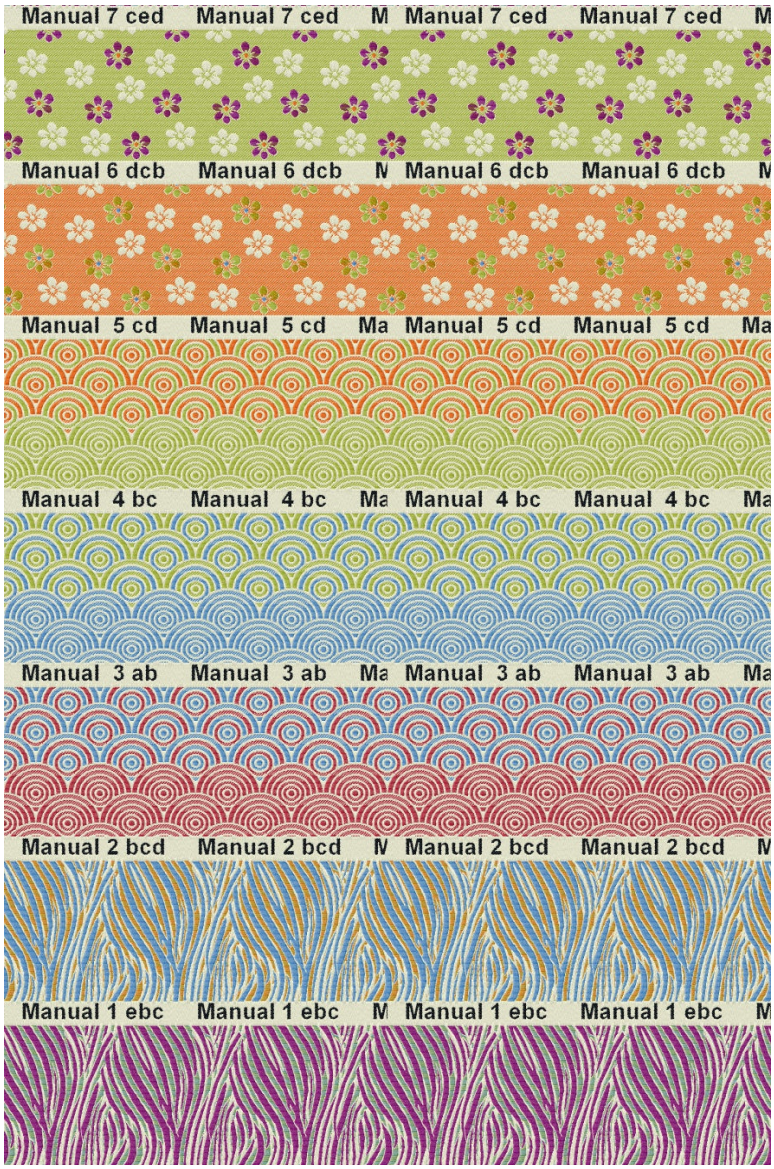



*Figure 300: Weft blanket from three different fabrics; seven variants are generated and woven as a single fabric. Program can add woven title between variants.*

## 10.2 Editing the weft blanket

To open the weft blanket editor, choose **Blanket** > **Weft blanket**.

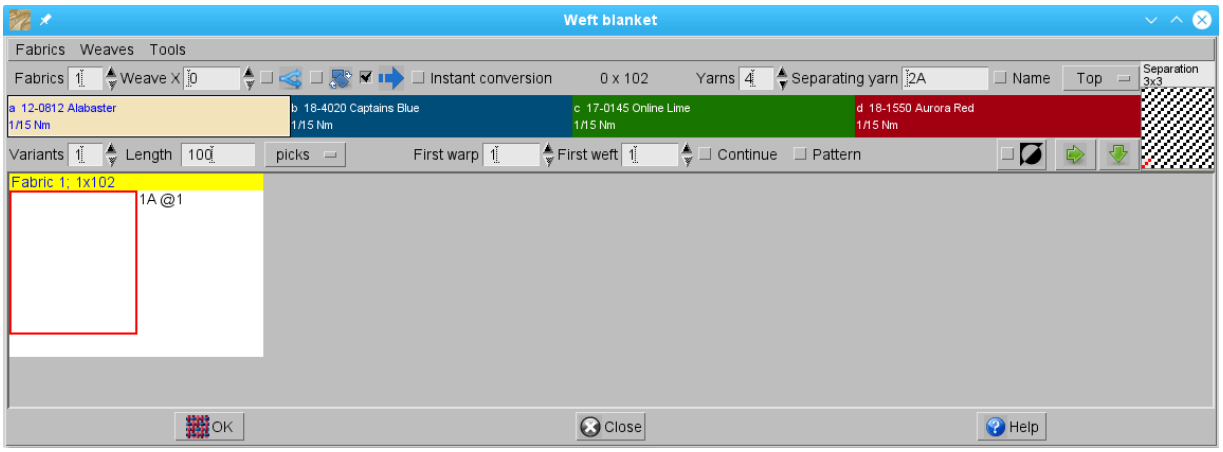



*Figure 301: Weft blanket editor (no fabrics loaded yet; default settings)*

### 10.2.1 General settings

General settings in the **Weft blanket** editor are:

- In the **Fabrics** field, enter the number of fabrics that you want to use for weft blanket creation. To load a fabric into the Weft blanket editor, choose **Fabrics** > **Browse** (or **Load**). Editor displays fabrics, which will form the weft blanket, in the first column of the icon display area; the first fabric is at the bottom of the window. Figure 303 shows three fabrics in the Weft blanket editor.
- **Weave X**: by default, the value is set to 0 (zero). It means that the weft blanket's weave width will have the same width as the wider fabrics in the selection. But if this width is not wide enough (usually if the title writing is too long), you have the possibility to manually declare the width of the blanket weave by setting the number of ends, used for weft blanket creation.
-  The Double option enables splitting of each weft in the weft pattern on two wefts during loading of the fabric. In this way, you can create richer color variations without modifying the fabric you have loaded for weft blanket creation.
-  It enables the 90-degrees rotation of the fabric during loading in a weft blanket. In this way, you can exchange warp and weft in sampling, to avoid preparing complicated warps just for sampling.
-  If enabled, the selected fabric input field jumps to the next one, as you load a fabric into the currently selected field. By default it is on, but you can change it and save the setup according to your desires.
-  To apply the changes without clicking the **OK** button, mark the **Instant conversion** box.
- In the **Yarns** field, enter the number of yarns that you will use in the blanket. We use 4 different weft yarns in the blanket in Figure 302.
- In the **Separating yarn** field, enter the yarn pattern (usually only one color) of the border between versions (*leave it empty, if you don't want to have a border*). Twill is the default weave for a border, but you can change it – choose **Weaves** > **Browse** from the menu bar, and load a new weave into the **Separation** field.
- **Name** – mark the toggle button, if you want to have a woven title – file name or custom text and used weft yarns – in the border between sections. For this, you would need at least 2 centimeters or 1 inch of the separating area. You can also change the weave for fabric's file name letters; load it into the **Title weave** area (double click opens the weave browser; you can also use *ArahWeave* keyboard shortcuts for entering weaves).
-  You choose the position of the woven name with the top/bottom button.

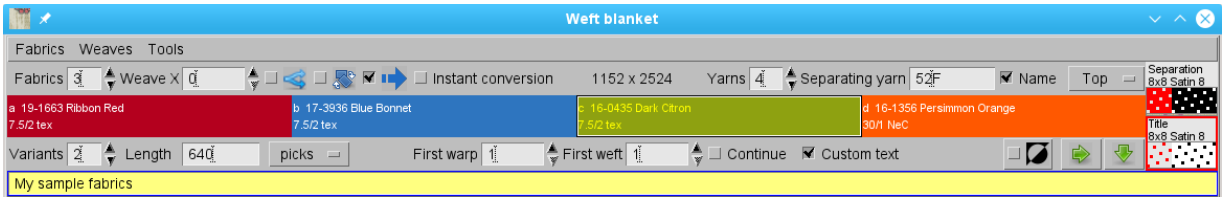



*Figure 302: General settings and the fabric specific settings in the Weft blanket editor*

### 10.2.2 Fabric specific settings

Fabric specific settings are:

- In the **Variants** field, enter the number of variants that you will weave for specific fabric. Each fabric may have its own number of variants. In Figure 303, the first fabric has three versions, the second has four variants, and the third one has two variants. Variants' icons are created automatically. The first variant of the first fabric is marked **1A**, next is **1B**, and **1C**. The starting weft of each variant is

written next to thename (**2C @3441** means the third variant of the second fabric starts at weft **3461**).

To change yarn, left-click the yarn tab, and copy it by right-clicking to the desired place.

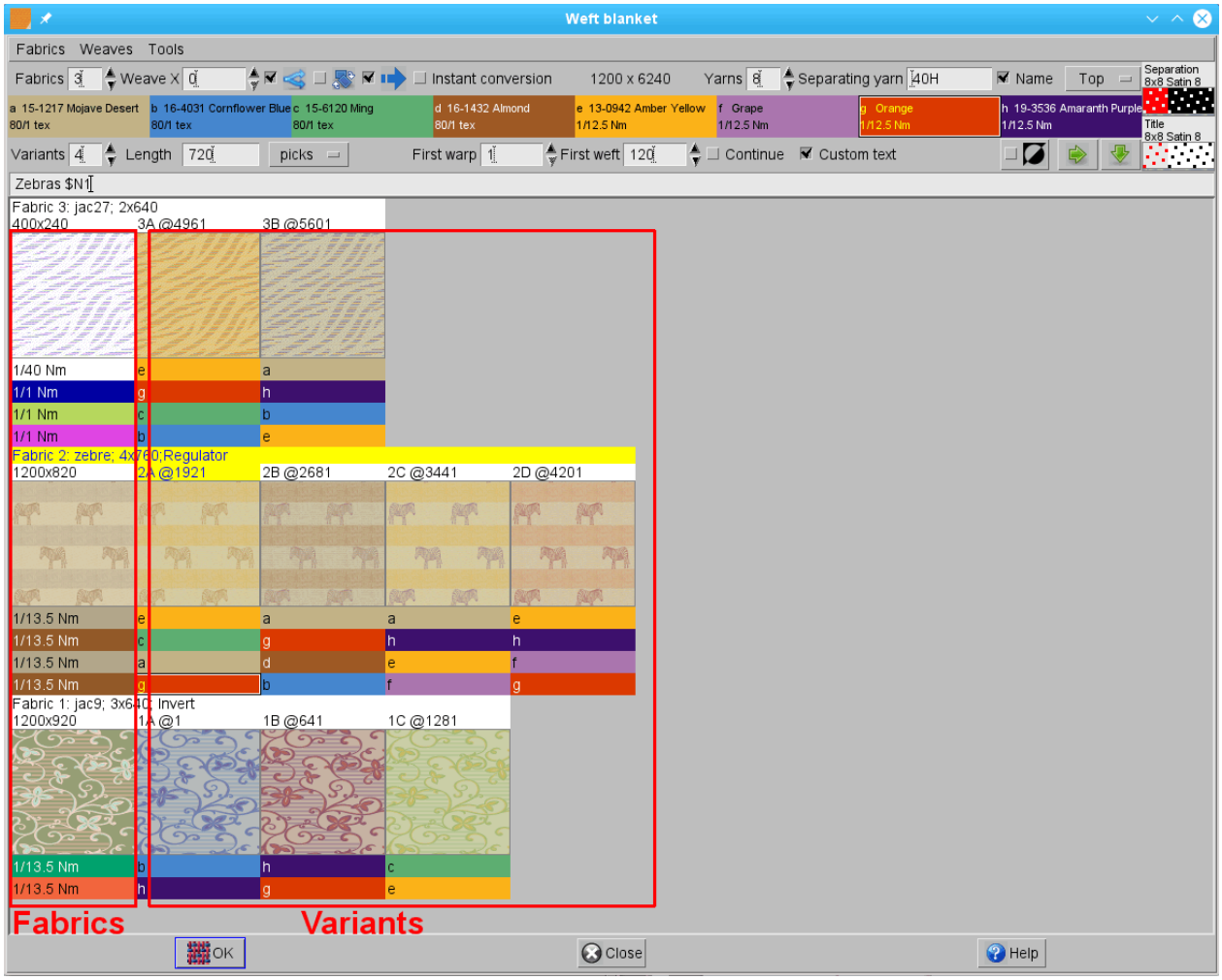



*Figure 303: Weft blanket editor with loaded fabrics and variants, which are generated from the input fabrics and specified weft yarns. The fabrics icons are displayed in the first column and the variants' icons are placed next to them.*

- In the **Length** field set the woven length for each version. The length unit can be: inch, centimeter, meters, number of picks, number of repeats. Variants of the same fabric have the same length.
- You can change the starting point of the version by changing **First warp**, or **First weft**. This is very handy for shawls, if you have several shawls which you want to compose in a new one, where you pick different areas of different designs to be put together in a new design.
- Switch on the **Continue** toggle button, if you would like to continue weaving of the next color variant from the last woven weft of the previous variant. In this way, if the design is a large jacquard motif, you can show both the complete motif and all the color variations, all in one small sample.
- If you want to mirror the original fabric, click  to mirror horizontally, or  to mirror it vertically. It is very useful for creation of symmetric shawls, using the previously saved partial fabrics.
- If you want to invert the fabric to weave it with a face down (usually fil coupe fabrics), there you have the Invert button  . *Program remembers the state of invert and mirror buttons, and it is saved in the blanket file.*
- If you enable the **Custom text** button, you can enter text in the text field below the setting area. This text will be woven in the separating area between two variants. There are few additional functions, which add naming and numbering to the title:

**$G**: It adds the filename of main fabric (a fabric, which is used as a “template” on which the weft blanket is created.
**$F**: It adds the filename of a component fabric.
**$N**: Type $N001 to the custom text to have the auto-incremented number for variants inside one component fabric. For example, if you enter $N01, the program will insert 01 for the first variant, 02 for second, and so on.
**$M**: Type $M001 to the custom text to have the auto-incremented number for all variants.

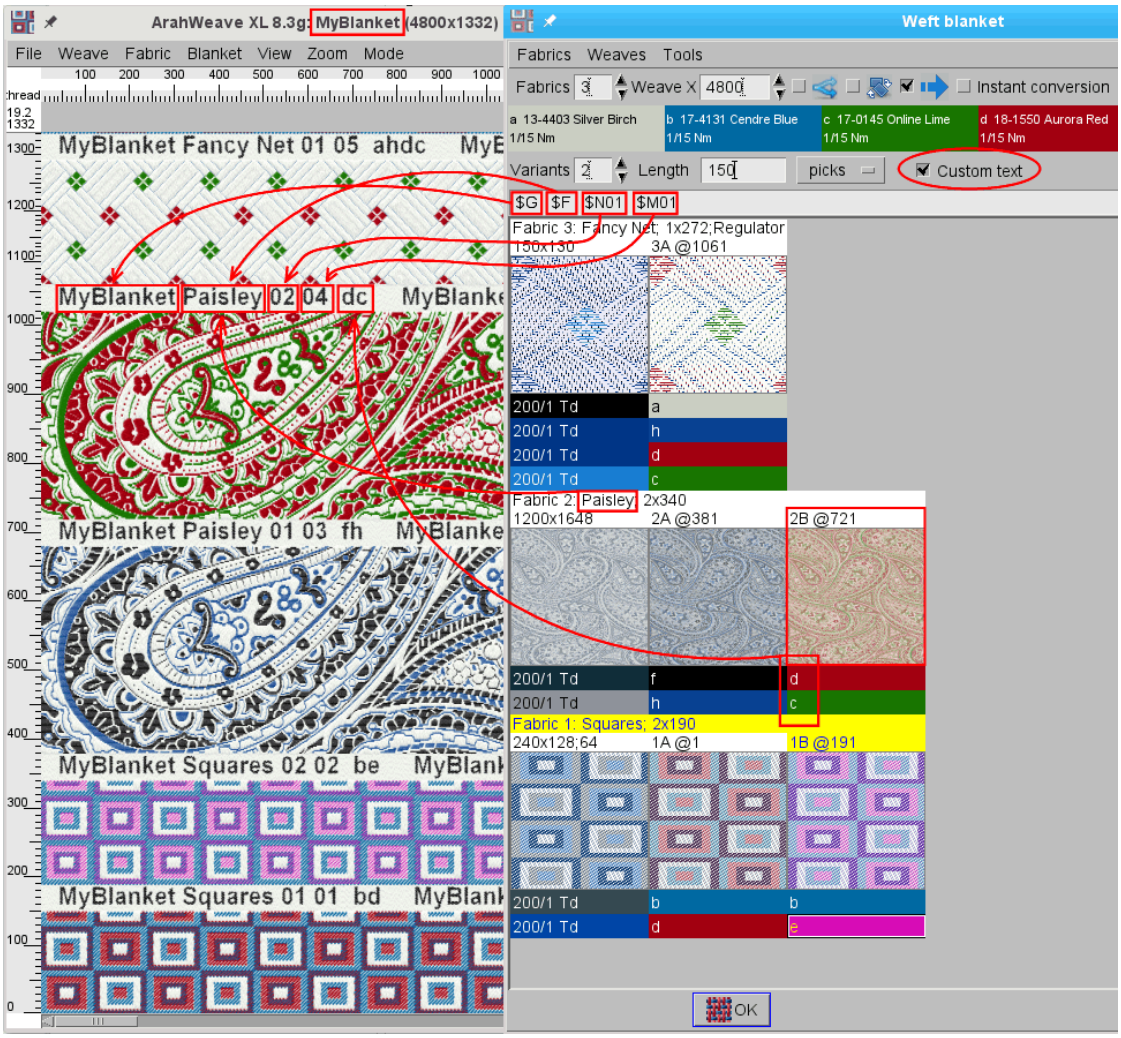



*Figure 304: Automatically generated text from the fabric filename, the component fabric filename, the variant number, the general variant number and used yarns: $G $F $N01 $M01. In this way, the samples passed to the customers do not need a written tag, which may detach or get mixed up. Customer can read the woven header and you know exactly which design and color variant they have ordered.*

### 10.2.3 Weft blanket as a design tool

Weft blanket editor is also a distinct and powerful design tool, and some of its settings make combining multiple designs into a single new design a quick and easy process. This tool is typically used when you need to combine several fabrics that are quite different in nature, such as terry border, terry top/bottom selvedge, and terry ground design. The main advantage of the weft blanket tool is the ease with which sections can be changed after the design has been created. Because of complex weaves, yarns, and finishing, it is common to create a complex fabric whose final length cannot be fully predicted during the design phase. So you must weave a sample, finish it, and then decide whether to lengthen or shorten specific areas based on the customer's desired length.

- You can change the starting point of the version by changing **First warp**, or **First weft**. This is very handy for shawls, if you have several shawls which you want to compose in a new one, where you pick different areas of different designs to be put together in a new design.

- Switch on the **Continue** toggle button, if you would like to continue weaving of the next color variant from the last woven weft of the previous variant. In this way, if the design is a large jacquard motif, you can show both the complete motif and all the color variations, all in one small sample.
- If you want to mirror the original fabric, click  to mirror horizontally, or  to mirror it vertically. It is very useful for creation of symmetric shawls, using the previously saved partial fabrics.
- The **Pattern** option lets you write the weft blanket as a weft pattern, of two or more fabrics. It is useful, when you have the same fabric, repeated at different places in the weft blanket, and you would need to load it into the weft blanket editor as many times as fabric occurs in the weft blanket. Figure 305 shows a weft blanket, which is made of two fabrics. In the "normal" editing mode, you would need to load two fabrics in the correct order, the violet fabric 5 times, and the green fabric 4 times, of course in the correct order. But if you switch to the **Pattern** mode, you need to load each fabric only once. In the **Pattern** field you have to write a weft blanket as a pattern: `90a 102b 90a 102b 194a 102b 90a 102b 90a`, where a means first fabric, and b means second fabric. Numbers beside letters mean the number of wefts from each fabric. If you need to change the height of a particular fabric band, just change the number of wefts, click **OK**, and you have a new design.

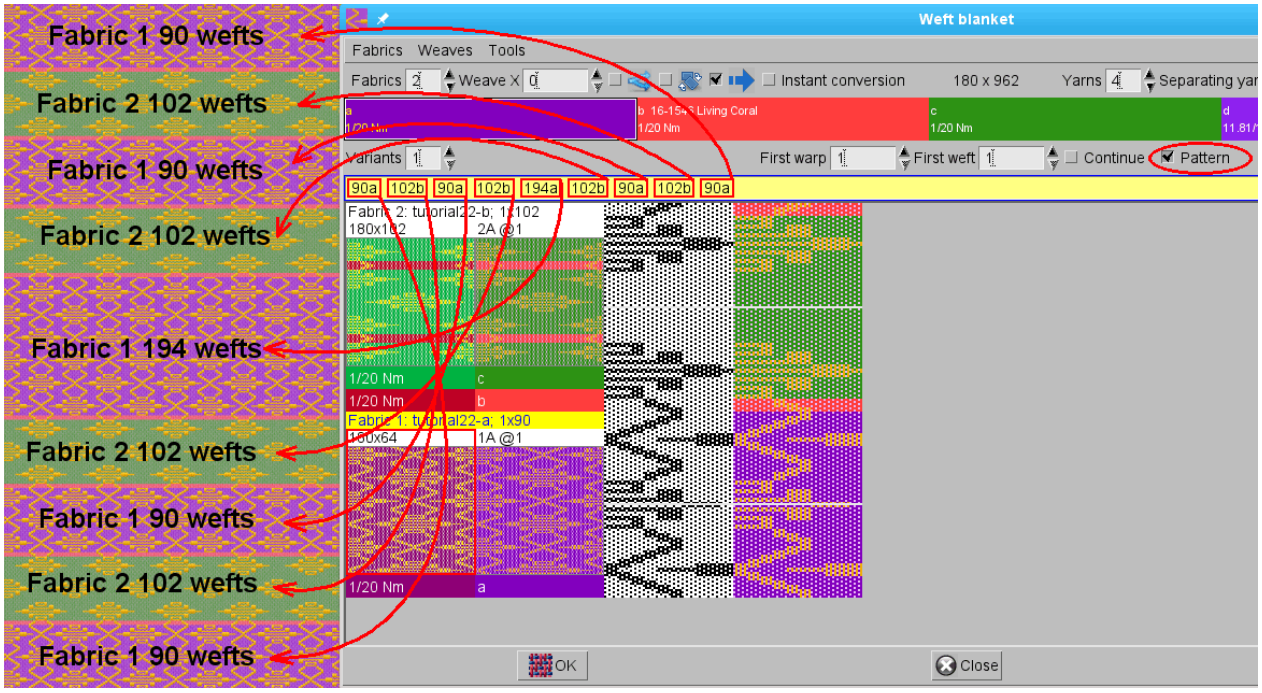



*Figure 305: The pattern option in the weft blanket editor: from two input fabrics we have created new design.*

### 10.2.4 Keyboard navigation and shortcuts in weft blanket editor

- Alt + click in the weft blanket fabric opens the weft blanket editor (if it is not already opened), and selects the icon of the version in the weft blanket editor, from which the clicked section was made. This feature is very useful, when we want to modify an old weft blanket, composed from many fabrics, and we can't find the right variant in the weft blanket editor.
- Double mouse click on the variant icon changes the position of the scroll-bar in the main window, so that variant becomes the first one at the bottom of the window, so you can easily find it.
- Alt + mouse wheel roll over blanket fabric in the main window adds or removes (depends on direction of rolling) threads from that particular variation, where the mouse pointer is. It also works, if the weft blanket editor is not opened. Data in the weft blanket editor is updated, as you roll the wheel. If the Instant conversion is enabled in the Weft blanket editor, the fabric is changing as you roll the mouse. If not, then you have to click the OK button to apply the changes.

- Pressing the Insert key adds a new fabric in the Weft blanket editor, if one of the fabrics (leftmost icon) is selected (you can achieve the same with **Tools** > **Fabrics** > **Add**). If a variant is selected (second, third,... icon in horizontal), then the variant is duplicated and you can edit it as a new variant (**Tools** > **Variants** > **Add**).
- Pressing the Delete key removes selected fabric or selected variant from the Weft blanket editor ( **Tools** > **Fabrics** > **Remove** or **Tools** > **Variants** > **Remove**).
- You can navigate variant icons, fabric icons or yarns using the arrow keys.
- Instead of copying yarn from the yarn bar to the variant yarn, you can position a cursor to that particular variant yarn, and change it by pressing a corresponding letter key on the keyboard. For instance, if you want to replace the yarn **a** with yarn **c**, select the yarn a, and press the c key.

### 10.2.5 Saving the weft blanket fabric

When you click the **OK** button, the program merges all variants into one fabric, writes new **weft pattern**, **regulator**, and other variables (**weft density**, **warp tension**, **loom speed**, **selvedges**, **terry variables**) if they exist in the input fabric files. You can save it as a new fabric.

### 10.2.6 Extracting a variant from the weft blanket fabric

If you need to get a specific variant from the weft blanket fabric, select the variant in the weft blanket editor, and choose **Tools** > **Extract fabric**. The program pulls out the weave, weft pattern and regulator of that fabric, with proper weft color remapping. Save it with a new file name.

## 11 Variants

*ArahWeave* enables you to create variants of the same fabric design, and save them into a single fabric file. Variants differ from each other only by yarns and colors. To open the Variants dialog window, choose **Blanket** > **Variants...**

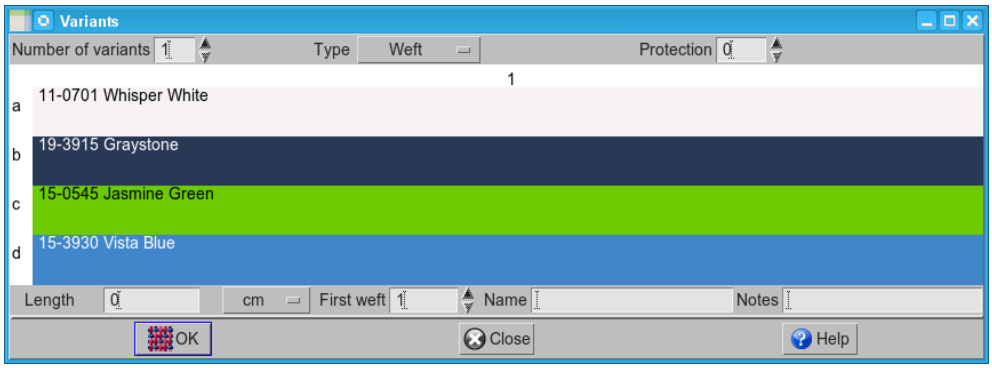



*Figure 306: The Variants dialog window*

### 11.1 Setting the type and number of variants

There are four different types of variants:

- **Weft** – you edit just the weft yarns.
- **Warp** – you edit just warp yarns.
- **Warp & Weft** – you edit both warp and weft yarns independently.
- **Warp = Weft** – warp and weft yarns are the same; as you edit warp yarns, the same applies to weft yarns.

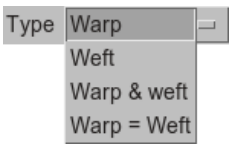



*Figure 307: Choosing the type of variants*

As you increase the number of variants, the last variant is copied to the new one. If you later (during editing) decide that you need more (or less) variants, you can simply change the number.
Figure 308 shows the Variants dialog, where we have changed the number from 1 to 4. We got four equal variants. Now we can edit them one by one.

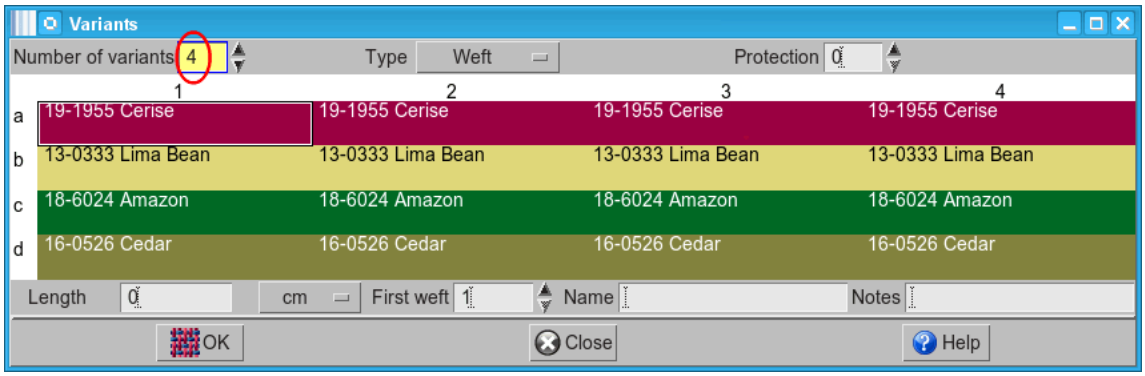



*Figure 308: Setting the number of variants in the fabric*

## 11.2 Editing variants

You can modify variants by pasting colors from color libraries, or by loading yarns from the yarn browser. The *ArahWeave's* copy/paste method with mouse (left click to select, middle click to exchange, right click to paste) also works inside the Variants dialog.

### 11.2.1 Pasting colors from Colors dialog

If you want to modify only colors and not yarns in the Variants, use the Colors editor. Set the number of variants and type, and open the Color dialog (**Fabric** > **Colors**). Click the **Variants** tab, which displays all colors used in the fabric variants. You can start copying colors from the currently opened color library to variants.

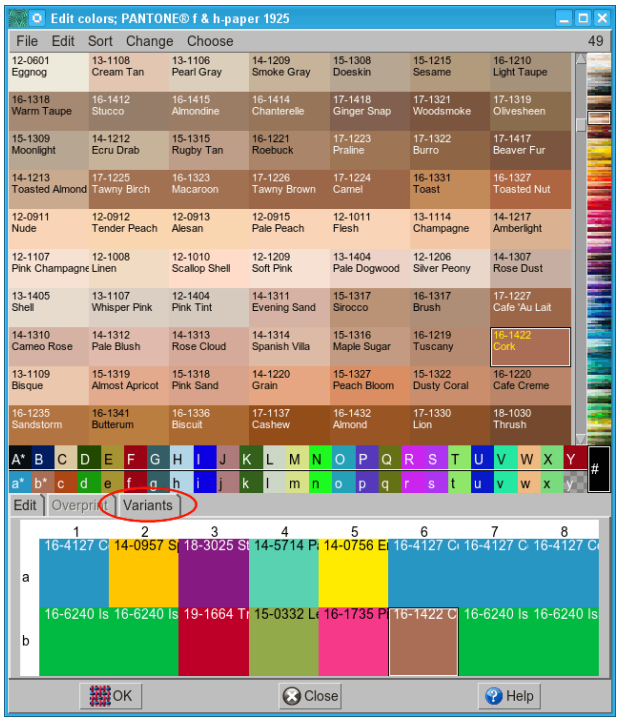



*Figure 309: Editing variants in the Color editor*

*As you click (select) color in the variant, that variant becomes selected and displayed in the main window. ArahWeave's title bar also shows the number of the selected variant. Please note that ArahWeave displays only one variant (selected one) at the time in the main window. If you want to review all variants at once, use the Print preview (more about this later in Chapter 11.3).*

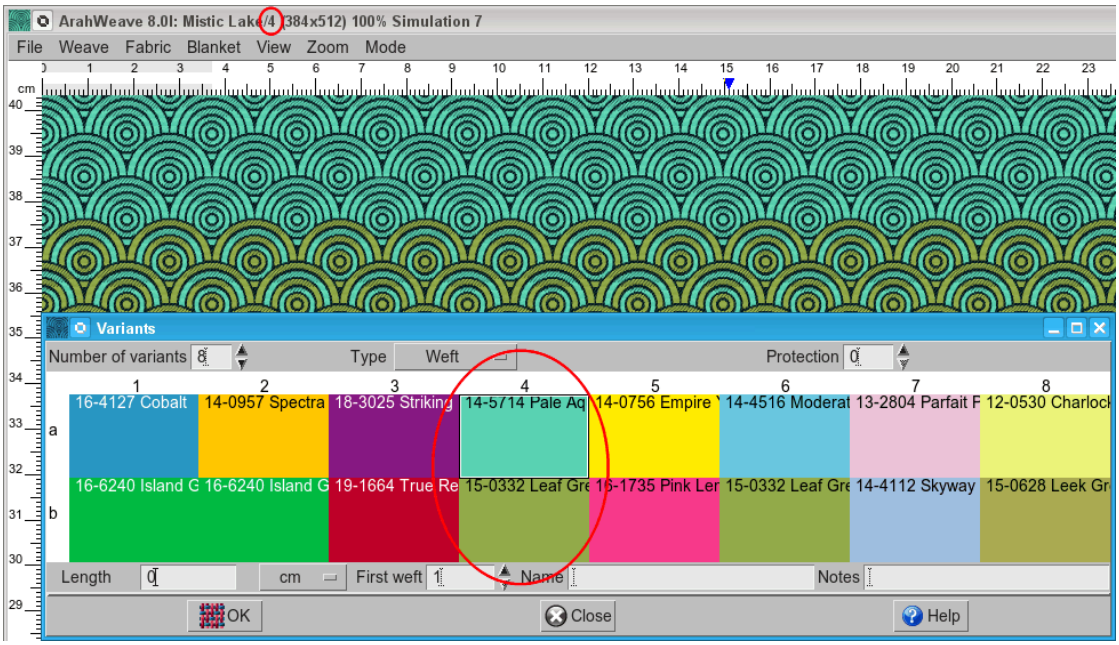



*Figure 310: Displaying selected variant*

## 11.2.2 Loading yarns from the Yarn browser

By double clicking on a variant yarn, you can open the yarn browser and load the yarn into the variant. The window is split into two parts. The left part lists all yarns from the default yarn directory. On the right side, there is a list of colors associated with currently selected yarn.

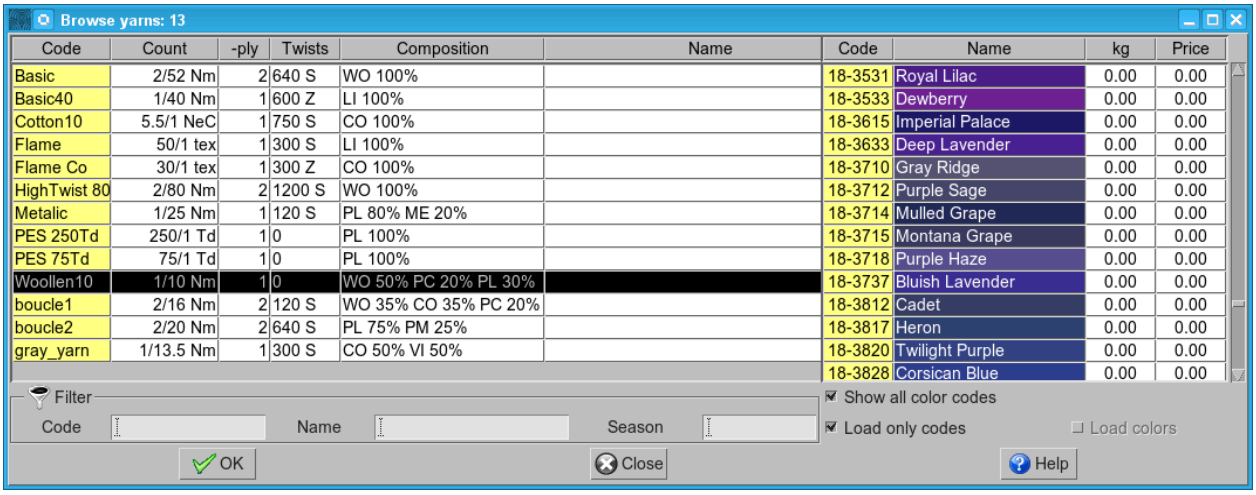



*Figure 311: Loading yarns from the yarn browser*

If you want to have displayed all colors from your library In the Browse yarns window, you need to export colors to XML format (from the Edit colors window choose **File** > **Export colors in XML**). The exported color file is available next time when you restart ArahWeave.

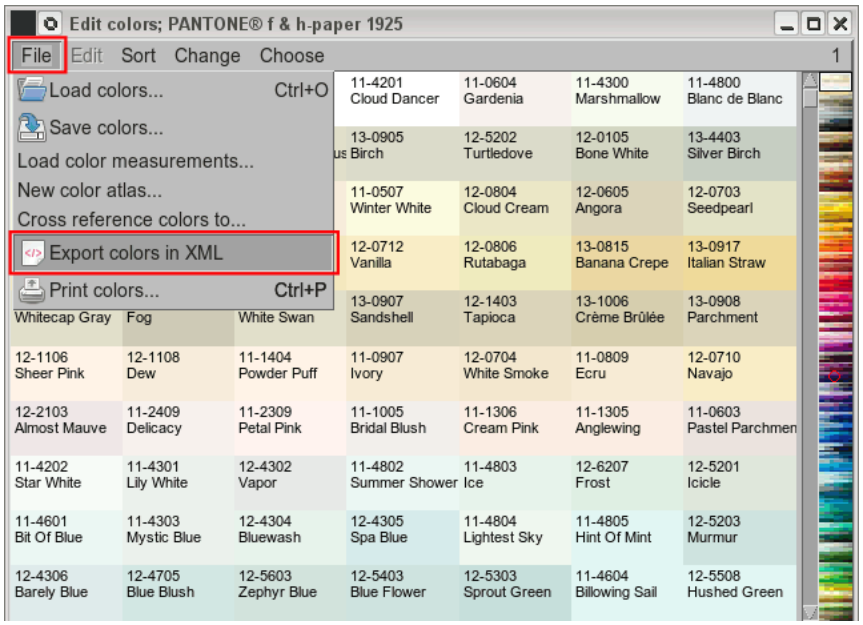



*Figure 312: Exporting colors in XML*

### 11.2.3 Protection - preventing accidental modification of variants

When you add new variants to already designed variants you may want to prevent them from accidental modification. To do this, just enter the number of variants which should be protected in the **Protection** field in the **Variants** menu bar.

## 11.3 Printing variants

Choose **File** > **Print fabric to printer...** to open the Print dialog. Mark the **Variants** check-button to access the **Print fabric to printer: Variants** window. Here you decide the form of printout (number of rows (**Fabrics Y**)and columns (**Fabric X**)) and position of titles (for details about titles and positioning of them, please see Chapter 17.8 about multi-fabric printing).
If you want to print just some of the variants, select them by double-clicking the variant's number. The number gets the asterisk mark *, which means that it is in a selection. We have selected four out of six variants in Figure 313.

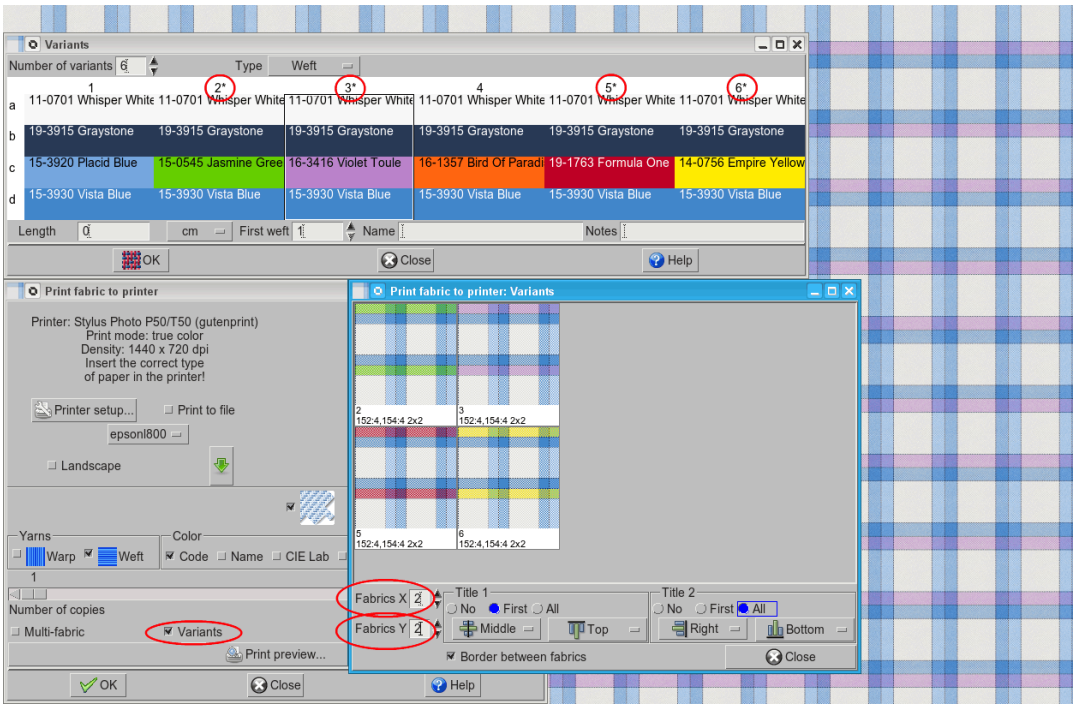



*Figure 313: Printing variants*

Check the print preview before printing. Or you can use the print preview just to display the variants side by side and review them.

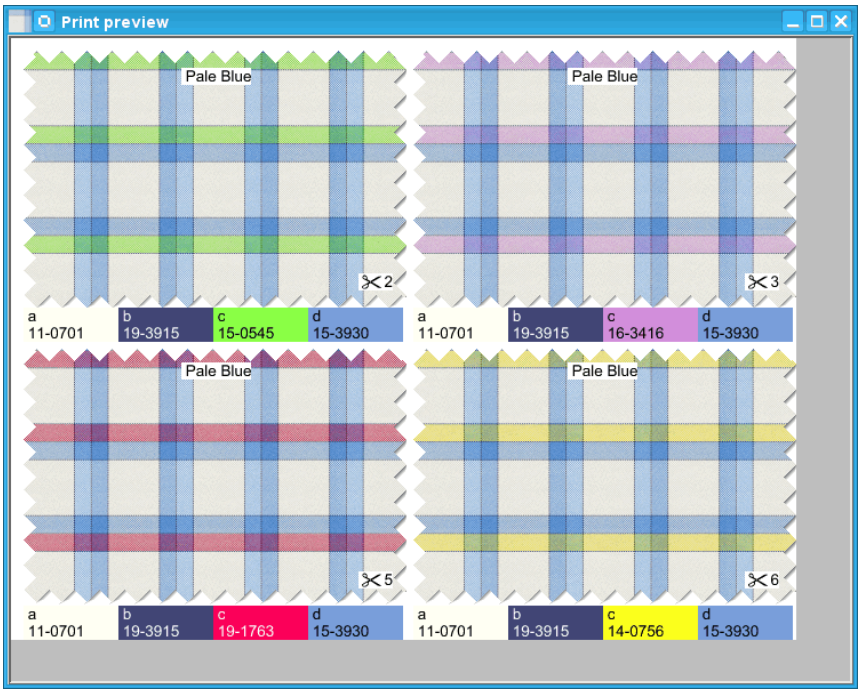



*Figure 314: Preview of the variants printout*

# 12 Overprint, Chiné, Ikat, Seersucker simulation

## 12.1 Overprint

You can simulate printing over a woven fabric in *ArahWeave*. Open *ArahWeave* and load (or create) a fabric, in which you want to use the overprint function. Choose **Fabric >Simulation**. In the Simulation window click the **Overprint** tab.

To load the image (usually the image that is used for screen printing), click the **Browse** button, and load the image into the Simulation window. In most cases, you load just one image into the Warp field. In the very rare case of double or compound ikat fabrics (both warp and weft yarns are dyed prior weaving with different patterns) you also load an image, which represents the used weft dye pattern, in the weft field.
The image for overprint is usually in the indexed (8 bits per pixel) mode, so that you have the option to control which color is transparent (the background color of the image).

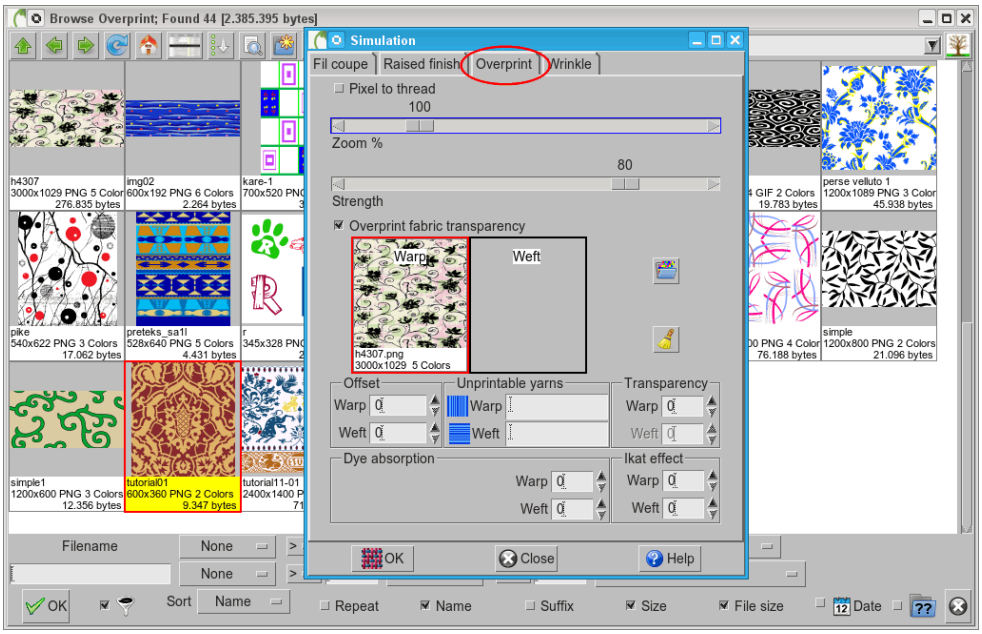



*Figure 315: Loading image into simulation window*

The program draws the image over fabric, as if it was printed. With **Zoom** you can control the size of the overprint image. **Strength** controls the color strength (transparency) of the overprint (at 100% it covers the fabric completely). In the **Transparency** field you specify the number of the color, which will not be displayed (printed) over the fabric (you can see the color palette and color numbers if you load the image into ArahPaint). The transparent color of the sample in Figure 316 is the white color (note that the counting is started with 0 and not 1—the first color in the image is marked as 0).

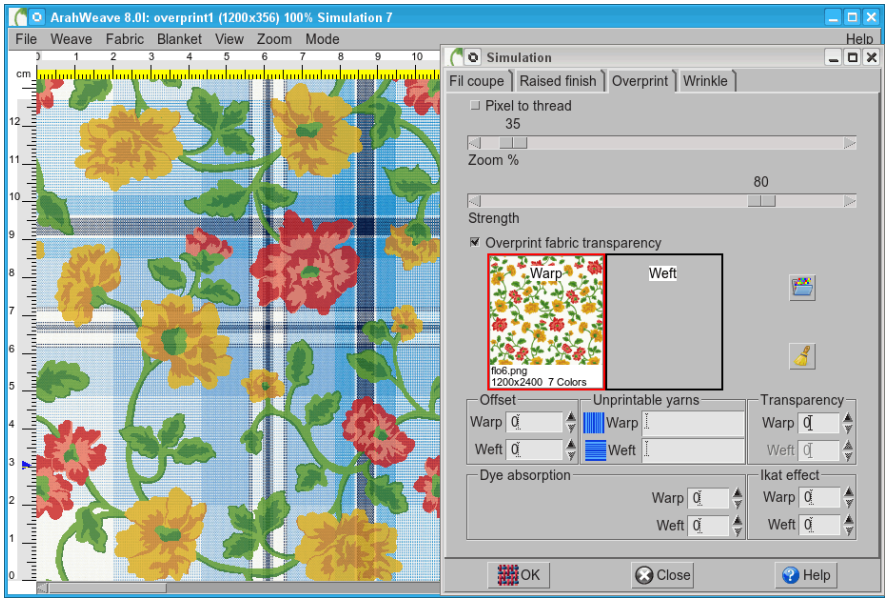



*Figure 316: Overprint simulation*

Figure 317 demonstrates the same image printed at different **Strength** levels.

*Figure 317: Overprint strength levels: 100%, 80%, 60% and 40%*

The option **Overprint fabric transparency** is useful for simulation of printing over transparent fabrics, like curtains for example. The holes between the threads are covered or left empty depending on the type of dyes. If the option is switched on, the program draws the overprint image on the space between yarns.

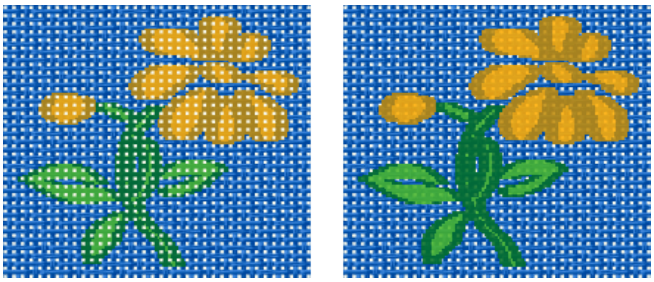


*Figure 318: Overprint fabric transparency: off and on*

### 12.1.1 Printed warp, Ikat, Chiné simulation

The overprint simulation window has some other options, which allow you to simulate even more exotic stuff. First of the three advanced functions in the overprint window gives you the possibility to specify which yarns in the fabric are print-protected. This allows simulation of fabrics with printed warp, ikat fabrics (warp, weft, or both), and even fabrics, which are made from yarns with different fiber composition and thus different dye affinity.

Figure 319 shows the input fabric, consisting of white and blue yarn, and the output fabric after printing. A dye which is used for printing, has no affinity to fibers in blue yarn, so you have to state them as **Unprintable** in the Simulation window (letter b in **Warp** and **Weft**).

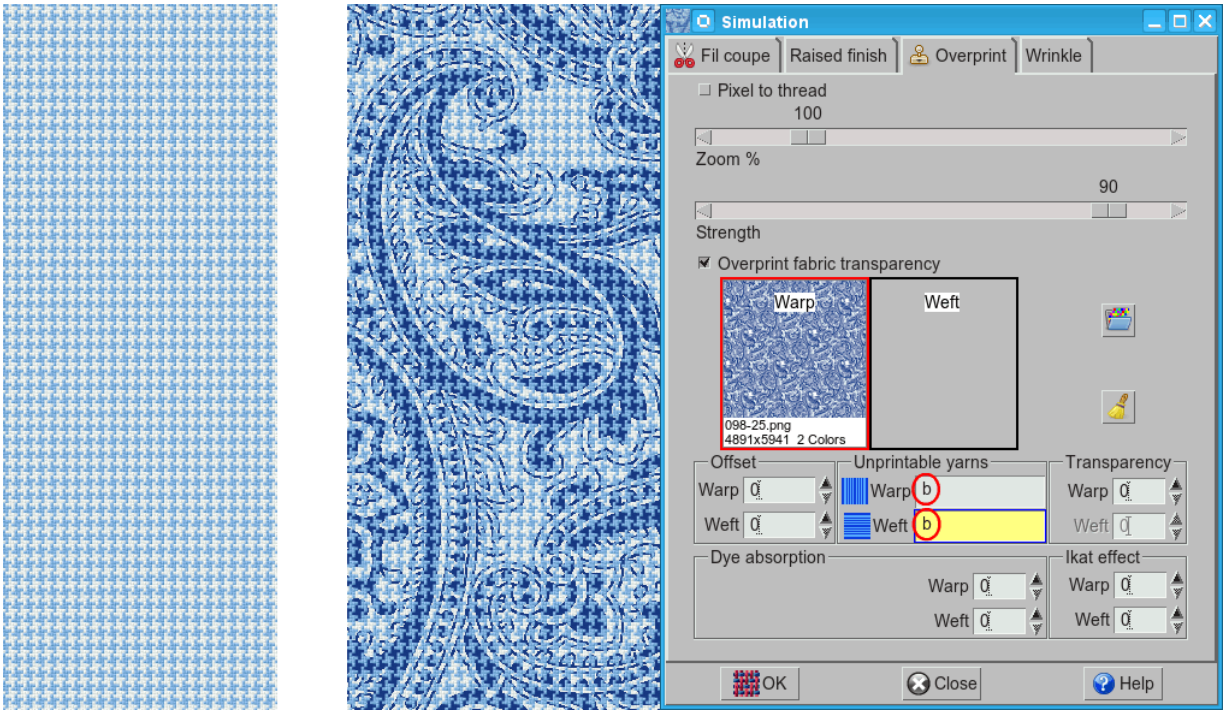



*Figure 319: Print-protected yarns*

The **Ikat** option for warp and weft allows you to simulate the overprint image distortion (feathered edges of the pattern), which is characteristic of techniques, where the warp, weft or both are tie-dyed or printed with a pattern before weaving, to create a design on the finished fabric.

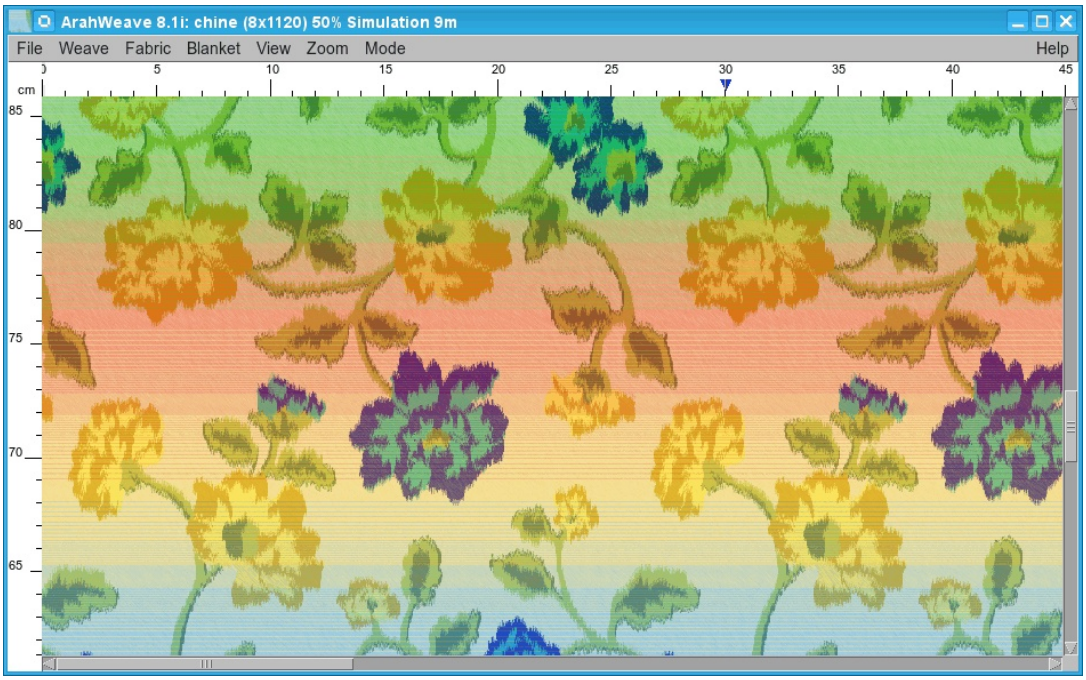



*Figure 320: Chiné simulation*

In *ArahWeave's* simulation, the value of ikat effect is specified as the number of pixels of the printed image. The higher the value, the bigger the distortion.
A closer look at the previous simulation shows you how ArahWeave makes the chiné simulation. On the sample the ikat value is set to 12 in the warp direction – it means that the borders of print will vary randomly from 0 to 12 pixels.

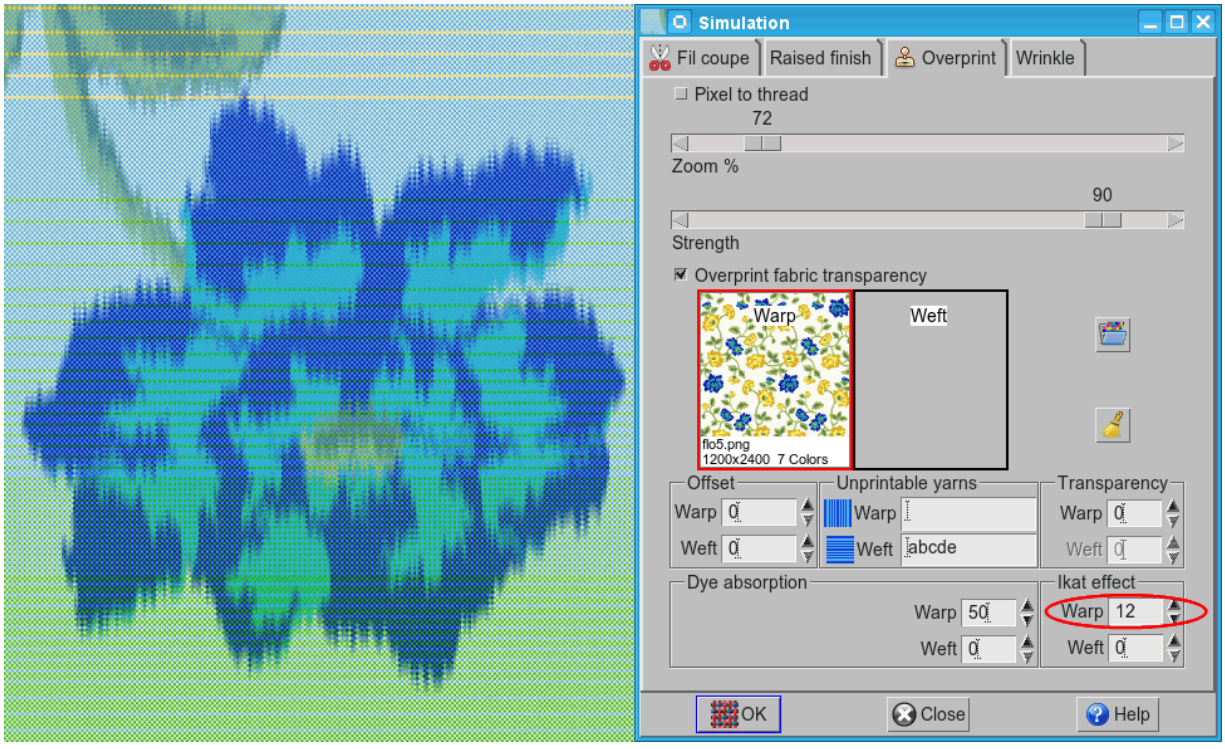



*Figure 321: Zoom in chiné simulation*

The Ikat simulation works best in combination with the **Dye absorption** function. It determines the absorption of dye over the edges of the printed motifs. This depends on the yarn material (fiber), type of dyes and printing technique. It can be set independently for warp or weft, and it is expressed in tenth of a millimeter.

Figure 322 shows a simulation with **Dye absorption** set to 0, while the simulation on the right was generated with **Dye absorption** set to 35.

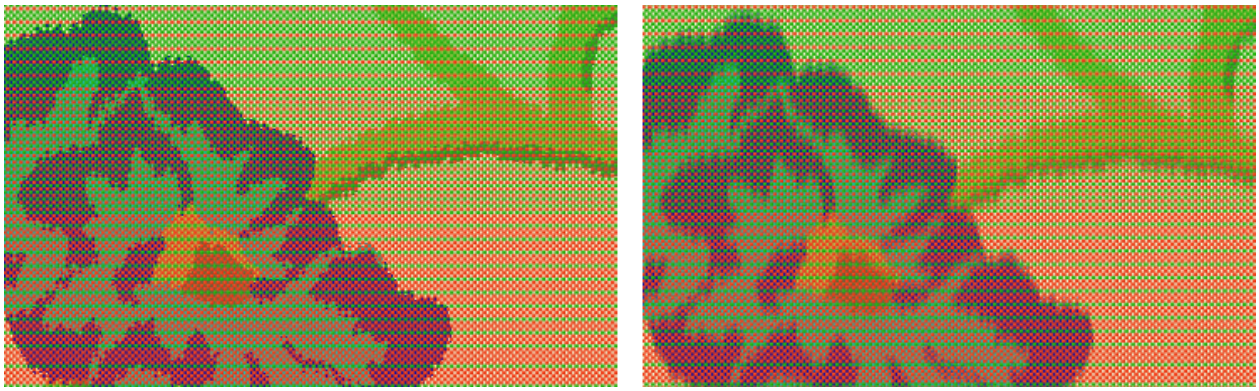


*Figure 322: Dye absorption*

### 12.1.2 Simple warp ikat plaid

The following image shows the setup for warp ikat, where only the warp yarn with letter d was printed (or dyed / painted) prior to weaving. So all the other yarns (a, b and c, which form the border design on the left) are set to be non-printed.

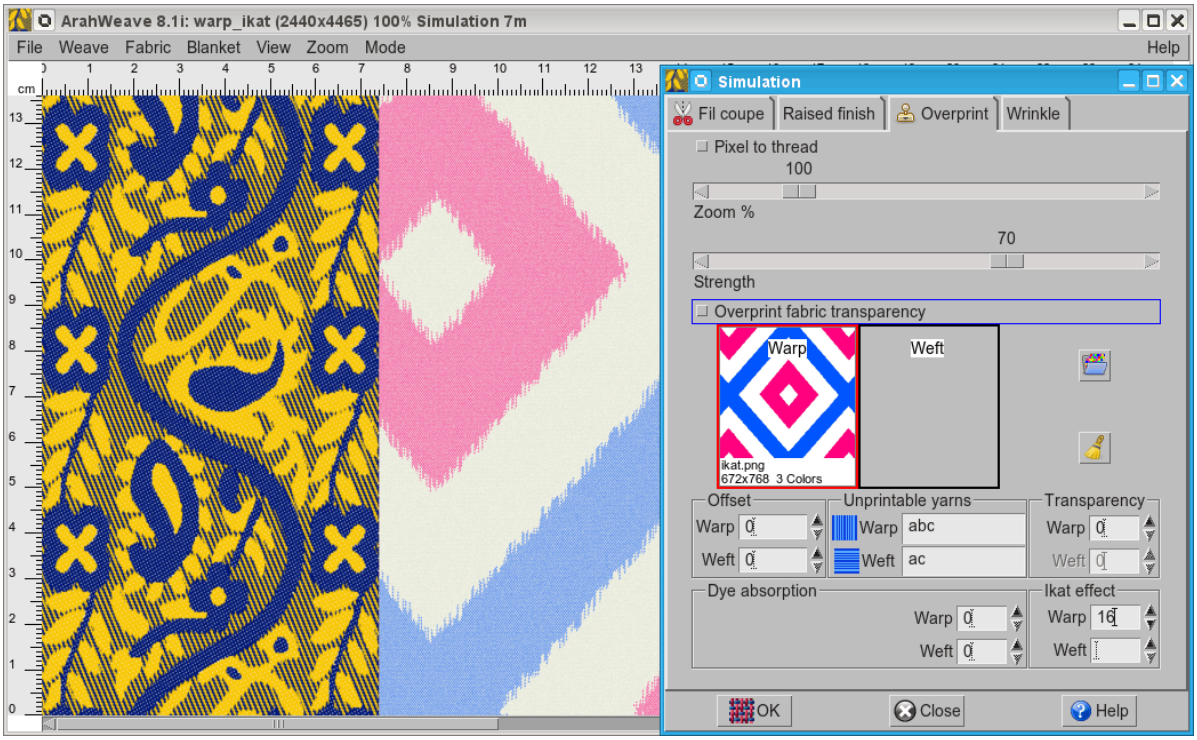



*Figure 323: Warp ikat*

### 12.1.3 Simple weft ikat plaid

Weft ikat is more difficult to make, since the start of each pick (weft yarn) must be aligned to the edge of the fabric. Usually, this is impossible in industrial weaving, due to the nature of weft insertion. But a skilled hand-weaver can do it.

Figure 324 shows a fabric and the settings for weft ikat. Only the weft letter **d** is left printable.

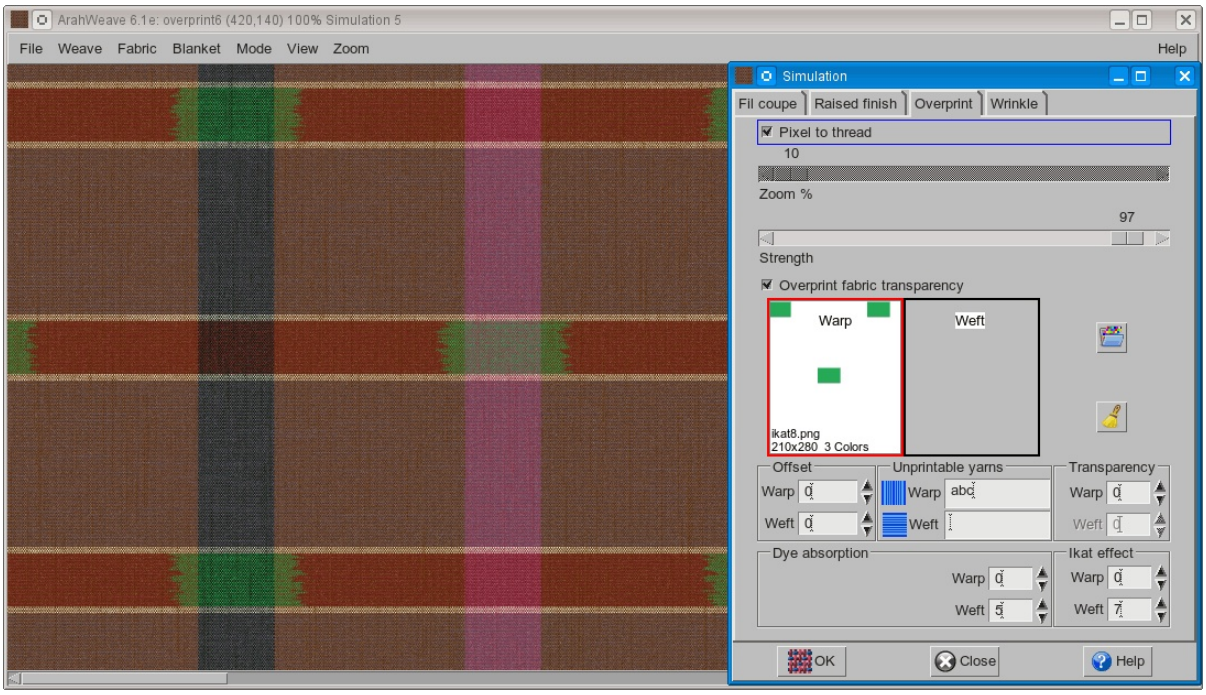



*Figure 324: Ikat weft plaid*

### 12.1.4 Changing colors of the overprint picture

To change colors in the overprint picture, open the Edit colors dialog (**Fabric** > **Colors**), and click the **Overprint** tab. There is a color palette of the overprint image. From the ArahWeave palette select a color, and copy it with the right mouse button over the overprint image color.
In the same way you can copy or exchange color chips of the overprint image.

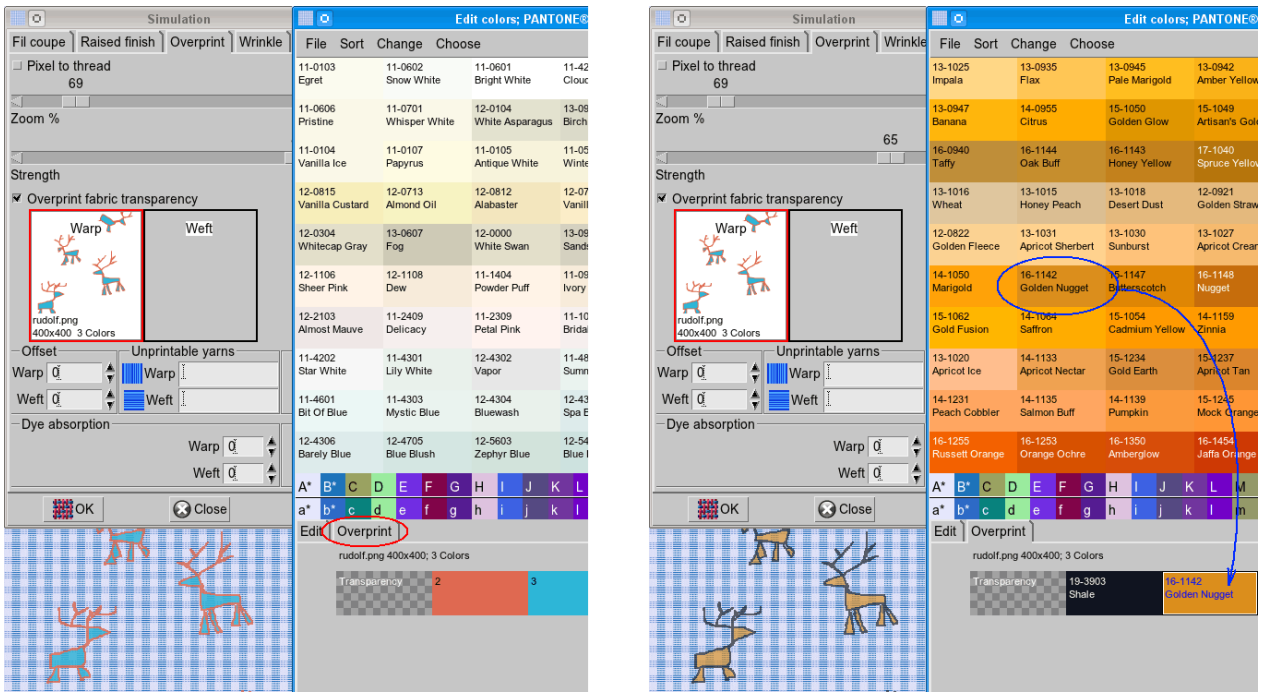



*Figure 325: Changing the overprint colors*

#### 12.1.4.1 Printing color chips of overprint image

If you enable the Overprint button in the Print fabric to printer dialog, the colors from the overprint image will be printed in the lower-left corner of the simulation.

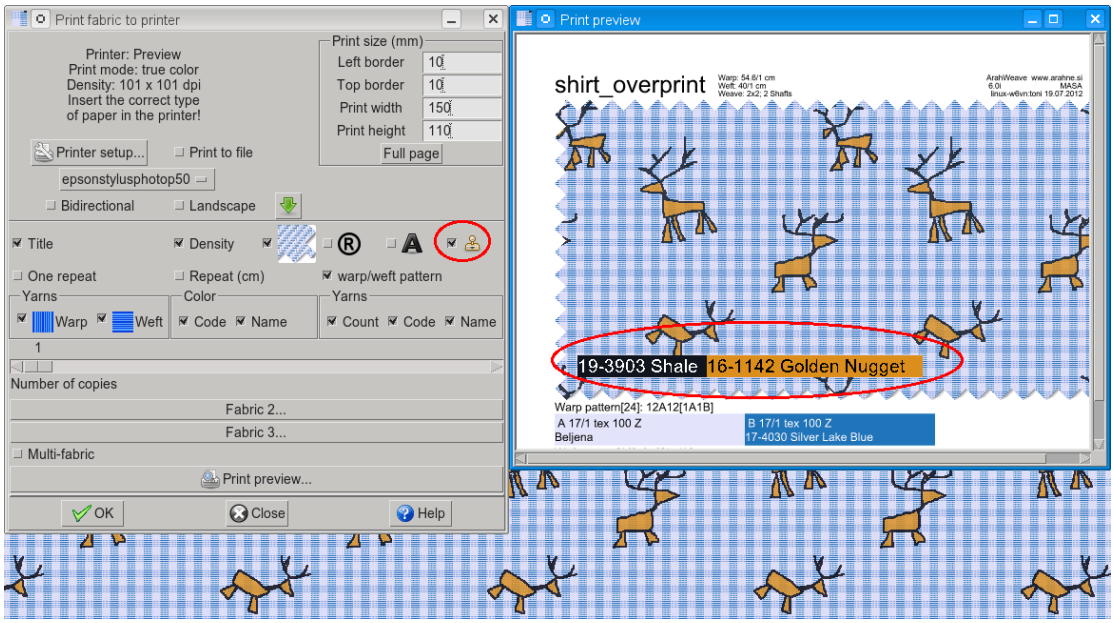



*Figure 326: Color chips of overprint image*

## 12.2 Simulation of wrinkles

**Wrinkle** is another fabric finishing feature, available in the **Simulation** window. It allows you to load any image and use it as a gray wrinkle map. If the image is not gray-scale, it will be automatically converted to gray-scale. As in overprint, you can also specify the zoom and intensity levels. Wrinkle works differently from the overprint, as it takes the color of underlying fabric, and modifies its lightness according to the wrinkle picture/texture. To load the texture, click the browse button, and from the image browser load the texture. The program will automatically figure out the base gray level of the loaded picture and will make the fabric both lighter and darker. The program's finishing simulation works in sequence, so you can have both overprint and wrinkles. You can also specify the non-wrinkable yarns, which allows you to make realistic seersucker simulations.

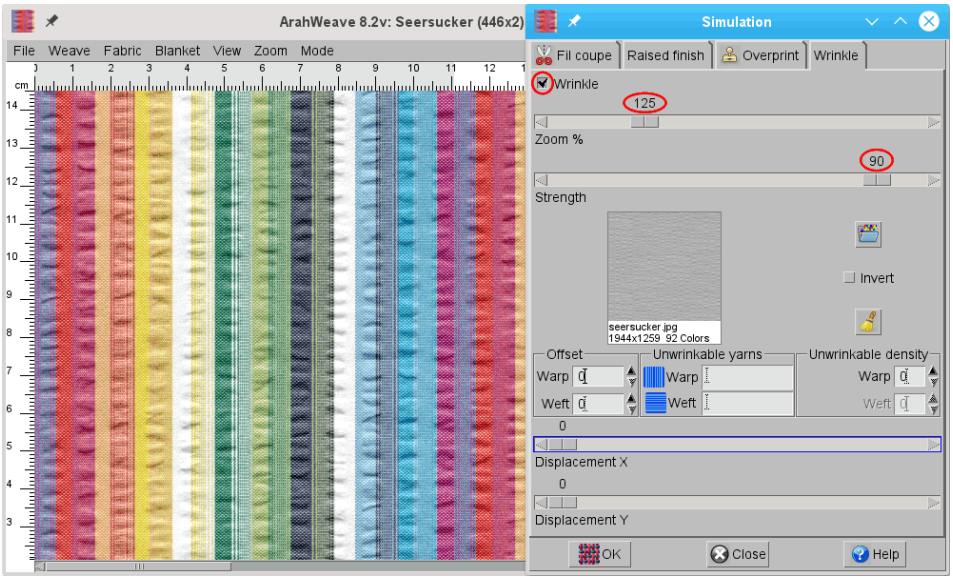



*Figure 327: Simulating the seersucker fabric*

To make a simulation even more realistic, you can set the **Displacement** function, which will curve the threads according to the wrinkle texture and the value of the displacement parameter.

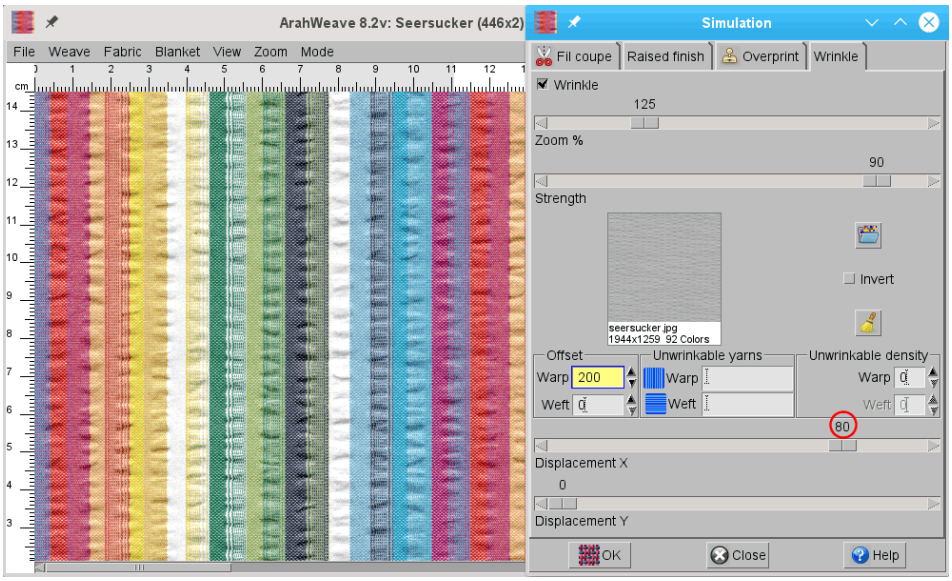



*Figure 328: Simulating the seersucker fabric with Displacement function*

# 13 Fabric properties

The **Properties** window allows you to enter lots of different information for the fabric. You can access this window from the *ArahWeave* menu bar through **Fabric** > **Properties** or by using the keyboard shortcut **Ctrl+I**.

There are two types of text fields in the Properties window:

- Ordinary text fields—you enter the data.
- Drop-down menu text fields—you enter the data or choose it from the drop down list. The list is configured with custom codes and values, using external XML files, which you add to your XML directory.

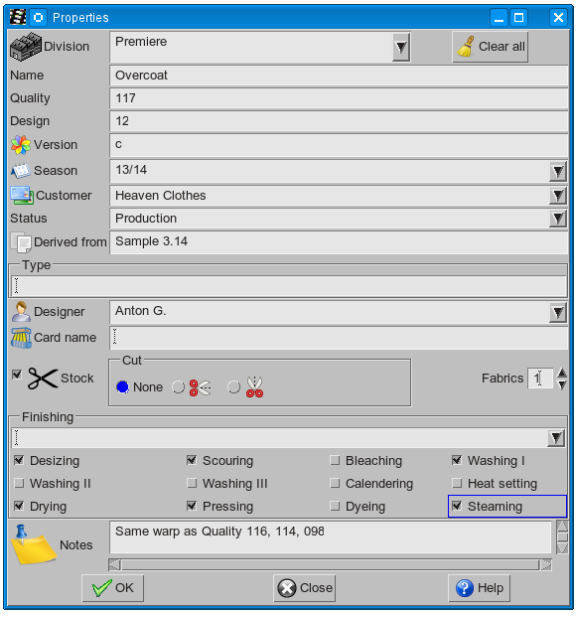



*Figure 329: The Properties dialog*

You can specify (among other things):

- For which customer the design was made (a list is taken from ArahneCustomerImport.xml).
- Which finishing was applied (you can choose it from the drop-down menu; a list in ArahneFinishingImport.xml, or as set of toggle buttons)
- Type of the fabric (as free text description or a set of toggle buttons)
- Which designer did it (ArahneDesigners).xml
- From which design was the actual design derived
- Status of the fabric (is it just a trial or real production)
- Division (when a company is divided into different plants or market/product groups)
- Name, quality, design, version, season—these entries are also used for automatic fabric name generation for saving fabric data in HTML format and for title of printed fabric simulation.
- The product availability—the scissors sign  can be also printed on the fabric simulation to show that fabric is already in stock.

# 14 Fabric technical data calculation

The technical data and calculation of yarn consumption is accessible as the **Consumption** menu entry from the **Fabric** menu. You should have previously set the yarn counts in the **Yarns** section.
The **Calculation of thread consumption** window is divided into two parts:

- **gray** with entry fields for fabric technical data
- **white**, where the calculated and data from other windows (colors, thread pattern) are displayed

You must enter the requested parameters and click **OK** to see the results of the calculation.

## 14.1 Number of threads, reed number, reed width

The number of threads in fabric width is the most important fabric production parameter, besides weft density. You can enter the number of **Threads in fabric width** by yourself, or better, enable button **Density from technical data** (you can also enable this button in the **Density** window), and the program calculates it for you from **Reed width** and **Reed number** (and **Denting**—ends per dent), which you set in the **Edit weave** window). The **Number of threads** field changes from the entry field into grayed-out field, so you know you can no longer enter this number. The number is rounded to an integer number of dents because it is nonsense to have dents “half full”. If there are 3 threads per dent, then number of threads will be a multiple of 3.

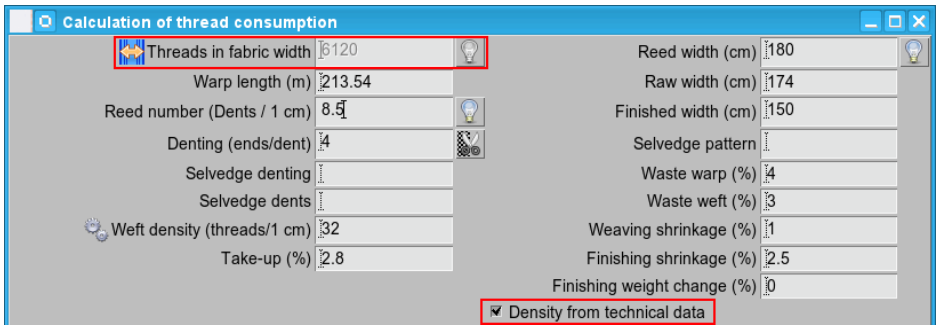



*Figure 330: Calculation of number of threads from reed number and reed width with Density from technical data option on*

If you disable **Density from technical data** you can use another way to calculate the **Total number of threads, Reed width** and **Reed number** (as you know these values are interrelated). You can change any of these fields (the **Threads in fabric width** field becomes red to indicate that one of the values should be recalculated – it is up to you which one).

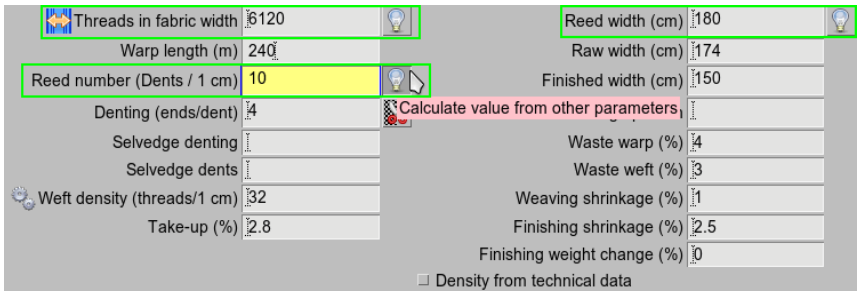



*Figure 331: Calculation of number of threads, reed number and reed width*

Then click the bulb icon  next to the field which you want to calculate. The value will be calculated from the other two. In Figure 332 we calculated the **Reed number**. It is changed from 10 to 8,5. The **Threads in fabric width** field changes from red to default color which indicates that all three values are correct.

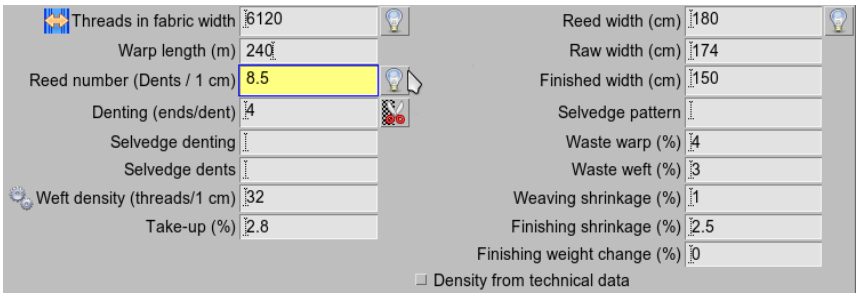



*Figure 332: Pressing the Bulb icon at the right side of the Reed number field calculates the Reed number from the number of threads and the reed width*

### 14.1.1 Calculating the Number of threads and Reed number from Density

You can calculate **Threads in fabric width** and **Reed number** from the **Set weaving density** window. **Finished width** and **Reed width** should be set to desired values. Then choose **Fabric** > **Density**. Set the warp density, and click  icon. Required number of threads in fabric width and the reed number for requested density will be calculated in the **Calculation of thread consumption** window.

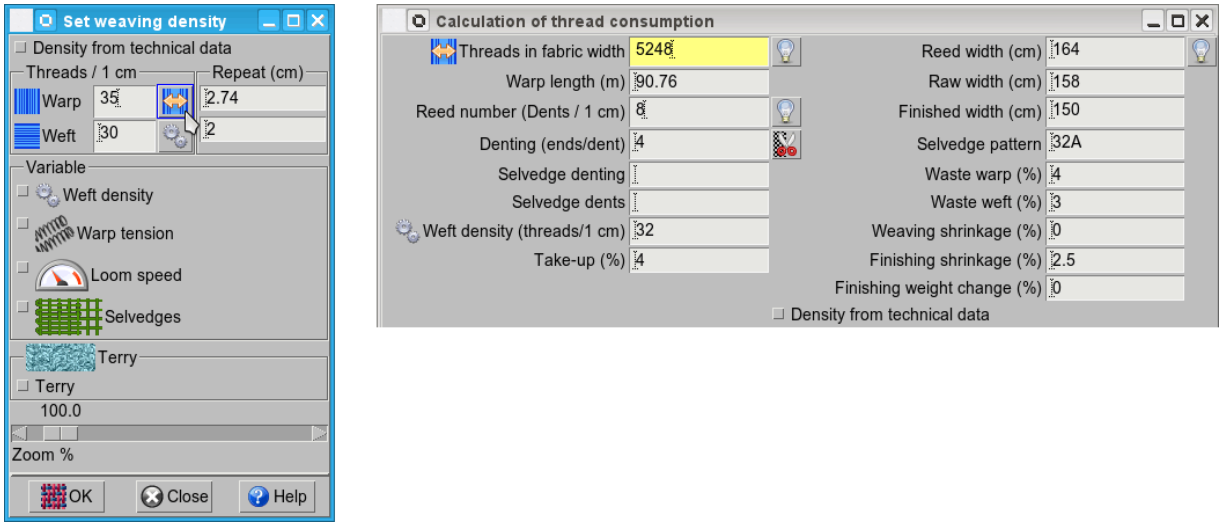



*Figure 333: Calculating the number of threads in fabric width and the reed number from the warp density*

### 14.1.2 Dents

Instead of **Threads in fabric width**, you can use **Number of dents in fabric width**. You have to change the program setting by choosing **Help** > **Save setup**. In the **Save setup** window click the **Weaving** tab (Figure 334), and change the option button from **Reed width -> Dents** to **Dents -> Reed width**.

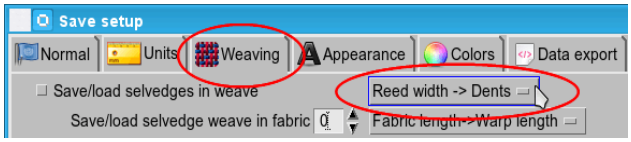



*Figure 334: Choosing the input unit for fabric width and consumption calculation - number of threads in fabric width or number of dents in the reed width*

## 14.2 Fabric width

At the top right edge of the window, you enter the basic fabric widths: reed width (pattern only, no selvages), raw width and finished width. This is necessary, if you want the program to calculate the finished density for you. If you do not have these data, you must enter the density by yourself in the **Set weaving density** window (**Fabric** > **Density and control**).

## 14.3 Fabric (or warp) length

Depends on your preference, enter the **Fabric length**, for which you want to calculate the consumption, and the program will calculate needed warp length. If you prefer to start with warp length, so the program calculates the fabric length, change the setting in the **Save setup** window.

With the **Fabric length -> Warp length** option button you choose either the **Fabric length** or **Warp length** is your input in the **Consumption** window.


*Figure 335: Choosing either Fabric length or Warp length as the input value in the Consumption calculation*

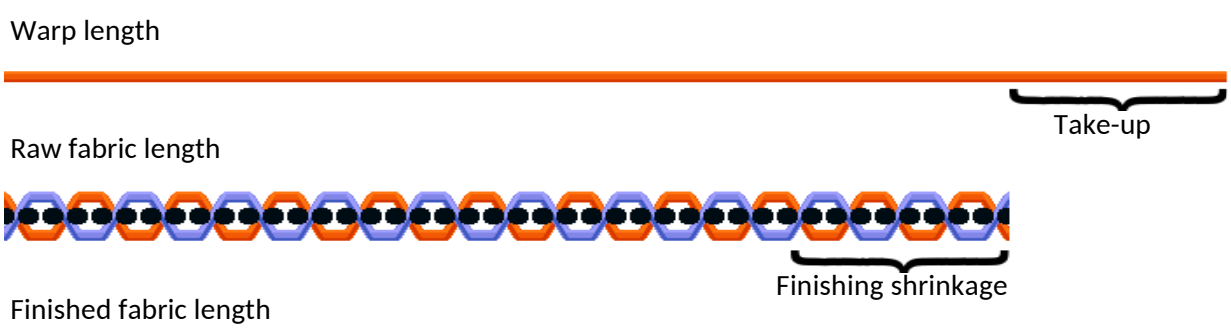



*Figure 336: From warp length to finished fabric*

The raw fabric length is the warp length reduced by the take-up. The take-up is the difference in length between the warp length and the length of fabric just taken off the loom.

$$RawLength(m) = \frac{WarpLength(m) * (100 - TakeUp(\%))}{100}$$

The finished fabric length is the raw fabric length reduced by finishing shrinkage.

$$FinishedLength(m) = \frac{RawFabricLength(m) * (100 - FinishingShrinkage(\%))}{100}$$

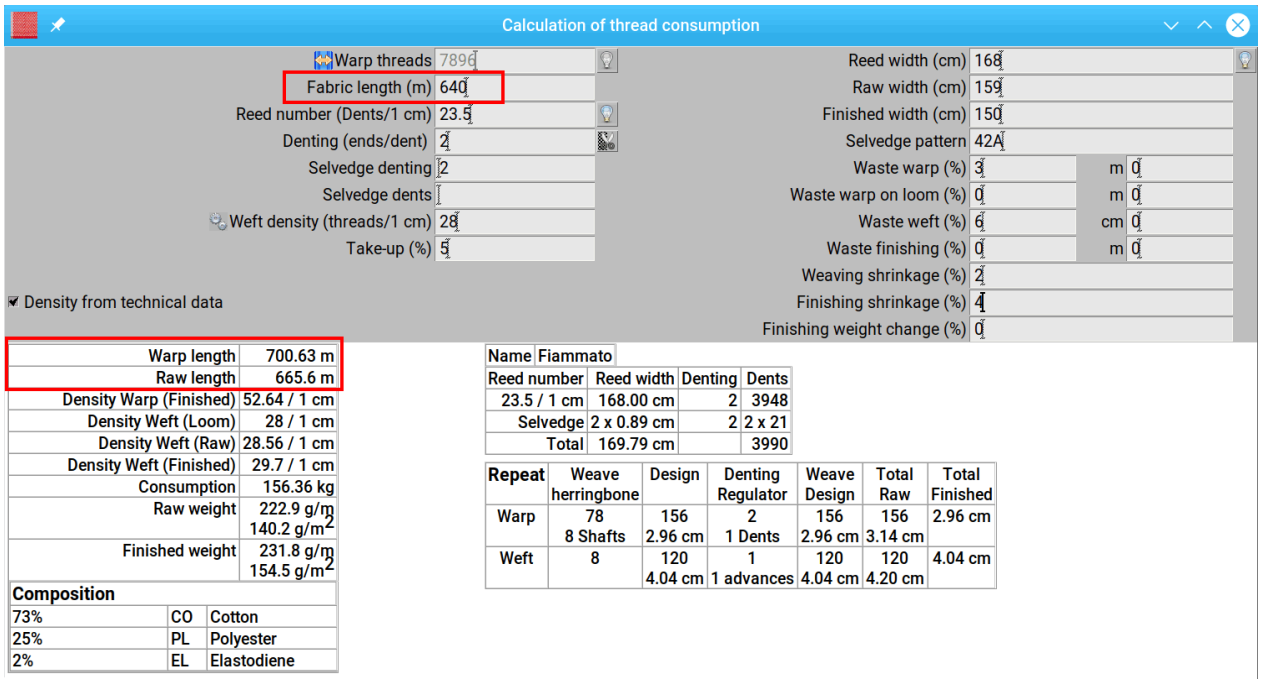



*Figure 337: Calculating the warp length from the Fabric length input*

## 14.4 Weft density

There are three kinds of weft threads density:

- Weft density on the loom (number of weft thread insertions per length unit)—you have to enter it
- Weft density of the raw (gray) fabric—calculated
- Weft density of the finished fabric—calculated

### 14.4.1 Weft density on the loom

**Weft density** is the density, set on a loom. It is the only one of three weft densities, which you have to enter in the **Calculation of the thread consumption** window.

### 14.4.2 Weft density of the raw (gray) fabric

The **Weaving shrinkage** variable generally depends on loom setting (warp and fabric tension), used weaves, material. It causes the difference between the density on the loom (weaving density) and density in the raw fabric. The **weaving shrinkage** is part of the **take-up, and cannot be higher than take-up.** It is expressed in a percentage (%). *ArahWeave* calculates the raw weft density using the following formula:

$$RawWeftDensity\,(wefts/cm) = \frac{LoomWeftDensity\,(wefts/cm) * (100 + WeavingShrinkage\,(\%))}{100}$$

### 14.4.3 Weft density of the finished fabric

The finished weft density is calculated from the **Finishing shrinkage**, which means the shrinkage (or elongation) of fabric (warp) during the finishing process. ArahWeave will also take into account regulator or variable weft density when calculating the weft density of finished fabric.
The finishing shrinkage is expressed unit is percentage (%).

$$FinishedWeftDensity\,(wefts/cm) = \frac{RawWeftDensity\,(wefts/cm) * (100 + FinishingShrinkage\,(\%))}{100}$$

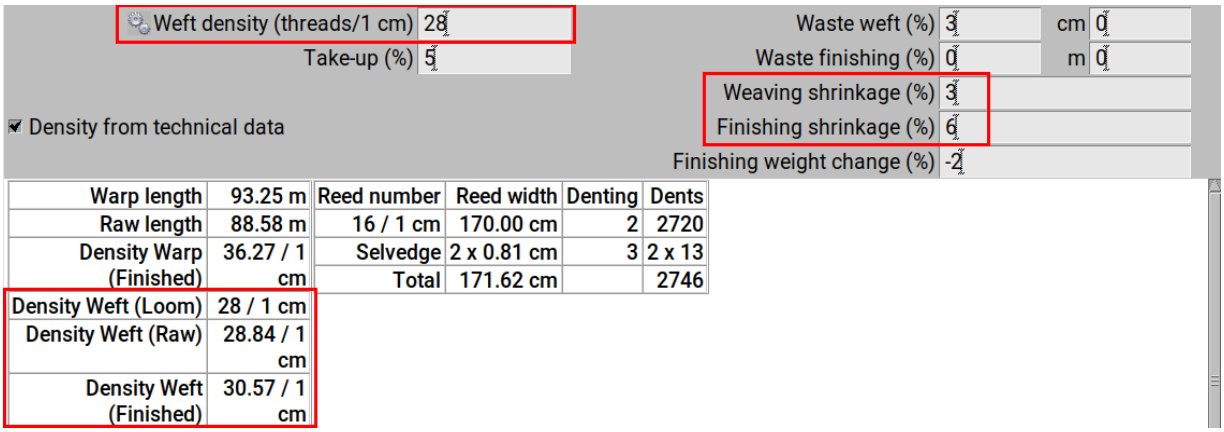



*Figure 338: Weft density calculation*

## 14.5 Selvages

You can enter selvages data in two ways:

- Enter Selvage **pattern**, which is the full pattern describing left selvage (the right one is assumed to be equal), and Selvage **denting**. The program will calculate the required number of dents and reed space for selvage.

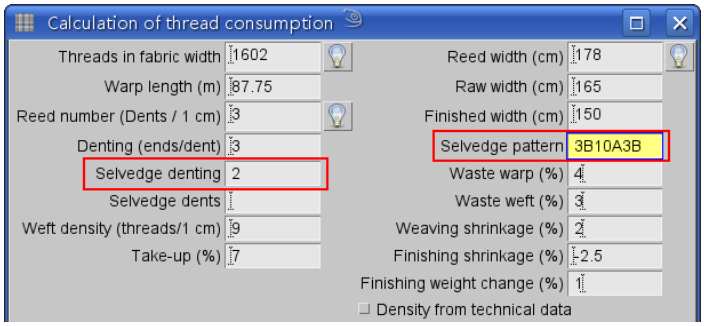



*Figure 339: Selvage pattern and selvage denting*

- If you want, that selvages are taken from the fabric ground, then enter the number of Selvage **dents** and **Denting**, and leave the Selvage **pattern** empty. Figure 340 shows data of fabric, which has 12 threads (Selvage denting (2) by number of selvage dents (6)) from ground in each selvage.

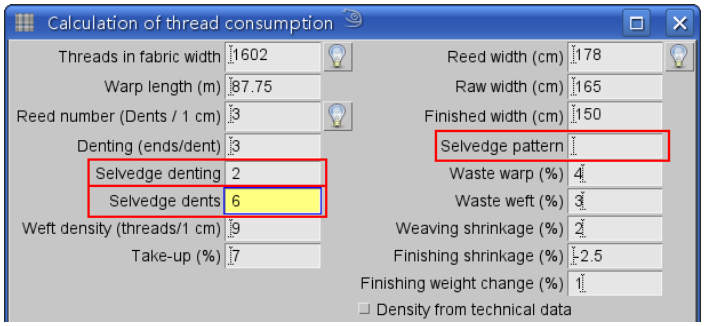
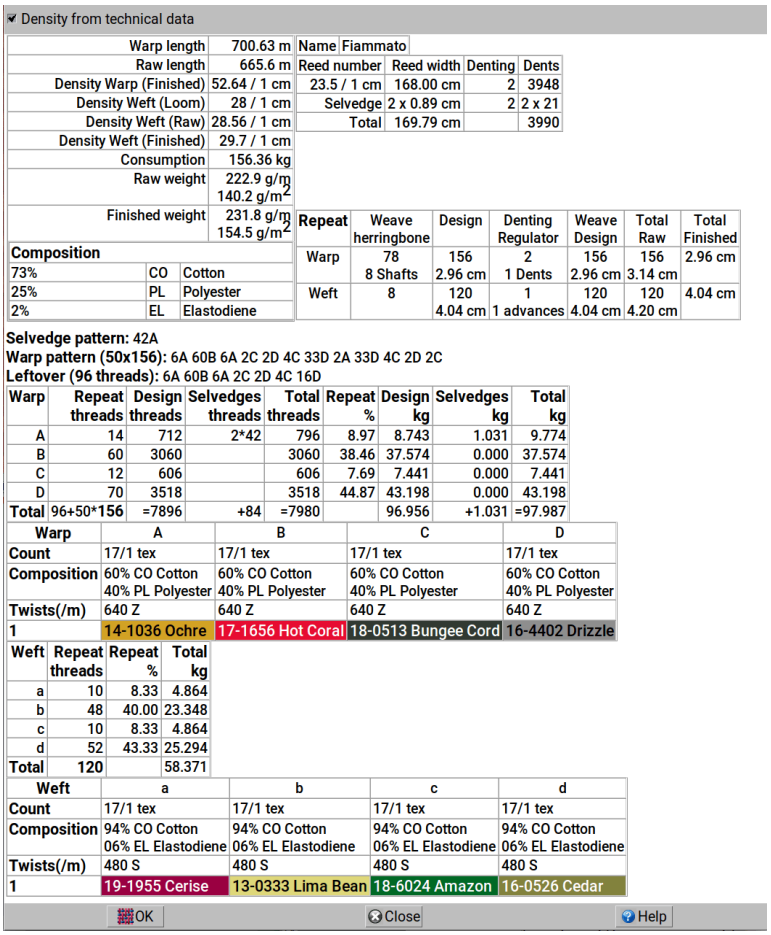



*Figure 340: Selvage from ground*

## 14.6 Yarn consumption

The scrollable window below the technical data entry fields contains the complete consumption calculation. It is in HTML format and is equal to the printed page of technical data. You can save it using **Save technical data as HTML** from the main File menu. By default, ArahWeave saves it in the data/html directory.



Density from technical data

| | | | | | |
|---|---|---|---|---|---|
| Warp length | 700.63 m | Name | Fiammato | | |
| Raw length | 665.6 m | Reed number | Reed width | Denting | Dents |
| Density Warp (Finished) | 52.64 / 1 cm | 23.5 / 1 cm | 168.00 cm | 2 | 3948 |
| Density Weft (Loom) | 28 / 1 cm | Selvedge | 2 x 0.89 cm | 2 | 2 x 21 |
| Density Weft (Raw) | 28.56 / 1 cm | Total | 169.79 cm | | 3990 |
| Density Weft (Finished) | 29.7 / 1 cm | | | | |
| Consumption | 156.36 kg | | | | |
| Raw weight | 222.9 g/m 140.2 g/m² | | | | |
| Finished weight | 231.8 g/m 154.5 g/m² | | | | |

| Composition | | |
|---|---|---|
| 73% | CO | Cotton |
| 25% | PL | Polyester |
| 2% | EL | Elastodiene |

| Repeat | Weave herringbone | Design | Denting Regulator | Weave Design | Total Raw | Total Finished |
|---|---|---|---|---|---|---|
| Warp | 78<br>8 Shafts | 156<br>2.96 cm | 2<br>1 Dents | 156<br>2.96 cm | 156<br>3.14 cm | 2.96 cm |
| Weft | 8 | 120<br>4.04 cm | 1<br>1 advances | 120<br>4.04 cm | 120<br>4.20 cm | 4.04 cm |

**Selvedge pattern:** 42A
**Warp pattern (50x156):** 6A 60B 6A 2C 2D 4C 33D 2A 33D 4C 2D 2C
**Leftover (96 threads):** 6A 60B 6A 2C 2D 4C 16D

| Warp | Repeat threads | Design threads | Selvedges threads | Total threads | Repeat % | Design kg | Selvedges kg | Total kg |
|---|---|---|---|---|---|---|---|---|
| A | 14 | 712 | 2*42 | 796 | 8.97 | 8.743 | 1.031 | 9.774 |
| B | 60 | 3060 | | 3060 | 38.46 | 37.574 | 0.000 | 37.574 |
| C | 12 | 606 | | 606 | 7.69 | 7.441 | 0.000 | 7.441 |
| D | 70 | 3518 | | 3518 | 44.87 | 43.198 | 0.000 | 43.198 |
| Total | 96+50*156 | =7896 | +84 | =7980 | | 96.956 | +1.031 | =97.987 |

| Warp | A | B | C | D |
|---|---|---|---|---|
| Count | 17/1 tex | 17/1 tex | 17/1 tex | 17/1 tex |
| Composition | 60% CO Cotton<br>40% PL Polyester | 60% CO Cotton<br>40% PL Polyester | 60% CO Cotton<br>40% PL Polyester | 60% CO Cotton<br>40% PL Polyester |
| Twists(/m) | 640 Z | 640 Z | 640 Z | 640 Z |
| 1 | 14-1036 Ochre | 17-1656 Hot Coral | 18-0513 Bungee Cord | 16-4402 Drizzle |

| Weft | Repeat threads | Repeat % | Total kg |
|---|---|---|---|
| a | 10 | 8.33 | 4.864 |
| b | 48 | 40.00 | 23.348 |
| c | 10 | 8.33 | 4.864 |
| d | 52 | 43.33 | 25.294 |
| Total | 120 | | 58.371 |

| Weft | a | b | c | d |
|---|---|---|---|---|
| Count | 17/1 tex | 17/1 tex | 17/1 tex | 17/1 tex |
| Composition | 94% CO Cotton<br>06% EL Elastodiene | 94% CO Cotton<br>06% EL Elastodiene | 94% CO Cotton<br>06% EL Elastodiene | 94% CO Cotton<br>06% EL Elastodiene |
| Twists(/m) | 480 S | 480 S | 480 S | 480 S |
| 1 | 19-1955 Cerise | 13-0333 Lima Bean | 18-6024 Amazon | 16-0526 Cedar |

OK Close Help

*Figure 341: Yarn consumption calculation*

The data contained in the consumption calculation should be pretty obvious to anyone, who has calculated it “manually” a couple of times. There are only a few points that need further clarification. The formulas for calculation of consumption are as follows:
TakeUp(%) of 2% is assumed to be 1.02
Loss(%) of 2% is assumed to be 0.98
Unit is reported in parenthesis.

$$ConsumptionWarp(kg)=\frac{TotalNumberOfThreads*Length(m)*TakeUp()}{YarnCount(Nm)*1000*Loss()}$$

$$ConsumptionWeft(kg)=\frac{ReedSpace(cm)*DensityWeft(threads/cm)*Length(m)}{YarnCount(Nm)*1000*Loss()}$$

$$Weight(g/m)=\frac{(ConsumptionWarp(kg)+ConsumptionWeft(kg))*1000*Loss()}{Length(m)}$$

Calculations of the number of threads of each color, total consumption, weight per square meter, etc. are trivial, and there is no need to go into obvious details.
In the table below the reed information, you have an overview of all the repeats in the fabric. In this way, you can check if they divide each other as expected, or the total repeat size will be a very big number. Currently, the repeat limit for the consumption calculation is 65520 threads.
The cover factor for warp and weft is calculated based on weave density and diameter of yarns. It is not an absolute value, you will learn with time how dense will the fabric be if the total cover factor is 78%.

The transparency gives you the percent of area with background color in the simulation. The heddles table shows you the number of threads that are lifted by each shaft.
At the bottom of the table, you will also find the weight in g/m for each shaft. We assume that each shaft is lifting 1 m of warp, and the program reports the corresponding weight. This is useful, when you have yarns with different yarn counts in warp, and in this case, the number of threads for each shaft does not reflect the true shaft load.

## 14.7 Advanced loom control functions

*ArahWeave* supports the following weft variables (loom control) functions:

- **Variable weft density**
- **Warp Tension**
- **Loom Speed**
- **Selvedges**
- **Terry**
- **Pile height**
- **Tension pile**
- **Tension ground**

To enable desired weft control function, open the **Set weaving density** window, and check the button at the left side of the option. You can enter data for variable functions in two ways: by entering a pattern in an adequate text field, or by drawing the pattern on the right side in the weave editor in the adequate control column.

### 14.7.1 Variable weft density

Variable weft density is set in the **Density** window (**Fabric** > **Density and control**). You need to mark the **Weft density** check box in the **Variable** field.

Then in the text field we type the variable density pattern. In Figure 342, the density pattern means, that 400 picks have density a, which we set to 25 picks per centimeter, then 50 picks are woven at density b, which we set to 28 wefts per centimeter, then 112 wefts are woven at density c, which we set to 34 picks per centimeter, and then again 50 picks are woven at density b. The program also calculates the total number of wefts in the variable weft density repeat (612), and the average weft density (27 per centimeter).

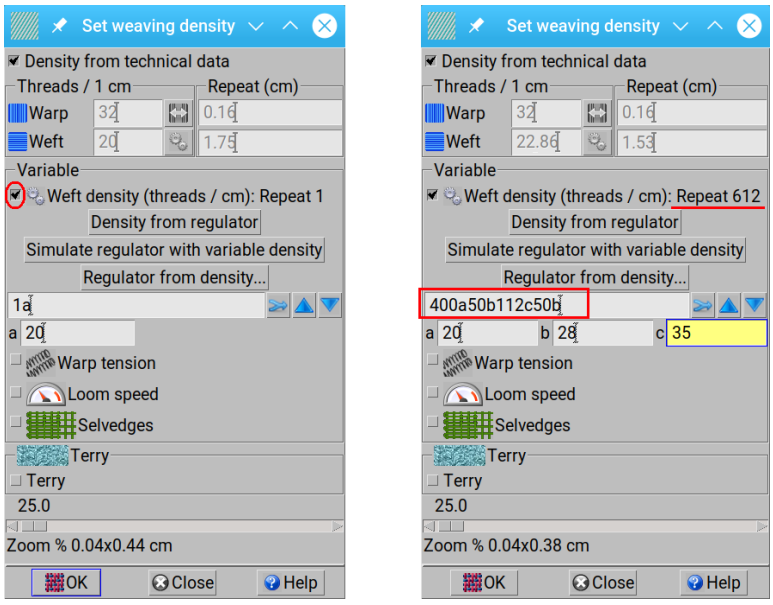



*Figure 342: Setting variable weaving density*

Figure 343 shows the fabric with a variable density.

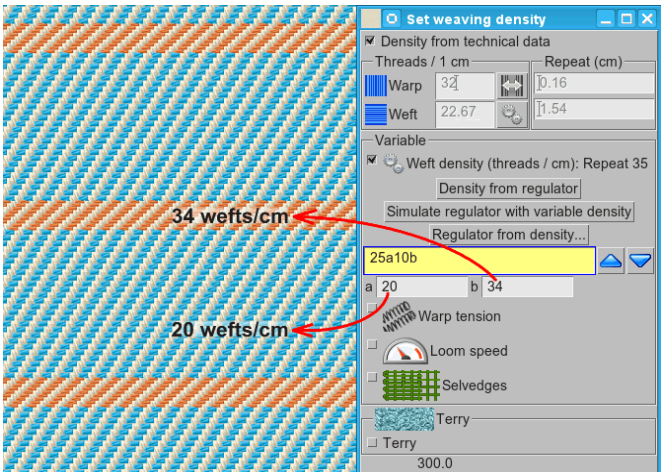



*Figure 343: Variable density in fabric simulation*

Beside the numeric way of entering variable density, you can draw it with a mouse in the weave editor. The variable density pattern is shown on the right side of the regulator column. To draw it, you have to (of course, it should be enabled in the **Variable** field in the **Set weaving density** window) select the desired color (letter) in the top right corner of the **Edit weave** window. As you draw it, the parametric density pattern is updated in the **Set weaving density** window.

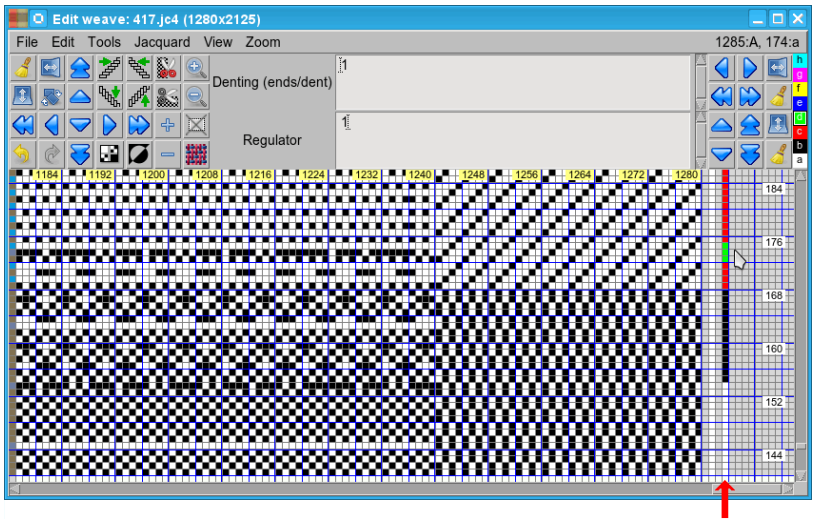



*Figure 344: Variable weft density in Weave editor*

Many times the variable weft density is the same (or very similar) as the weft pattern (weft **a** has one density, weft **b** another etc). In this case you can easily copy a weft pattern to the variable weft density field by selecting weft pattern text with the left mouse button (the text background becomes black), and copying by middle mouse click into the variable weft density field.

***This type of copy / past works among all text fields in ArahWeave. But you can also use standard keyboard shortcuts for copy/paste: Ctrl+C, Ctrl+V.***

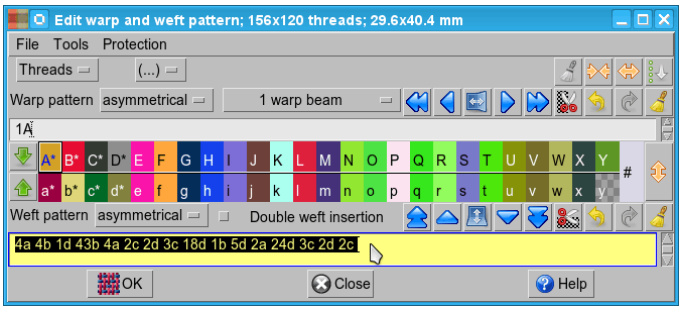



*Figure 345: Selecting text in the Edit warp and weft pattern*

## 14.7.2 Getting a variable density pattern from a regulator pattern

If you want to convert a design, which is made with a regulator, to a design woven with variable density, enable **Weft density** in the **Variable** field, and click the **Density from regulator** button. The program calculates and writes the variable density pattern.

*After that, you need to delete the regulator pattern, because the program will use both, variable density and the regulator, to calculate the average density, which is used to generate the fabric simulation.*

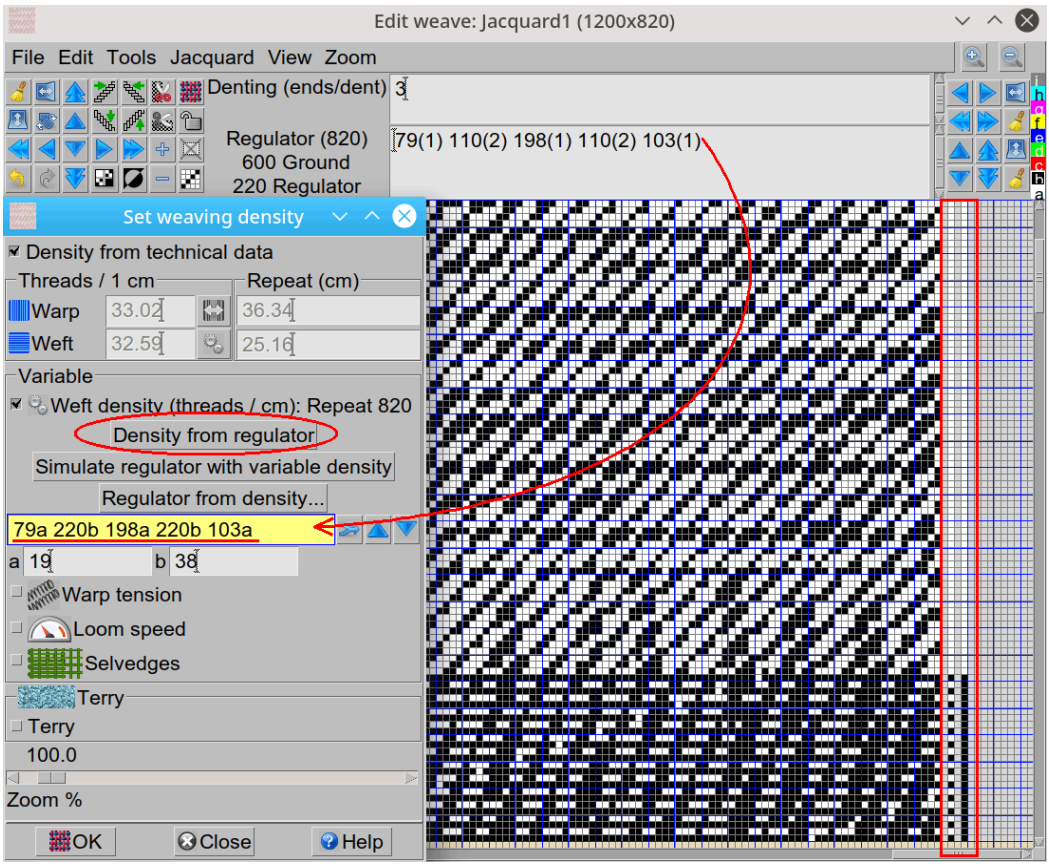



*Figure 346: Density from regulator*

### 14.7.3 Getting a variable density pattern from Jacquard conversion

If you uncheck the **Regulator** check box in the Jacquard conversion dialog, then the program will calculate and write the variable density pattern instead of the Regulator pattern.

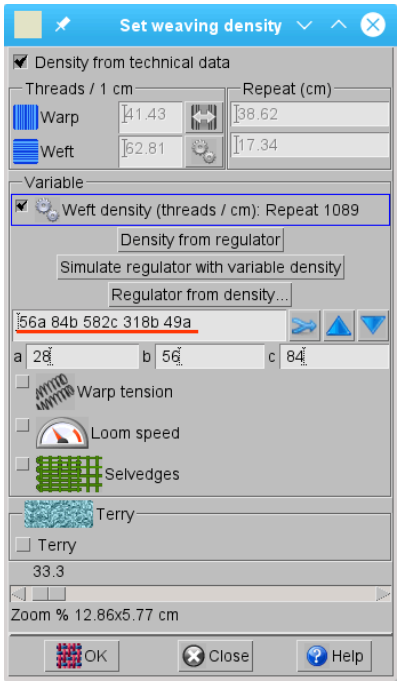



*Figure 347: Variable weft density, written by the program*

### 14.7.4 Simulate regulator with variable density

This function transforms regulator pattern into variable density pattern You get only two different densities, one for ground and one for “regulator” wefts (and, in case, you have fringe enabled in the save cards for production window, you get the third density for the fringe).

To use this function, enable the **Variable weft density option** in the **Set weaving density** window, and click the **Simulate regulator with variable density** button. *ArahWeave* writes the variable density pattern, and draws it in the variable weft density column in the weave editor.

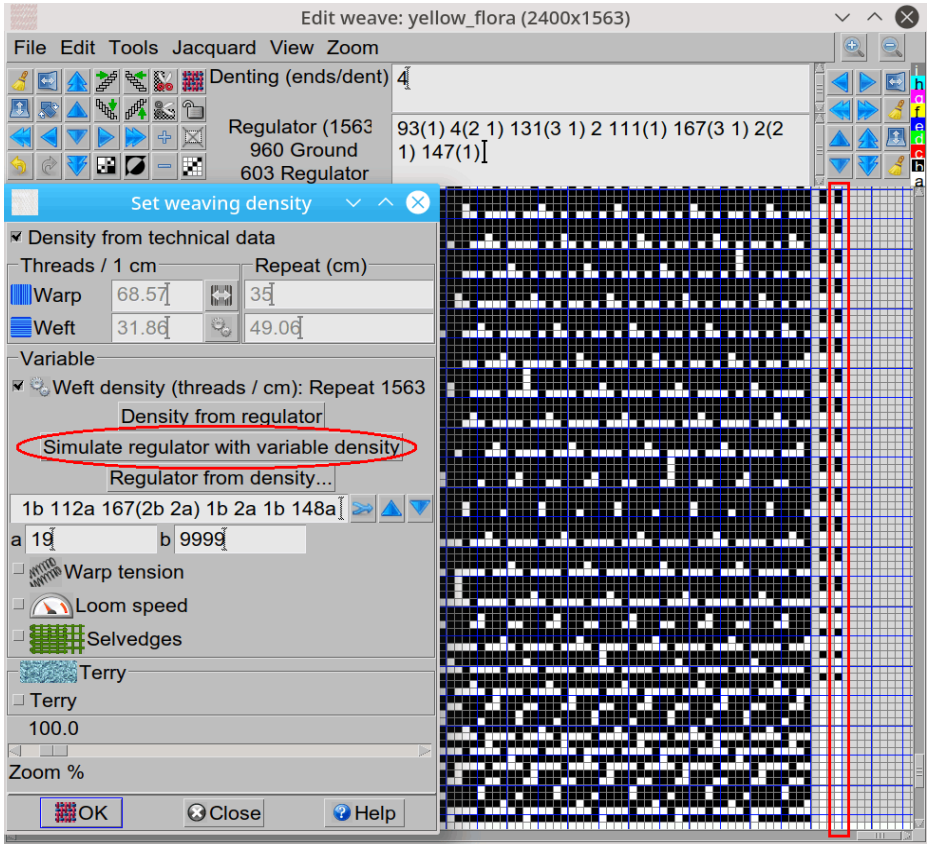



*Figure 348: Simulate regulator with variable density*

### 14.7.5 Regulator from density

If you click the **Regulator from density** button, you can specify the regulator pattern for each density section in the **Regulator from density** window. *ArahWeave* calculates the resulting regulator pattern.

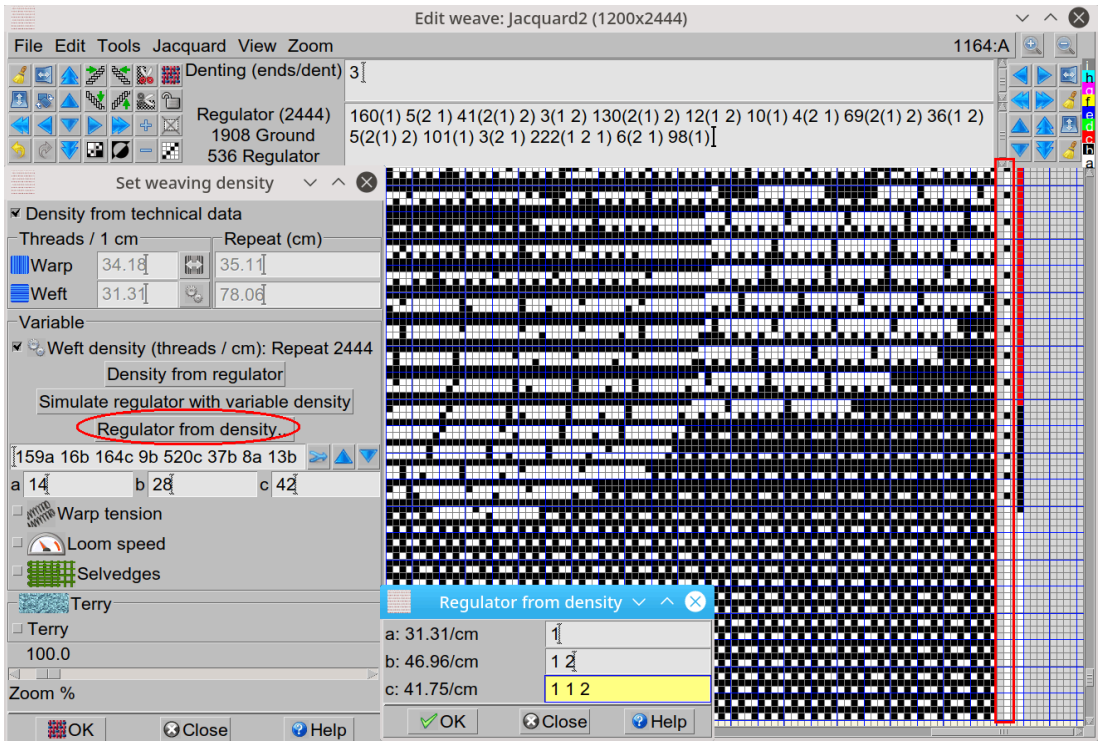



*Figure 349: Regulator from density*

## 14.8 Saving and printing technical data sheet (HTML and PDF formats)

Technical data can be saved in HTML or XML format. To save technical calculation choose **File** > **Save technical data as HTML** in main *ArahWeave's* window. You will get window with many options, which help you to customize your technical data sheet. If you want only to save the file, click on the **OK** button, if you want both save and print, press the **Print** button. The HTML file will be open in a web browser, from which you can print. File will have the same name as the fabric file, the program will add the html extension.

*If you tick the PDF check-box, the fabric data will also be saved as a PDF file and will be opened in a PDF viewer.*

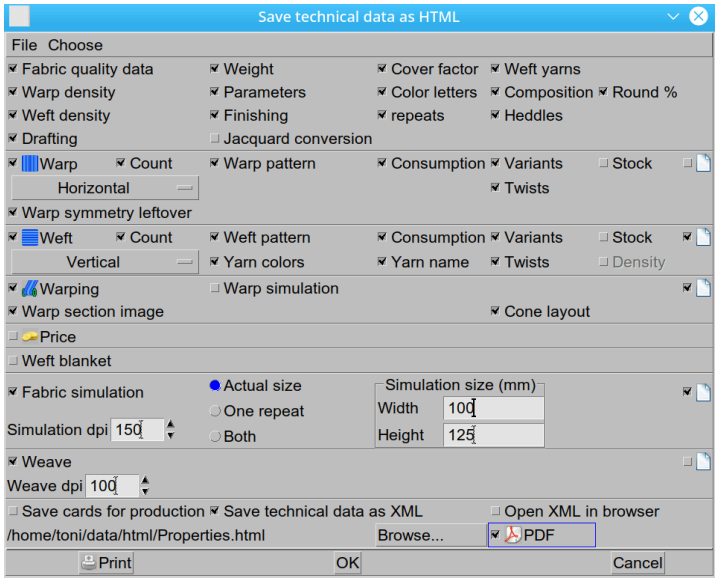



*Figure 350: Save (and print) technical data window*

Technical data consists of the following elements:

- Fabric quality data
- Warp pattern
- Weft pattern
- Warping
- Price
- Weave
- Fabric simulations

If you uncheck the check-box at the left side of the segment, then it will not be saved (and printed) in the HTML file. (When you get a desired tables output by checking/unchecking various check-boxes, save the current setting for future use by saving the Setup (**Help** > **Save setup**; click **OK**)).
Warp and weft patterns have the **Vertical** option; it means that they can be written in a vertical form. If you like to have background colors of the letters, which mark warp and weft yarns, in the color of that yarn, mark the **Color letters** option.

- **Fabric quality data** (number of threads, density, reed number, width, fiber composition of the fabric, denting, regulator, repeat, cover factor).

| | | |
|---|---|---|
| Warp length | | 6497 m |
| Fabric length | | 6400 m |
| Raw width | | 310 cm |
| Finished width | | 300 cm |
| Density Warp | | 40 / cm |
| Density Weft | | 40 / cm |
| Average Density Weft | | 50.67 / cm |
| Weft Total<br>Ground<br>Regulator | | 698<br>551<br>147 |
| Take-up | | 1.5% |
| Waste warp | | 3% |
| Waste weft | | 2% |
| Consumption | | 1492 kg |
| Raw weight | | 227.2 g/m<br>73.3 g/m$^2$ |
| Finished weight<br>Fil coupe | | 210.0 g/m<br>70.0 g/m$^2$ |
| **Composition** | | |
| 86.92% | PL | Polyester |
| 13.08% | CO | Cotton |

| **Repeat** | Weave<br>Fil Coupe | Design | Denting<br>Regulator | Weave<br>Design | Total |
|---|---|---|---|---|---|
| Warp | 480<br>12 Shafts | 1<br>0.02 cm | 2<br>1 Dents | 480<br>12 cm | 480<br>12 cm |
| Weft | 698 | 698<br>13.78 cm | 698<br>551<br>advances | 698<br>13.78 cm | 698<br>13.78 cm |

| Reed number | Reed width | Denting | Dents |
|---|---|---|---|
| 19 / 1 cm | 316.00 cm | 2 | 6001 |
| Selvedge | 2 x 0.32 cm | 1 | 2 x 6 |
| Total | 316.63 cm | | 6013 |

Cover factor

| Warp | Weft | Total | Transparency |
|---|---|---|---|
| 62.07% | 76.19% | 69.13% | 12.60% |

| **shaft** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Heddles** | 1251 | 1251 | 1250 | 1250 | 100 | 100 | 100 | 100 | 1650 | 1650 | 1650 | 1650 |
| **g/m** | 9.8 | 9.8 | 9.8 | 9.8 | 0.8 | 0.8 | 0.8 | 0.8 | 12.9 | 12.9 | 12.9 | 12.9 |

**Drafting: 50**(1 - 2 - 3 - 4) **2**(5 - 6 - 7 - 8) **66**(9 - 10 - 11 - 12) **2**(5 - 6 - 7 - 8)

- **Warp pattern** (has also the **Vertical** option, and if you want to pass only this information to weaving mill, there is option saving on **New page**).

**Selvedge pattern:** 36A
**Warp pattern (66x):** 1A 2B 3A 3C 3D 8C 3E 7C 3D 3C 3A 2B 1A 48B
**Leftover (36 threads):** 1A 2B 3A 3C 3D 8C 3E 7C 3D 3C

**Color letters** enabled

| | | | | |
|---|---|---|---|---|
| 1 | a | 16-4019 Forever Blue | 17/1 tex | 470 Z |
| 2 | b | 14-0114 Celadon Green | 17/1 tex | 470 Z |
| 3 | a | 16-4019 Forever Blue | 17/1 tex | 470 Z |
| 3 | c | 14-0755 Sulphur | 17/1 tex | 470 Z |
| 3 | d | 12-0106 Meadow Mist | 17/1 tex | 470 Z |
| 8 | c | 14-0755 Sulphur | 17/1 tex | 470 Z |
| 3 | e | 18-1454 Red Clay | 17/1 tex | 470 Z |
| 7 | c | 14-0755 Sulphur | 17/1 tex | 470 Z |
| 3 | d | 12-0106 Meadow Mist | 17/1 tex | 470 Z |
| 3 | c | 14-0755 Sulphur | 17/1 tex | 470 Z |
| 3 | a | 16-4019 Forever Blue | 17/1 tex | 470 Z |
| 2 | b | 14-0114 Celadon Green | 17/1 tex | 470 Z |
| 1 | a | 16-4019 Forever Blue | 17/1 tex | 470 Z |
| 48 | b | 14-0114 Celadon Green | 17/1 tex | 470 Z |
| **90** | | | | |

Program writes this table only if the **Vertical** option is on

| **Warp** | **Repeat threads** | **Design threads** | **Selvedges threads** | **Total threads** | **Repeat %** | **Design kg** | **Selvedges kg** | **Total kg** |
|---|---|---|---|---|---|---|---|---|
| A | 8 | 532 | 2*36 | 604 | 8.89 | 5.463 | 0.739 | 6.203 |
| B | 52 | 3434 | 0 | 3434 | 57.78 | 35.265 | 0.000 | 35.265 |
| C | 21 | 1407 | 0 | 1407 | 23.33 | 14.449 | 0.000 | 14.449 |
| D | 6 | 402 | 0 | 402 | 6.67 | 4.128 | 0.000 | 4.128 |
| E | 3 | 201 | 0 | 201 | 3.33 | 2.064 | 0.000 | 2.064 |
| **Total** | 36+66***90** | =5976 | +72 | =6048 | | 61.369 | +0.739 | =62.109 |

| **Warp** | A | B | C | D | E |
|---|---|---|---|---|---|
| **Count** | 17/1 tex | 17/1 tex | 17/1 tex | 17/1 tex | 17/1 tex |
| **Composition** | 60% CO Cotton 40% PL Polyester | 60% CO Cotton 40% PL Polyester | 60% CO Cotton 40% PL Polyester | 60% CO Cotton 40% PL Polyester | 60% CO Cotton 40% PL Polyester |
| **Twists(/m)** | 470 Z | 470 Z | 470 Z | 470 Z | 470 Z |
| **1** | 16-4019 Forever Blue | 14-0114 Celadon Green | 14-0755 Sulphur | 12-0106 Meadow Mist | 18-1454 Red Clay |

- **Weft pattern** (you can save it in the **Vertical** form, and on the **New** page; the letters of the pattern can be written in yarn colors)

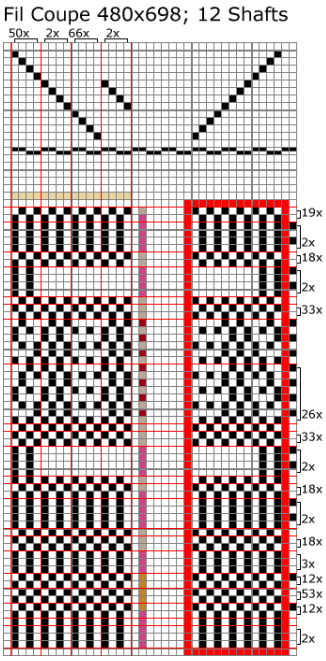
**Weft pattern :** 8b 153d 9b 37a 9b 36a 8b 68a 106(1c 1a) 1c 67a 8b 36a 9b 37a

| | | | |
|---|---|---|---|
| 8 | b | 17-2120 Chateau Rose | |
| 153 | d | 16-1143 Honey Yellow | |
| 9 | b | 17-2120 Chateau Rose | |
| 37 | a | 15-1309 Moonlight | |
| 9 | b | 17-2120 Chateau Rose | |
| 36 | a | 15-1309 Moonlight | |
| 8 | b | 17-2120 Chateau Rose | |
| 68 | a | 15-1309 Moonlight | |
| 1 | c | 14-1318 Coral Pink | **106 X** |
| 1 | a | 15-1309 Moonlight | **= 212** |
| 1 | c | 14-1318 Coral Pink | |
| 67 | a | 15-1309 Moonlight | |
| 8 | b | 17-2120 Chateau Rose | |
| 36 | a | 15-1309 Moonlight | |
| 9 | b | 17-2120 Chateau Rose | |
| 37 | a | 15-1309 Moonlight | |
| **698** | | | |

| Weft | Repeat threads | Repeat % | Weight % | Fil coupe % | kg |
|---|---|---|---|---|---|
| a | 387 | 55.44 | 52.40 | 0.00 | 453.130 |
| b | 51 | 7.31 | 3.54 | 8.92 | 30.623 |
| c | 107 | 15.33 | 33.43 | 37.88 | 289.117 |
| d | 153 | 21.92 | 10.62 | 0.00 | 91.869 |
| **Total** | **698** | | | | 864.739 |

| **Weft** | a | b | c | d |
|---|---|---|---|---|
| **Count** | 78/1 dtex | 4/1 tex | 18/1 tex | 4/1 tex |
| **Composition** | 100% PL Polyester | 100% PL Polyester | 100% CO Cotton | 100% PL Polyester |
| **Twists(/m)** | 0 | 0 | 420 S | 0 |
| **1** | 15-1309 Moonlight | 17-2120 Chateau Rose | 14-1318 Coral Pink | 16-1143 Honey Yellow |

- **Weave** in GIF format




- **Simulation** in JPG format: you have three options here: simulation in actual (real) size, simulation of one repeat (if the repeat is too big, the program reduces the zoom so the repeat fits into set size), or both. For simplicity reasons, one file is named **fabric_name.jpg** and the other is **fabric_name.jpeg**). You can set the resolution in dpi (default is 100 dpi) and both width and height of the simulation size (default is 150 mm)


### 14.8.1 Saving Jacquard conversion data

Among other things, the Save technical data dialog enables you to save Jacquard conversion data, which lists the color-weave combinations (color RGB, weave name and size, and weave's floats).
The table shows Jacquard conversion data of a 12-color image. Data of RGB, weave, size and long floats data is next to every color cell.

| Color | RGB | Weave | Size | Long floats |
|---|---|---|---|---|
| 1 | 219,203,163 | 2up24 | 24x120 | 23,7 |
| 2 | 0,0,255 | 1up5 | 24x120 | 23,8 |
| 3 | 255,143,203 | 1up5 | 24x120 | 23,8 |
| 4 | 87,151,255 | 1up | 24x120 | 23,9 |
| 5 | 175,175,175 | 2up24 | 24x120 | 23,7 |
| 6 | 0,0,0 | 1up5 | 24x120 | 23,8 |
| 7 | 0,219,191 | 2up14 | 24x120 | 23,6 |
| 8 | 95,195,0 | 2up14 | 24x120 | 23,6 |
| 9 | 0,111,51 | 2up23 | 24x120 | 23,8 |
| 10 | 167,95,199 | 1up | 24x120 | 23,9 |
| 11 | 255,179,7 | 2up14 | 24x120 | 23,6 |
| 12 | 107,107,107 | 2up24 | 24x120 | 23,7 |

### 14.8.2 Saving the price calculation

If you tick the **Price** check-box, the Price table from the Price calculation will be saved in HTML file.

| **Cost** | **€/m** | **%** |
|---|---|---|
| Warp | 1.84193 | 29.54 |
| Weft | 1.95796 | 31.40 |
| **Yarn price** | **3.80** | 60.95 |
| Warping | 0.20816 | 3.34 |
| Weaving | 0.87550 | 14.04 |
| Darning raw | 0.10200 | 1.64 |
| Finishing | 0.91800 | 14.72 |
| Darning finished | 0.30000 | 4.81 |
| Transport | 0.02418 | 0.39 |
| Margin | 30% | |
| Divisor | 0.7 | |
| **Industrial cost** | | |
| Raw net | 4.91 | |
| Raw gross | 4.92 | |
| Finished | 6.23 | |
| **Price** | | |
| **Raw** | **7.02** | |
| **Finished** | **8.91** | |

### 14.8.3 Viewing the fabric data file in Web Browser (or PDF viewer)

As you click the Print button in the Save technical data in HTML dialog, the file is opened in the default web browser, or in the PDF viewer, if the PDF check-box is marked in the Save technical data dialog. You can change the default browser (Firefox) in ArahWeave's **Save setup** window. For instance, if you prefer Chrome (of course Chrome should be installed on your system), choose **Help** > **Save setup**, in the Save setup window click the **Expert** tab, and type-in `/usr/bin/chromium` in the **WWW browser** field.

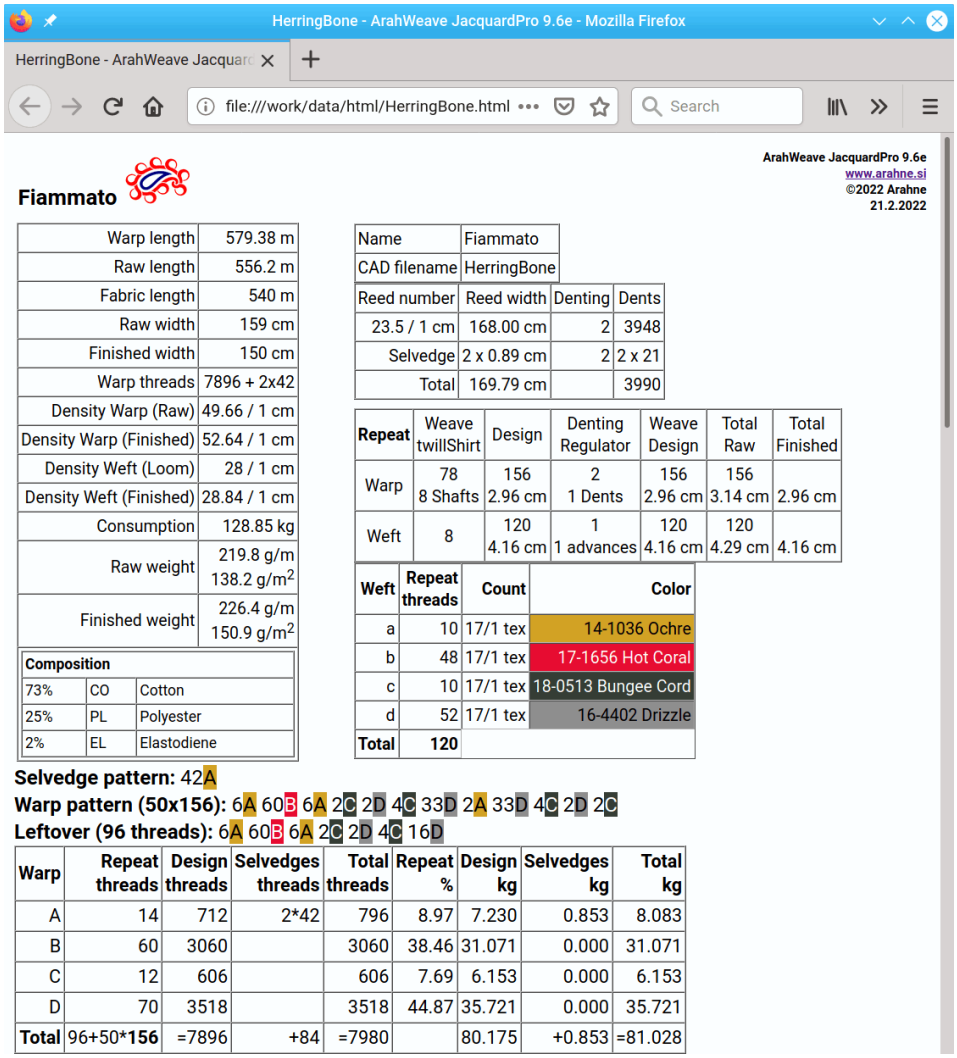



*Figure 351: ArahWeave's HTML data in Mozilla Firefox*

*ArahWeave* enables direct saving to PDF format, which may be easier to send by email, because the tabla data, a fabric simulation and a weave are written in a single file.

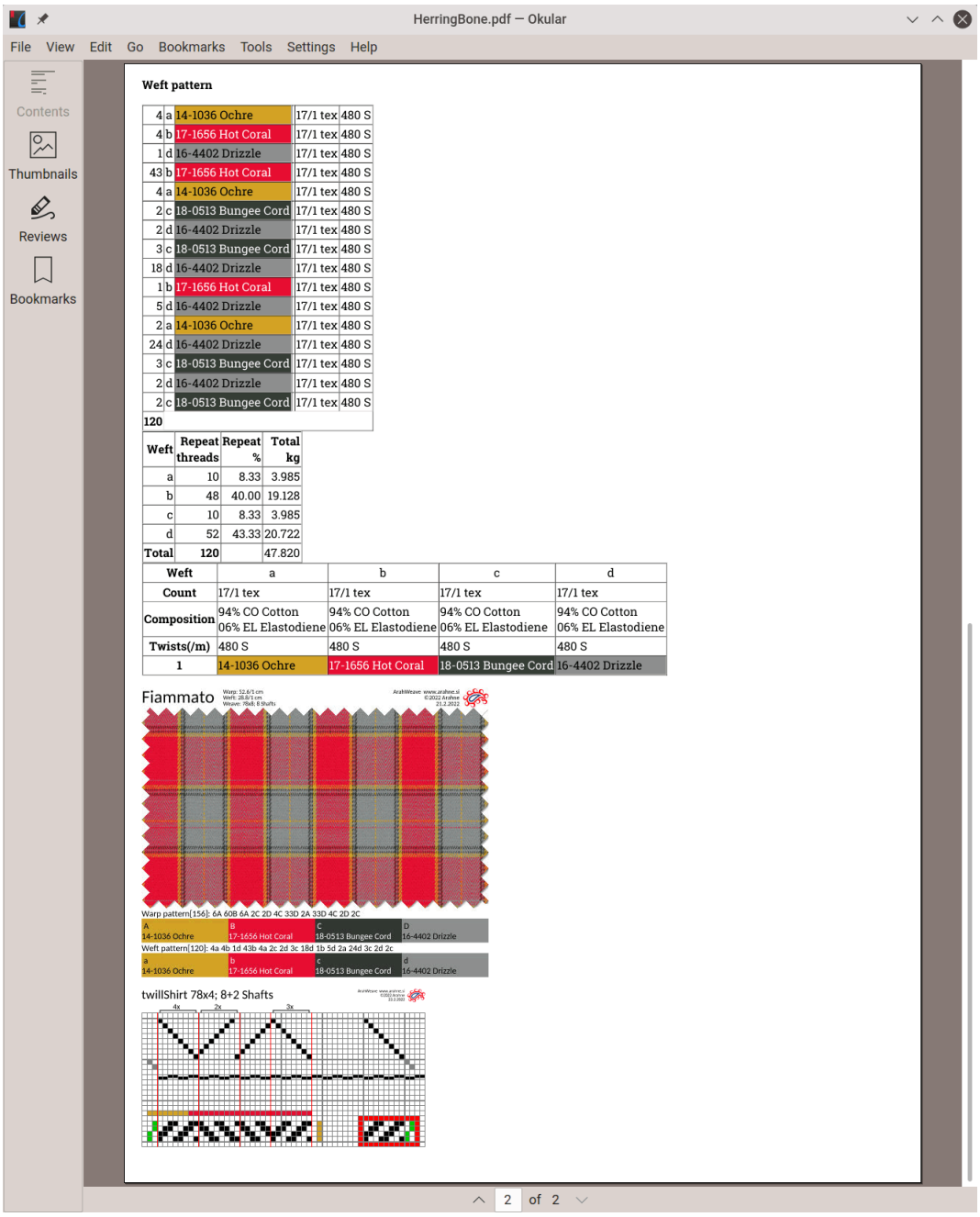



*Figure 352: Technical data in PDF format*

# 15 Warping

The **Warping** feature calculates:

- yarn consumption for particular warp
- the number of required cones per yarn color
- the length (weight) of yarn per cone
- the yarn cones layout for selected warper.

## 15.1 Warper configuration

First you need to edit or add a .warper file in the /home/user_name/data/warp/ folder. The file is description of your warper and should contain:

- Number of creels

- Number of creel blocks
- Order of yarn cones.

There are eight possible directions. *ArahWeave* uses simple two letters nomenclature for that: first letter means a starting point (L-left, R-right, U-up, D-down), and second letter means the direction).

| | | |
|---|---|---|
|  | LD | Left Down |
|  | RD | Right Down |
|  | LU | Left Up |
|  | RU | Right Up |
|  | UR | Up Right |
|  | UL | Up Left |
|  | DL | Down Left |
|  | DR | Down Right |

The layout of warper(s), used in the warp directory is read at program startup from location /home/user_name/data/warp/.warper

The location of the .warper file can also be different, if the path to warp files, as defined in your .arahne file, is different.

The structure of the .warper configuration file is very strict. If there are any errors in the file, the program ignores it and uses the default warper. The .warper file must use Unix line endings, not MSDOS (CR/LF). You should use a plain text editor on Linux (kwrite, kate...), or take care of the file ending conversion, if you edit the file on Windows. The easiest way to edit the file is to copy text below into the editor's window, then edit it, and save it as .warper (note the dot at the beginning of the name). Or you can contact Arahne (arahne@arahne.si), and we will create a file based on warper's specifications.

Here is one example of .warper file contents, explanation follows below:

```
#WARPER
#NUM_WARPERS=2
#WARPER_NAME=warper1
#NUM_DIRECTIONS=2
DR
UL
#NUM_CREELS=3
#CREEL_NAME=A
#NUM_CREEL_BLOCKS=6
6x7
6x7
5x7
5x7
5x7
5x7
#CREEL_NAME=B
#NUM_CREEL_BLOCKS=6
5x7
5x7
5x7
5x7
6x7
6x7
```

```
#CREEL_NAME=C
#NUM_CREEL_BLOCKS=1
5x7
#WARPER_NAME=warper2
#NUM_DIRECTIONS=1
LU
#NUM_CREELS=2
#CREEL_NAME=A
#NUM_CREEL_BLOCKS=1
24x7
#CREEL_NAME=B
#NUM_CREEL_BLOCKS=1
24x7
```

The sample file defines 2 warpers. You can define up to 5 warpers, as it is unlikely that a single company would have more than 5 different warpers. Each warper should have a distinct name. Each warper can have up to 5 creels. Each creel can have up to 50 blocks. The dimension of a block can be up to 100. Let's follow the example and comment on it:
#WARPER --- file signature, just to identify the file type. Does not have any parameters.
#NUM_WARPERS=2 --- number of warpers defined in the file
#WARPER_NAME=warper1 --- name of the first warper
#NUM_DIRECTIONS=2 --- number of allowed directions of filling in the creel with cones
DR --- first direction: begin in upper left corner, and fill in the cones down, and to the right
UL --- second direction: begin in lower right corner, and fill in the cones up, and to the left
#NUM_CREELS=3 --- number of creels for first warper
#CREEL_NAME=A --- name of the first creel
#NUM_CREEL_BLOCKS=6 --- number of creel blocks
6x7 --- size of creel block, horizontal x vertical
6x7 --- repeat until you define all the blocks
...
#CREEL_NAME=B --- name of the second creel
#NUM_CREEL_BLOCKS=6 --- number of blocks in the second creel
5x7 --- size of creel block, horizontal x vertical
#CREEL_NAME=C --- name of the third creel
#NUM_CREEL_BLOCKS=1 --- last creel has just one block
5x7 --- the size of the creel block
#WARPER_NAME=warper2 --- the name of the second warper
#NUM_DIRECTIONS=1 --- number of directions on the second warper
LU --- begin in lower right corner, and fill in the cones left, and then up
#NUM_CREELS=2 --- we have just two creels on the second warper
#CREEL_NAME=A --- name of the first creel of second warper
#NUM_CREEL_BLOCKS=1 --- number of blocks of the first creel of second warper
24x7 --- horizontal x vertical number of cone positions

## 15.2 Editing the warp

To edit the warp, choose **Fabric** > **Warping**.
You have to enter in the following data:

- **Number of sections** – depends on the number of threads in the width and the warp pattern repeat. Number of threads and the length of the warp are taken from the **Calculation of thread consumption** dialog.

- **Threads** – number of yarn cones in one section
- **Times** – number of section's repeat
- Filling direction on the creel of warper. Program allows eight filling directions (the letters indicate direction of first and second move), which have to be declared in the warper configuration file. To change the direction, click on the icon.

The goal of *ArahWeave* is to allow you graphical specification of number of warping sections, relative length of each section, with the number of repeats of each section. The output of the program is the exact count on cones for each yarn color and for each length (number of warp repeats).

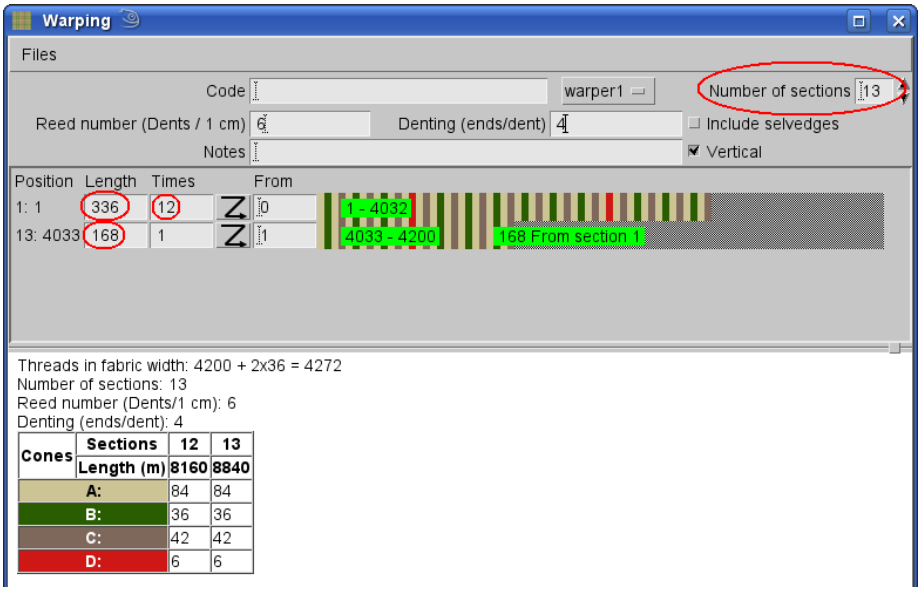



*Figure 353: The Warping dialog*

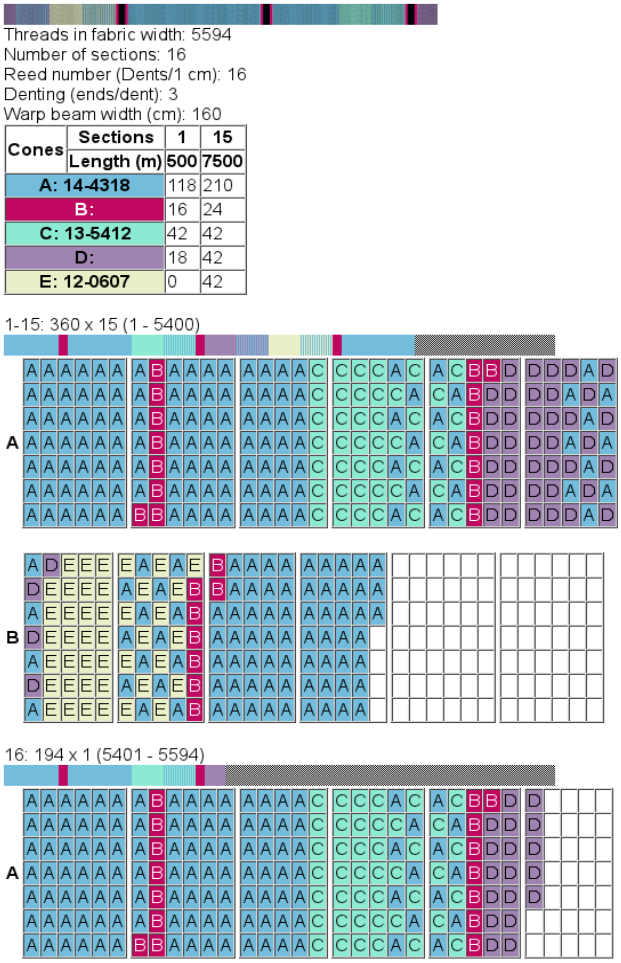
Program also gives you the graphical map of cone placement on the creel. The cone placement should be taken with a grain of salt, as intelligent workers may be able to better optimize each individual case. In the warping window it will also indicate with red or green color, if the number of repeats of each section is correct.

## 15.3 HTML OUTPUT

There are three options in the warping section of the HTML output:

- **Warp simulation**: it creates an image of one repeat of the warp pattern.
- **Warp section image** adds an image of current warp section, with the unused parts of the warper marked in black and white check board pattern.
- **Cone layout** enables or disables cone section layout printout.

In the report of the warping section, the program explicitly tells that one section is equal or mirrors a previous section, if one section repeats a previous one. If the section is a complete repeat or mirror of another section, it is not reported in table form to save space in the HTML report.




| Cones | Sections | 1 | 15 |
|---|---|---|---|
| | Length (m) | 500 | 7500 |
| A: 14-4318 | | 118 | 210 |
| B: | | 16 | 24 |
| C: 13-5412 | | 42 | 42 |
| D: | | 18 | 42 |
| E: 12-0607 | | 0 | 42 |

*Figure 354: HTML output of warping data*

# 16 Calculating the price of fabric

## 16.1 Necessary inputs for the price calculation

You have to input following data in the **Price** window (**Fabric** > **Price**) in order to calculate the fabric price:

- The price for each yarn used in the fabric (in the **Yarns** window)
- The cost of **warping** per length unit
- The cost of **sizing** per weight unit
- The cost of **weaving** per number of picks (default unit is 1.000 picks; you can change it in the **Save setup** > **Units**)
- The cost of **darning** per length unit
- The cost of **piece dying** per weight unit
- The cost of **transport** per weight unit

To calculate the final price, you have to enter some financial ratios:

- the **Operating margin** (%)
- **Financing** (%)
- **Provisions** (%)
- the **Commercial margin** (%)

After entering the parameters, click **OK** to get the price calculation.

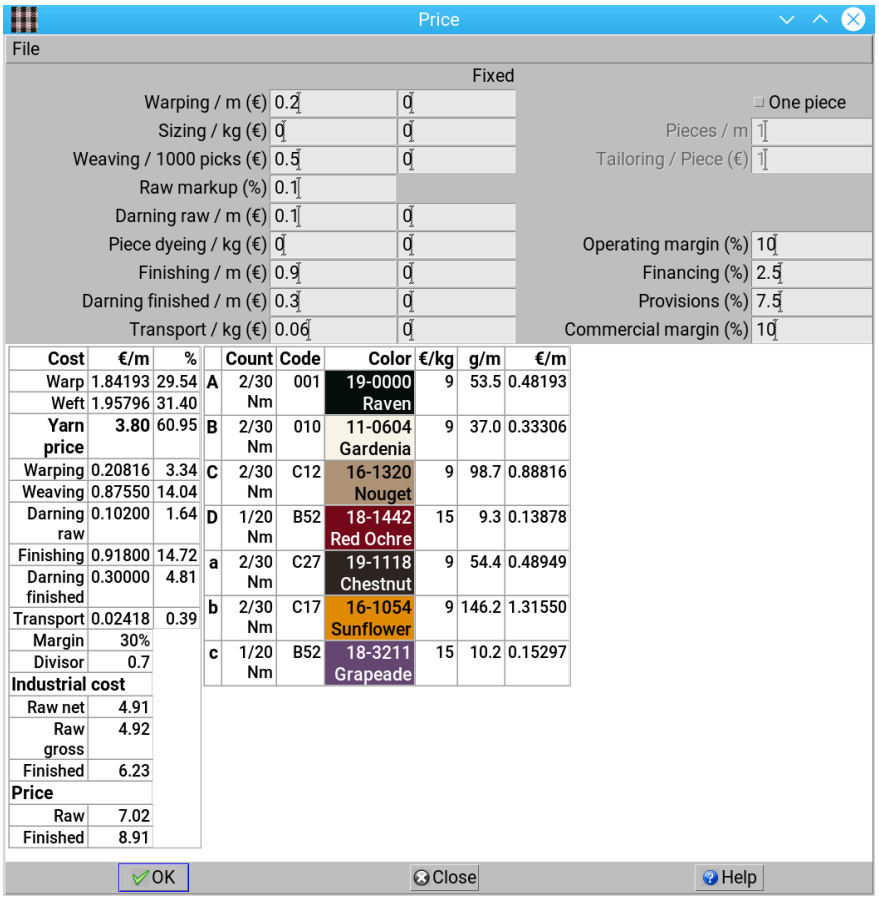



*Figure 355: The price calculation dialog*

If you don't use some of the production phases, just set them to zero. You can also print out the fabric calculation, if you select it during HTML saving/printout. If you want to have an online price calculation during designing, you can enable it in the **View** menu, and the program will display the price in the program title bar based on current fabric parameters.
The processing costs which depend on fabric weight, use the raw fabric weight for calculation.

## 16.2 Setting the currency

To set the currency, in which you want to display the price, open the **Save setup**, and enter the currency code in the **Currency** field.

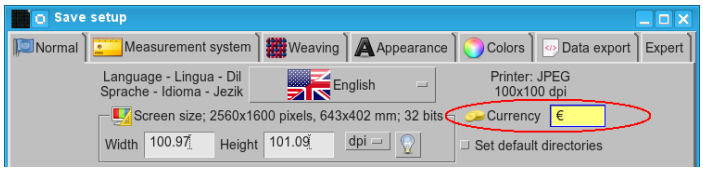



*Figure 356: Setting the currency*

# 17 Printing the fabric simulation

*ArahWeave* always prints a fabric using current **View** mode and **Zoom** level. Normally, it is the **Simulation** view at 100% **Zoom**. But any other combination is also possible. To print a fabric simulation, select the **Print fabric to printer** function from the **File** menu.

## 17.1 Print size

To control the size of the printout and its position on the paper, enter the print size (**Print width** and **Print height**), and position (distance from top and left border of the paper), in the fields in the **Print size** area. To check the maximum printable area, press the **Full page** button. If you insert an area out of range (too big for the paper size), it will be trimmed to a specific printer size and you will be warned with a beep.

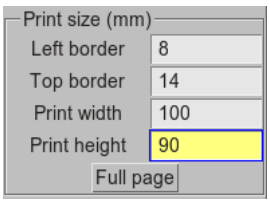



*Figure 357: The print size dialog*

## 17.2 Setting print area

The print area starts from the bottom left corner of the fabric in the main *ArahWeave* window. You can position to the desired starting point of the printout with the program's scroll bars. So if you want your fabric to be printed from the first warp and first weft, position the program scroll bars in the main window to the leftmost and bottom position.

Figure 358 shows a fabric with a circle motif, the size of the motif area is approximately 10x9 centimeters; the red rectangular indicates the print area. If we want to print a motif, we need to move the program's scroll bars to get the desired print area in the lower-left corner.

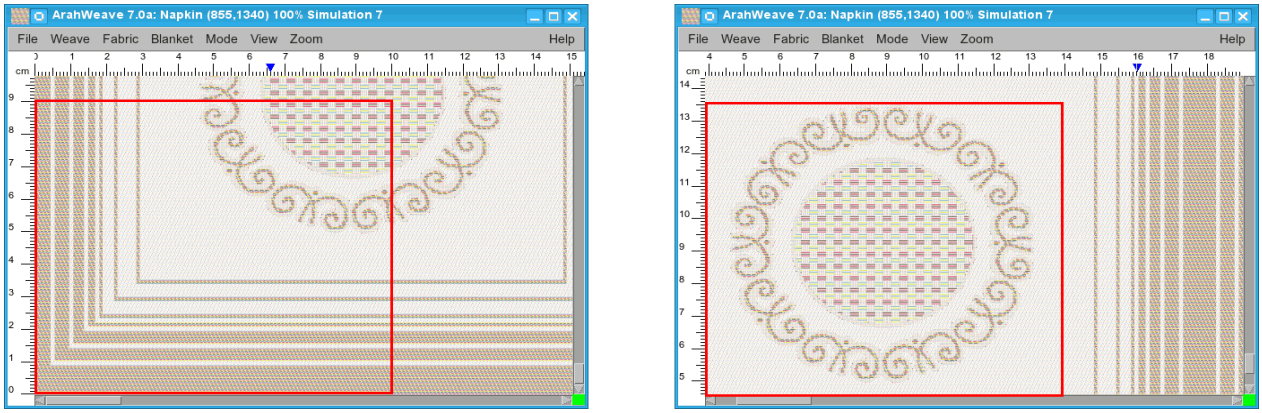



*Figure 358: The red rectangular indicates the print area*

In case that you can't position the desired starting point of the printout to the lower-left corner, because the current view of the fabric doesn't require scroll bars, there is an additional setting in the **Print fabric to printer** window – coordinates of starting point in fabric. You can set the numbers in two ways: Ctrl+left mouse click in the fabric, where the printout should start, or you can set these numbers manually in the **First Warp/Weft** text fields.

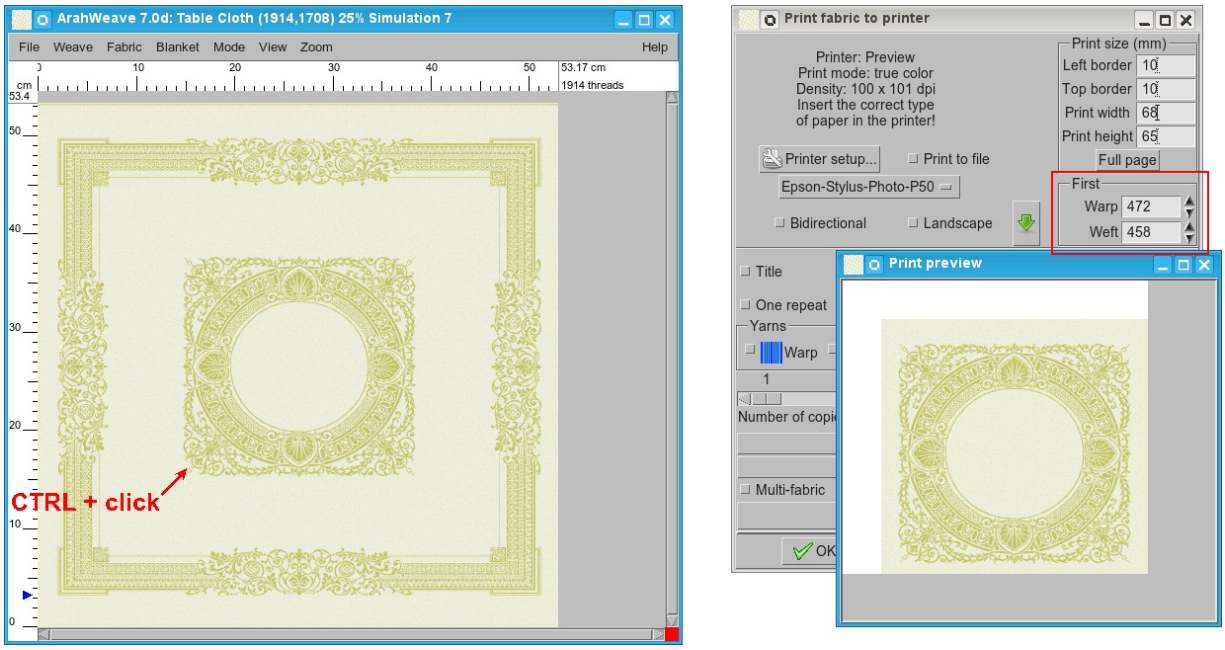



*Figure 359: Ctrl+left mouse click in the fabric sets the starting point of printout*

## 17.3 Printing options

The printing option toggle buttons are below the **Print size** text fields. Simply, by marking the check box in front of the option, you include that in the printout:

- **Title**; you will get an extended title with date, user name, customer name (your company) and version of the program at the top of the page. The printed fabric name is the current fabric filename, but if you enter the data into the Properties window (**Fabric** > **Properties**), then the fabric name is taken from there.
-  ; You can choose the type of scissors cut: straight, zigzag with white background, zigzag with transparent background.
- **Density**; the density of the fabric will be written in the title line.
- **Yarns;** the yarn color tabs will be printed below fabric simulation.
- **Color**; you can enable **Code**, **Name**, **CIE Lab** and **RGB** values to be printed in the color tab.
- **Warp/weft pattern;** you will get warp and weft patterns at the bottom of the printout.
- **One repeat**, as name indicates, will print only one repeat of the fabric, mostly useful for one repeat designs (blankets, table linen).

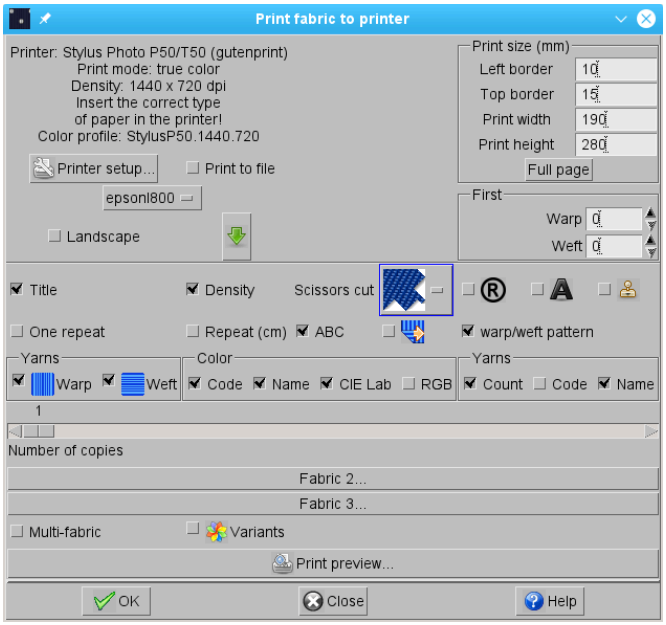



*Figure 360: Printing the fabric simulation*

- ®; the text, which you have in the **Registered design text** field in the **Appearance** tab of the **Save setup** window, will be printed (or saved) in the fabric simulation printout.
- A; if you enable it, the program prints a text, which you have entered in the **Custom print text** field in the **Appearance** tab of the Save setup window, over the fabric simulation.

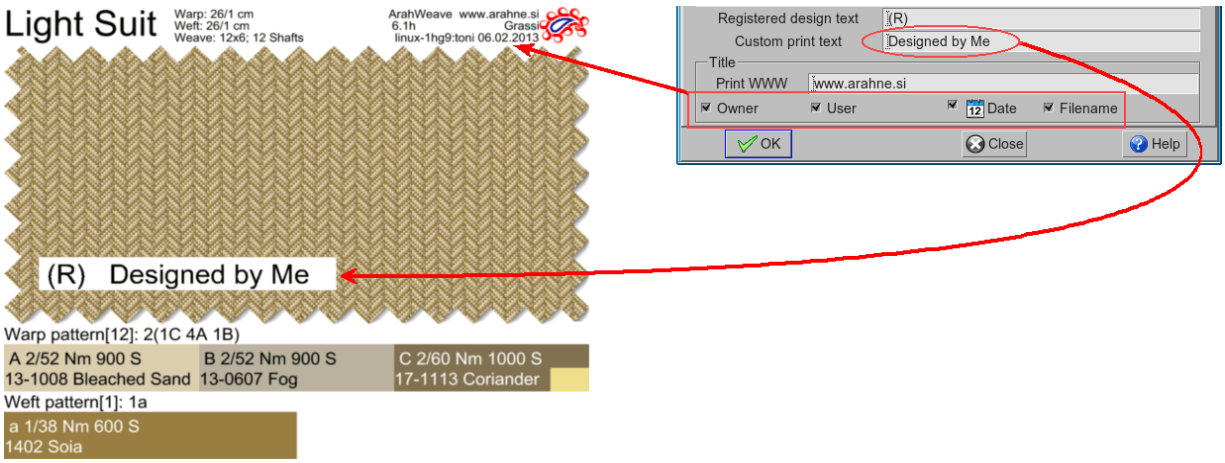



*Figure 361: Registered design text, custom print text and the right side part of the title in the printout*

- ; if you check the **Overprint** box, the colors from the overprint image (**Fabric** > **Simulation** > **Overprint**) will be printed in the lower left corner of the simulation.

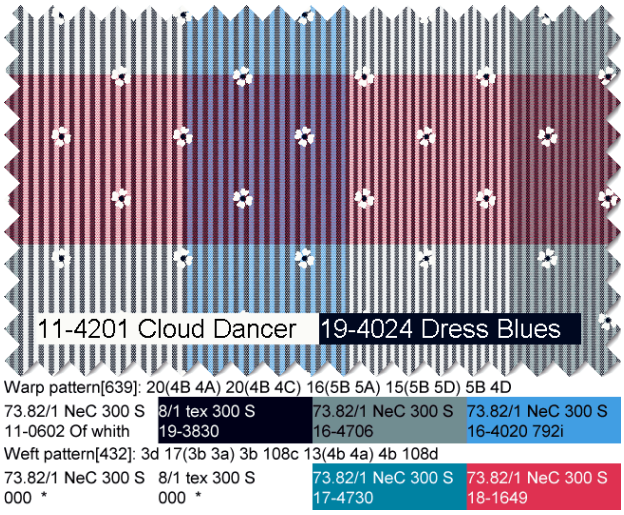



*Figure 362: Color chips of overprint image*

- ; The printout will be divided into halves: one for the face and other for the back of the fabric.

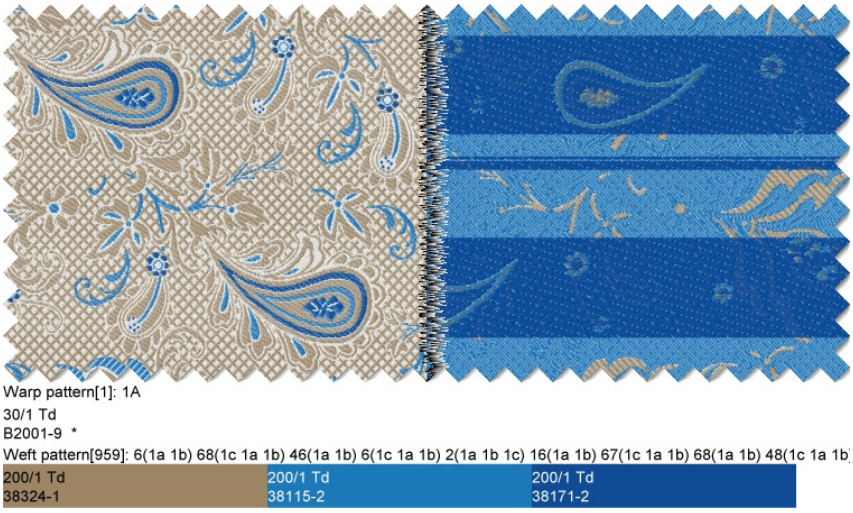



*Figure 363: Face and back printout*

## 17.4 Print preview

When the settings are correct, check the **Print preview**. It displays simulations exactly as it will be placed on a paper (left and top offset). If everything is in a proper place, close the print preview, and click **OK**.

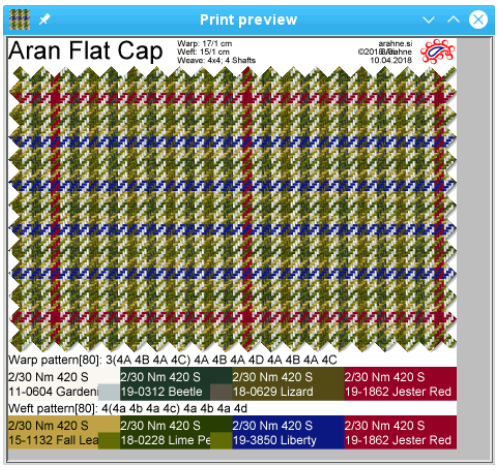



*Figure 364: Print preview*

## 17.5 Printer setup

If you want to print to a different printer or file, you should select **Printer setup** in the **Print fabric to printer** dialog to change printer settings. In the **Printer setup** dialog (Figure 365), you have to choose the desired printer or graphics file format, print mode and density (in dpi—dots per inch). For higher quality printouts use 1440 dpi, but in most cases 720 dpi is sufficient.

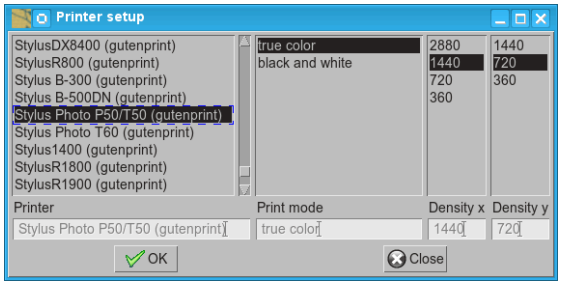



*Figure 365: Printer set-up*

## 17.6 Customizing printout

### 17.6.1 Logo

To change a logo, which is printed in the upper right corner of the simulation, you have to replace **logo.gif** file, which is in default folder for saving fabric technical data in html format (usually **/home/user_name/data/html** folder), with your own logo image file. It can be in any common graphical format, but the file name should remain **logo.gif**.


*Figure 366: Logo and website in the printout*

### 17.6.2 Top image

Beside logo, you can add a second image on HTML data sheet. It will be displayed at the top of the page. The file name should be **logoHTML.gif** and placed in the default folder for saving fabric technical data (usually `/home/user_name/data/html` folder).

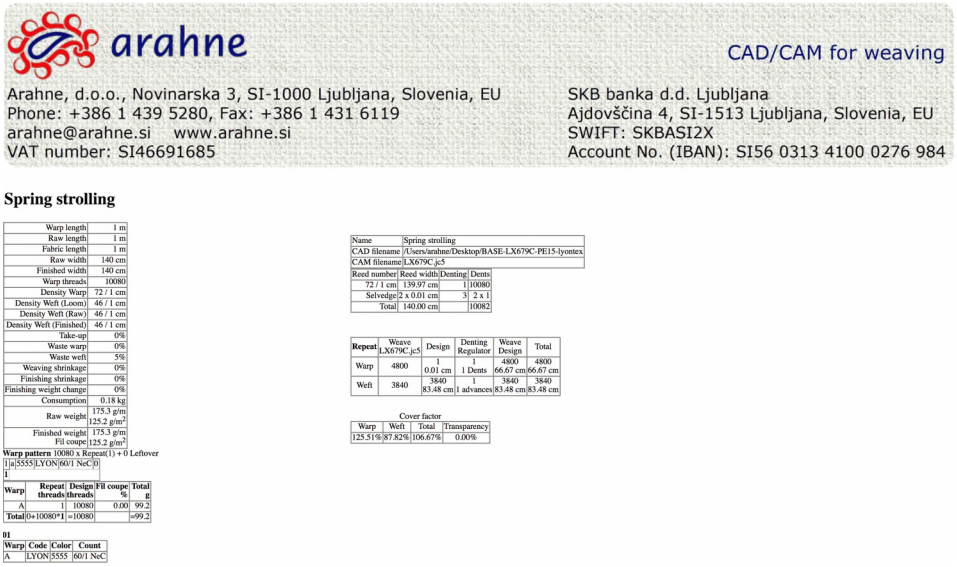



*Figure 367: Additional image at the top of the technical data sheet.*

## 17.6.3 Website

You can have your website address printed near the logo. Just type it in the **Print www** field in **Help** > **Save setup** > **Appearance** (please check chapter 20.4 about saving the setup).

## 17.6.4 Title of the fabric simulation

You can use data from the Properties window (**Fabric** > **Properties**) to generate the title of the printed fabric simulation. The **HTML fabric name format** text field of the **Generate filename** section in Save setup (**Help** > **Save setup**) enables you to declare which properties are used for an auto-generated fabric simulation title.

The format of the fabric name formula has only one rule: the number of a field which will be used in the fabric name, should stand after the dollar sign ($), which is there to indicate that the used number is the field number and not a character which would be part of the text. After the field number you can enter whatever character you want, like space, slash, hyphen, and it will be used in the generated filename.

The text fields in the Properties dialog have following numbering labels:

| Field | Label |
|---|---|
| Division | $8, $9 * |
| Name | $1 |
| Quality | $2 |
| Design | $3 |
| Version | $4 |
| Season | $5, $6 * |
| Designer | $7 |
| Notes | $N |
| Variants | $V |

- * $8 takes only the first word (anything until the space character) from the division code (or name), while $9 takes the whole name. Same applies to Season: $5 takes only the first word, while $6 takes the whole code.

You can use four additional signs for automatic title generation:

| | |
|---|---|
| Fabric filename | $0 |
| Jacquard image filename without suffix ** | $I |
| Scissors *** | $@ |
| Directory, in which the fabric is saved | $D |

- ** It is a capital letter I.
- *** Scissors sign can be printed only on multi fabric print, when the **Multi-print** option in the Print dialog is enabled. The scissors mark $@ should be written in the **Multi-fabric 1** or **Multi-fabric 2** field of the **Generate filename** section (see chapter 17.8).

Let's see an example: if you have written **$1 $2/ $3 - $4** as a rule in **HTML fabric name format**, and have entered following text in the Properties window: **Overcoat** as a Name (Field 1), **117** as a Quality (Field 2), **B** as a Design (Field 3), and **12** as a Version (Field 4), then the generated name would be: **Overcoat 117/ B – 12**.

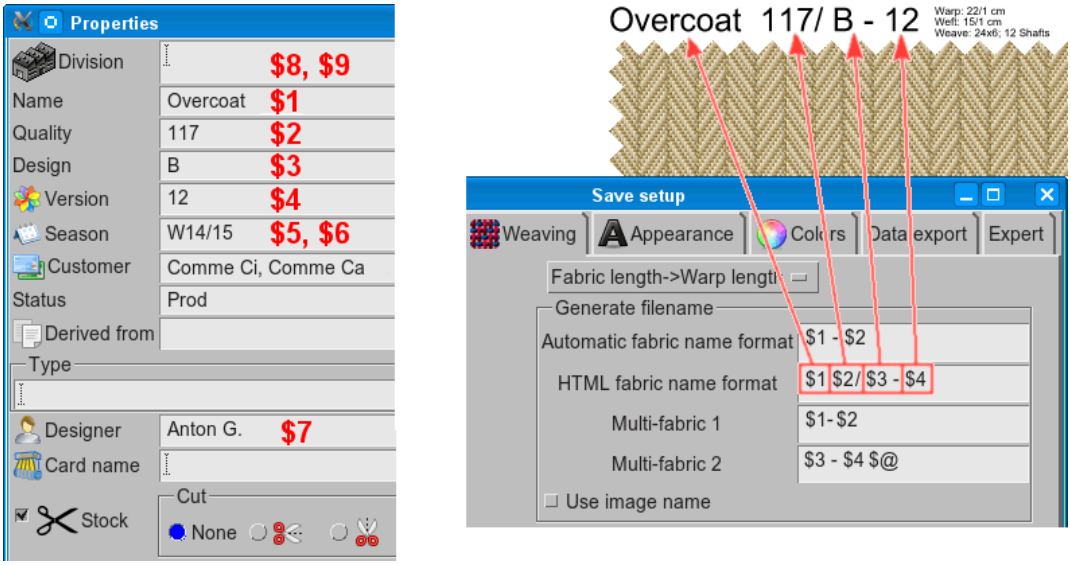



*Figure 368: The fabric properties, which can be used in automatic generated fabric name, the fabric name rules in Save setup, and generated title on the printout*

## 17.7 Printing more simulations on one page in one step

To print more fabric simulations on the same page, without error-prone calculation of positioning of the printouts to the available space, you have a possibility of selecting two more fabrics (to a total of three) to be printed on the same area. Click on the **Fabric 2** button or the **Fabric 3** button in the **Print fabric to printer** window. This will open the fabric browser, from which you load additional fabrics. The available area will be divided horizontally in two or three equal spaces.

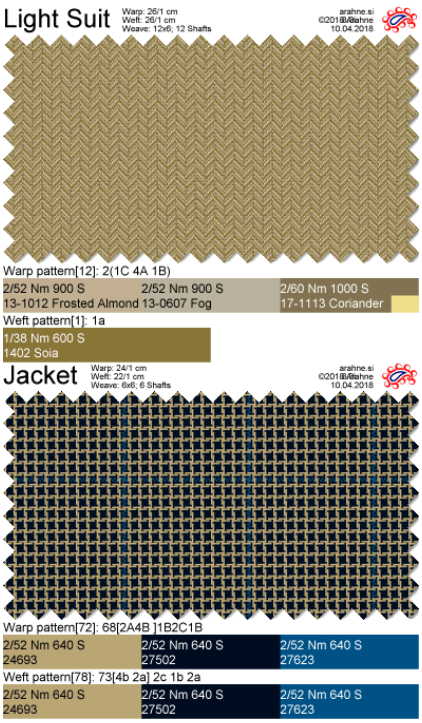



*Figure 369: Printing of two fabrics*

## 17.8 Multi-fabric print

There is another possibility to print more fabric simulations at once. In the **Print fabric** window (Figure 360), mark the **Multi-fabric** toggle button. The Multi-fabric dialog will pop-up. (Figure 371). Set the number of fabrics in the **Fabrics X** and **Fabrics Y** field. You can print up to 8 by 8 fabrics. To load fabrics use **Browse window**, which you get by double clicking in the window or by clicking the **Browse** button in the lower left corner of the window. You can set the alignment of the fabric title by changing the alignment option buttons.

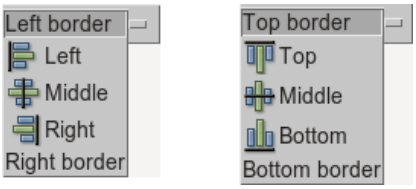



*Figure 370: The alignment option buttons for title positioning*

To view the Print preview, click **Preview** in the **Print fabric to printer** window.

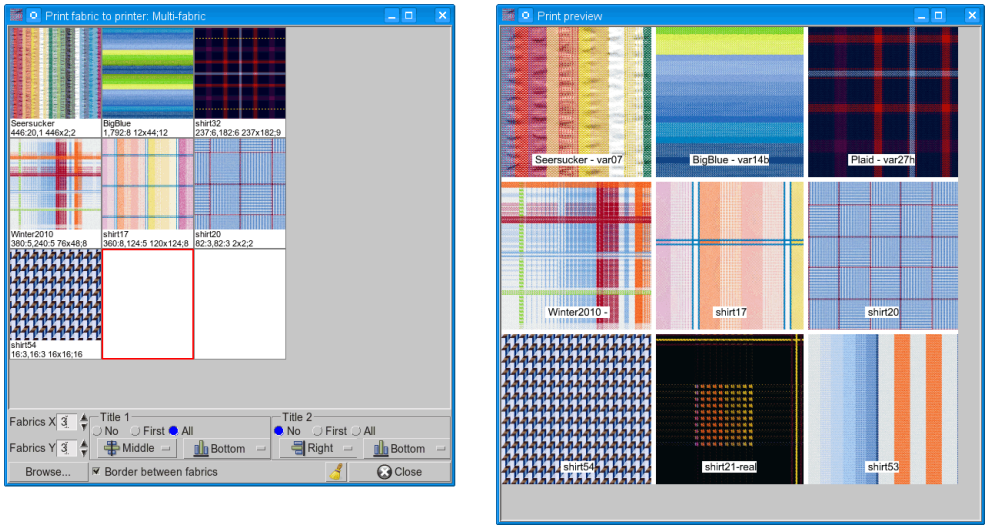



*Figure 371: The Multi-fabric print dialog and the print preview*

### 17.8.1 Title of the fabric simulation in the Multi-fabric printout

Similar to “normal” printout, the title of the fabric simulation in the **Multi-fabric** printout can be generated from the fabric’s preferences. You can have two titles at different positions. The idea behind two titles is to create something similar to “real” fabric samples, which are usually put on a black cardboard with main design and few color variants, which can have a different title than main design.

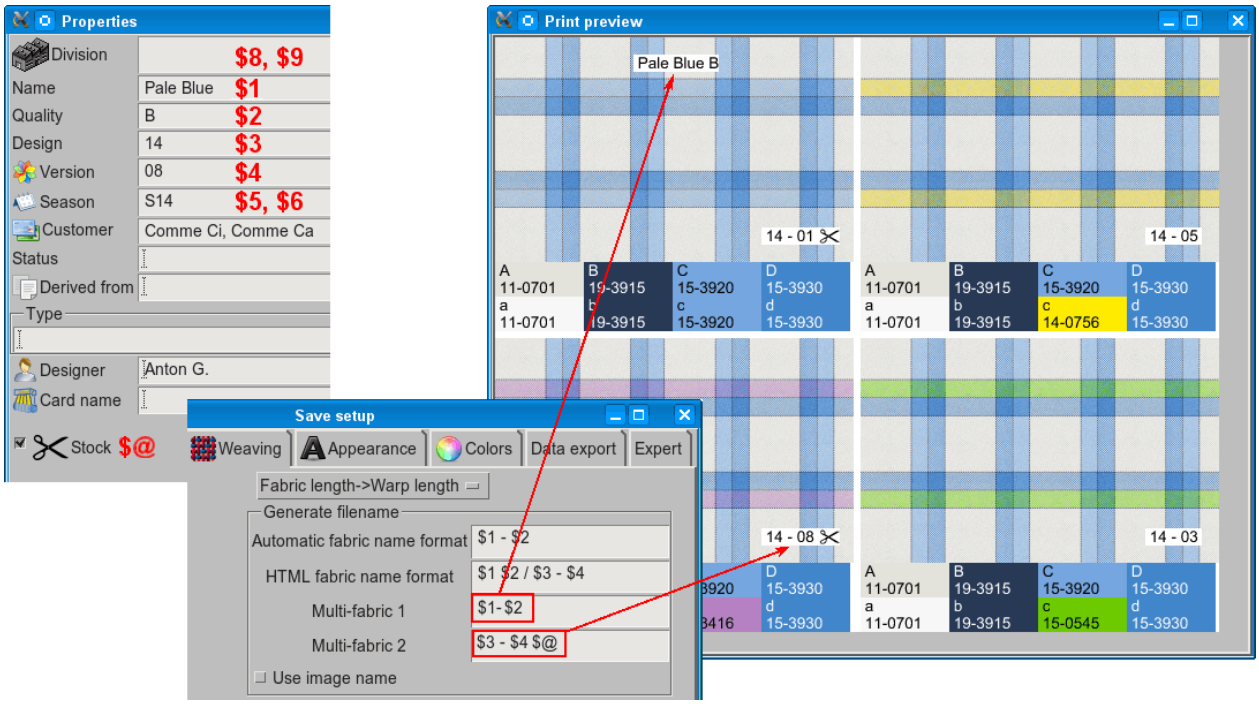



*Figure 372: Multi fabric print with title one and title two*

## 17.9 Printing to file (saving fabric simulation as a digital image)

Instead of printing it, you can save fabric simulation as a digital image. In the **Print fabric to printer** window click the **Printer setup** button. In the **Printer setup** window choose the graphical format, in which you want to save the picture (PNG, GIF, JPEG, TIFF), and dpi (dots per inch) of the image. Dpi can be selected independently for width and height of the image. Click the **OK** button, and close the window.

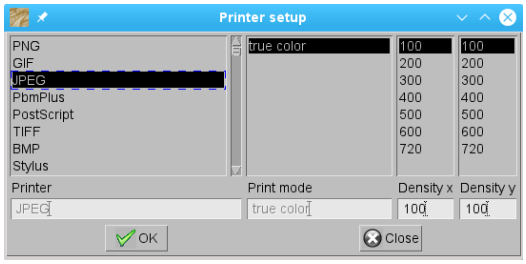



*Figure 373: Printer setup for saving simulation as an image file*

In the **Print fabric to printer** window, you have the option to select where this file should be written: the Desktop, USB flash drive or the **tmp** folder, or you can choose Browse to select a destination from the file dialog. Then enter a file name for the image (in Figure 374 it is “sample”). The program adds a file name extension (file format) automatically. When you close the Printer setup window, there is new information in the Print fabric to printer window: the printer name is changed to a chosen file format, then there are the pixel density and the size of image in pixels. When you click the **OK** button, simulation is saved as a digital image.

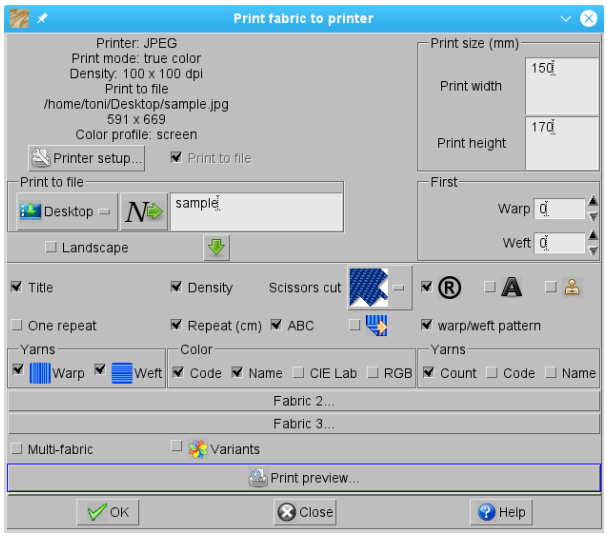



*Figure 374: Printing to file*

## 17.10 Printing to an unsupported printer

*ArahWeave* superb fabric simulation print quality is the result of custom printer drivers and printer color profiles. Because there are many printers on the market, Arahne can’t support all of them. However, if your printer is not supported directly in *ArahWeave*, you can still print from it (of course, it should be supported in the Linux OS), but the printouts will not have the same color accuracy as printed on native supported printers.
To print on a printer, which is not listed in the **Printer setup** window, you should select **TIFF** as a type of your printer. The rest of the procedure is the same as with a “normal” printer. *ArahWeave* creates an image file in tiff format, and your Linux print system is properly configured, the TIFF image will be automatically recognized and converted into printer specific code.

## 17.11 Suggested paper type

We calibrate EPSON Photo printers using Epson Photo Quality Ink Jet Paper S041061, so you will achieve color matching results only printing to this type of paper. There is one exception though, Epson Stylus Photo R2400 uses Matte Paper Heavyweight S041256.

## 17.12 Saving fabric texture

To save fabric simulation as a texture (image in repeat for use in ArahDrape, for web background etc.) choose **File** > **Save fabric texture** from the main Arahweave’s window.

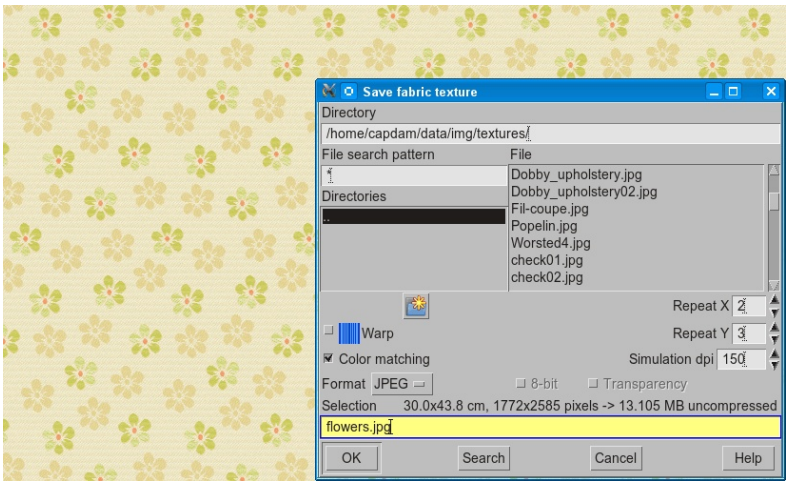



*Figure 375: Saving fabric texture*

The file name is set automatically based on the current fabric name (you can change it, if you want), plus the suffix from the chosen image format. You can set image format (JPG, PNG, TIFF), dpi – dots per inch; probably 100 to 150 dpi will suffice for most cases, and the number of design repetitions.
Program displays the actual texture size in pixels above the file name, so you have the feel for the size of your texture. If your fabric repeat is small, and the pixel size is 3000×3000, then your dpi is probably too high. If your image repeat is very big, you can also lower the dpi to get a reasonably sized fabric texture. Also, if the file size is too big, you can choose PNG as a file format, and mark the 8-bit button to save texture in the indexed (256) color mode. This will make a much smaller image, and *ArahDrape* will work much faster, as it will need less memory.

If you want to save only the warp image, tick the **Warp** check box next to the warp icon .

# 18 Saving loom (or other CAM) data (cards for production)

## 18.1 Save cards for production dialog

Arahweave's **Save cards for production dialog** enables you to save a fabric data into any supported machinery format (a machine readable file), which you then transfer by data storage medium (floppy, USB flash drive) or network to the loom controller, jacquard controller, or to the electronic card punch machine, warper or drawing-in machine.
The appearance of the **Save cards for production** window depends on the chosen machine and a file format, as some formats have more options than others. Saving to jacquard format (Stäubli, Bonas, Grosse...) means the most complex window with hook layout and other settings. If you save a file in one of the loom (dobby) formats, a dialog window looks similar as for Jacquard, except it doesn't contain a hook layout, while a dialog for saving to drawing-in machine format or warper format basically consists just from filename field and the OK button.
Almost all necessary information for creating a CAM file is taken from the fabric file, like a weave structure, weft color pattern, a regulator and variable weft density. Usually, you need to edit the hook layout, then enter the selvedge weave, choose a format and destination for saving, and a filename.

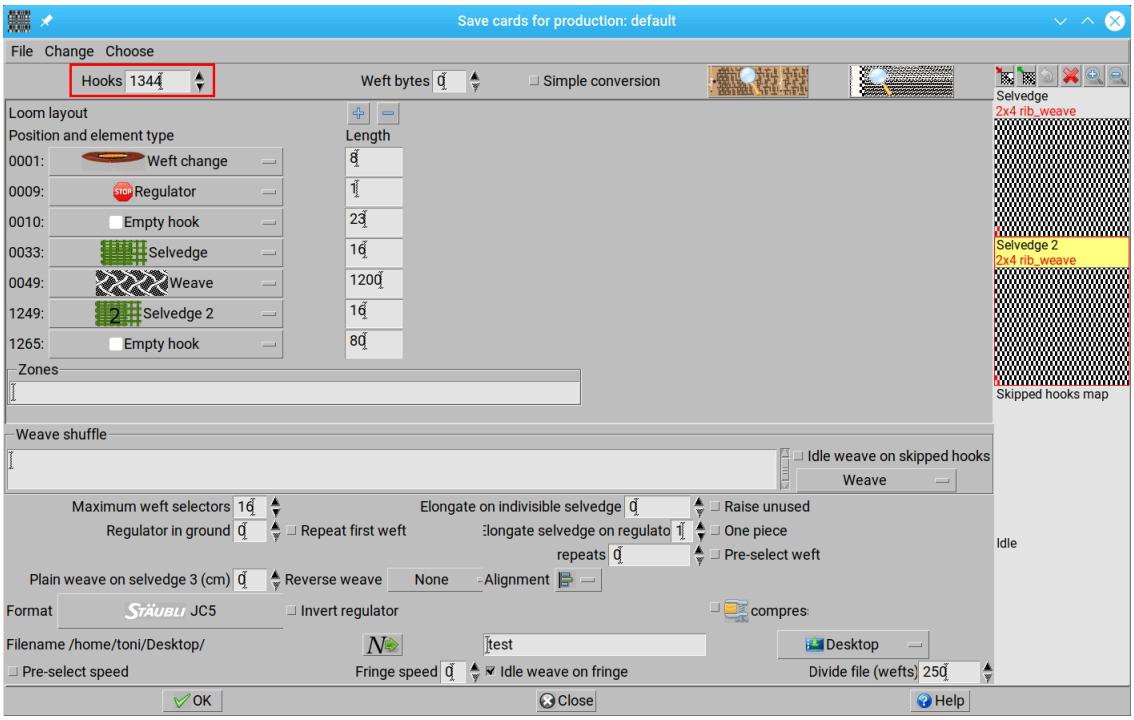



*Figure 376: Save cards for production window; a Jacquard layout*

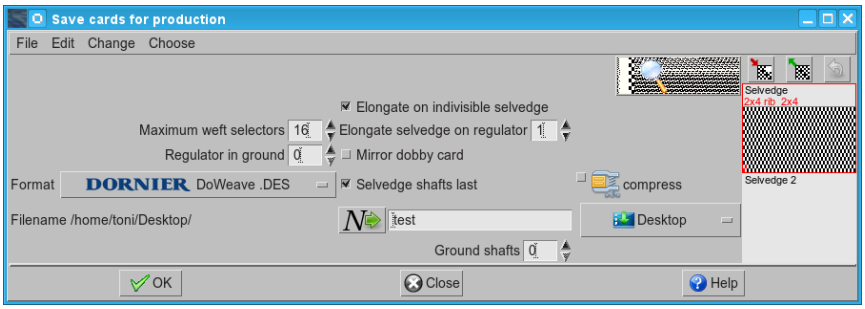



*Figure 377: The program hides the jacquard hooks layout, if you choose a loom (like Dornier, Picanol, Vamatex...) format*

When you finish editing various settings in the Save cards for production window, you can save the loom layout for future use (choose **File** > **Save loom layout** from the menu bar in the **Jacquard conversion** window). To load a loom layout, choose **File** > **Load loom layout**, or click **Choose** in the same menu bar, which displays a list of saved loom layouts in the currently selected loom directory. The list shows more information (format, number of hooks, a file name) than usual Load file dialog, so it is easier to find a layout you want to use for saving a production file.

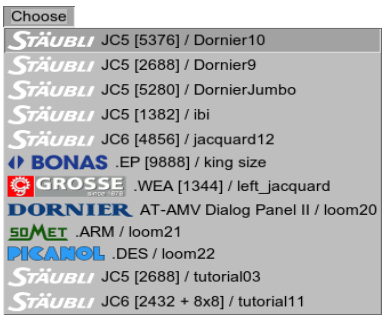



*Figure 378: List of saved loom layouts shows more information than usual Load file dialog*

## 18.2 Setting the number of hooks (Jacquard)

The number of hooks is basic information, when you save a jacquard card. Enter it in the **Number of hooks** field.


*Figure 379: Number of hooks and Weft bytes fields*

## 18.3 Setting the number of electronic functions (Jacquard)

With the mechanical Jacquard, additional Jacquard functions (weft selection, regulator, weave fringe, pile loops...) could only be controlled by using actual hooks. Instead of these function hooks, most electronic Jacquard machines have electronic functions (virtual or electronic hooks), which don't actually show up in the head as physical hooks. Bonas controllers always include 32 of these in positions 1..32 (the first physical hook is #33) while Grosse controllers optionally include 64 to the right of the last real hook. Stäubli controllers optionally include 32, positioned either to the right or the left depending on your preferences.
Enter the number of electronic functions in the **Weft bytes** field next to the Hooks field (see Figure 379). Usually it is four bytes (32 hooks). For the exact position of each control bit (hook) refer to your loom and Jacquard documentation.

## 18.4 Setting hooks position and function (Loom layout)

Usually we use some of the hooks in the jacquard head for other purposes than lifting heddles (warp threads), for example, weft change, regulator, selvage, weft density. You set the position and function of hooks in the **Loom layout** section of the Save cards for production window.

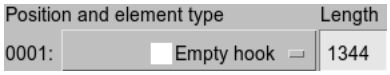



*Figure 380: The Position and element type button and the Length field*

To choose the type of the field (hooks function), click the field button (it is labeled **Empty hook** by default), and select the function (type) from the drop down menu (Figure 381). In the **Length** field, enter the determined number of hooks for that function. Then press the Enter key on the keyboard, which confirms the data and opens the next field. *ArahWeave* limits the number of fields in the loom layout to 50, which should be more than enough in most cases. When you enter all the fields, save your loom layout (**File** > **Save loom layout**), so that you will have it ready for next time.

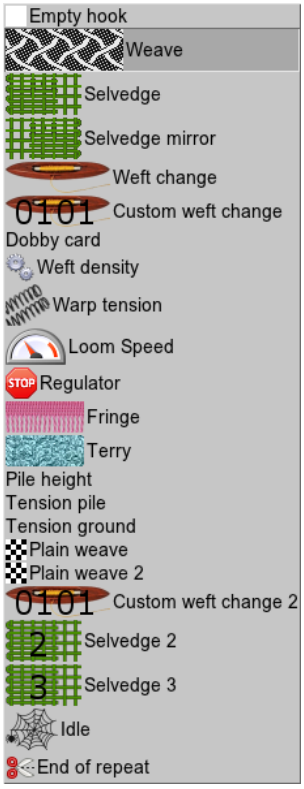



*Figure 381: Menu for selecting hooks function*

## 18.5 Loading the selvedge weave

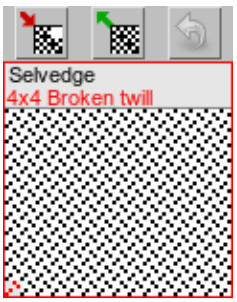



*Figure 382: The selvedge weave entry*

To load a selvedge weave into the Save cards for production window, do one of the following:
Double click on the **Selvedge** area on the right of the window. It opens Weave editor's file dialog, from which you load the weave to be used for selvedge.

- Select the area, labeled **Selvedge**, and load any of the default weaves by pressing weave's shortcut on a keyboard (see Chapter 5.7).
- Click the **Weave to editor** icon ( ) which replaces the current weave with selvedge weave in the weave editor. Apply desired changes on the selvedge weave, and click the **Weave from editor** icon ( ). This action puts the selvedge weave back to the Save cards for production window, and restores the previous (jacquard) weave in the weave editor.

To delete a selvedge from the field, select it and press the Delete key on your keyboard.
If the repeat of a selvage weave divides the number of wefts in the design, the weave dimension is depicted in black; otherwise, it is shown in red.

### 18.5.1 Elongating the selvedge on regulator

You can add a space for the extra wefts in the selvedge by using the **Elongate selvedge on regulator** option. It can have five distinct settings ranging from 0 to 4. A value of 0 (zero) indicates that the application does not modify the selvedge. When set to 1, it repeats the selvedge weft on the regulator with the same weaving points as the previous weft. If it is set to 2, it replicates it in the warp direction as well. At 3, it will place blank weave (warp down) on the wefts of the regulator. At 4, the warp-up weave will be placed on the regulator's weft.

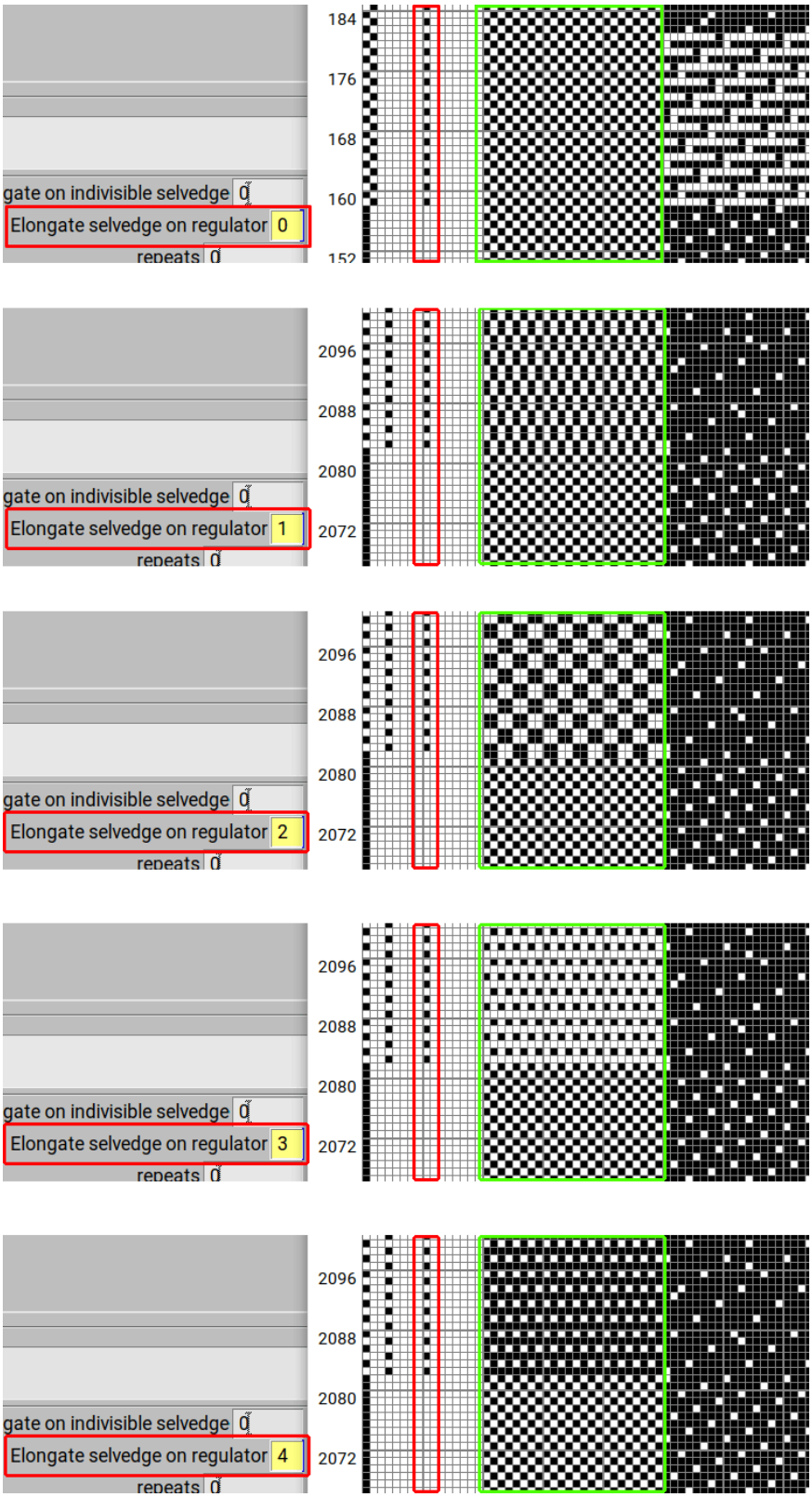



*Figure 383: Regulator is highlighted in red and selvedge is highlighted in green on the jacquard card previeew. The image depicts five different elongation option possibilities.*

### 18.5.2 Fil coupe selvedge

It is a special function for handling selvedges in fil coupe. Some customers complain that cutting of fil coupe threads tears off the selvedges, if fil coupe threads are woven in the selvedge. But we can also not leave them unattached on the edges, since they will randomly fall back in the fabric and create

defects. By enabling **Fil coupe selvedges**, the program will put a weave for fil coupe weft only on the first six ends of the selvedge. That is enough to make them stay at their place during weaving, but they will also gracefully fall out during fil coupe shearing. Again, some people don't like this, and you can disable it.
***This option is available only when the ArahWeave mode is set to Expert.***

## 18.6 Weft change, Custom weft change

When one hook activates one weft, this is referred to as a typical weft change. In the Save cards for production window it is simply indicated as **Weft change**. It is the default setting in *ArahWeave*, and program automatically takes one hook for one weft – first hook for weft **a**, second for weft **b** etc. But some Jacquard settings have so called **Custom weft change**. In this case you should choose **Custom weft change** in your **Loom layout** and load a weave, which indicates the position of weft selector hooks, in the **Custom weft change** field in the right column of **Save cards for production** window. To load a weave into the field (you have to prepare and save a weave before) double-click on **Custom weft change** field. The file dialog will pop up, and you have to double-click the desired weave file.
Figure 384 shows the position of eight weft selectors: normal, and two examples of custom weft changes: binary and doubled weft change.

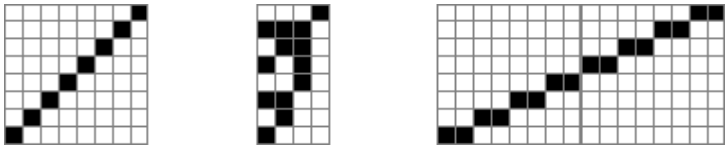


*Figure 384: Normal weft change, binary, and custom weft change*

Figure 385 shows the weft change of pattern 1a1b2c1b1d in Jacquard cards with normal weft change, binary weft change, and custom weft change (note, that last one is just an example of custom weft change; your may be different). Last column is just a color indication of weft selection.
No matter which type of weft selection you use, the weft pattern is always taken from the **Edit warp and weft pattern** window.
If the weave size in weft direction is not divisible by weft pattern repeat, the program will make a Jacquard card in the size of lowest common multiplier. Example: if your weft pattern repeat is 6, and weave size is 100, the height of Jacquard card will be 300.

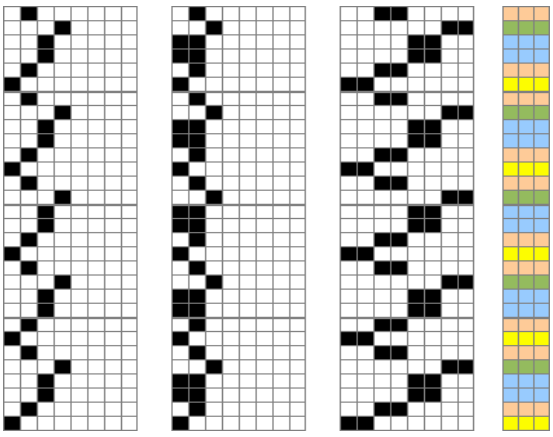


*Figure 385: Weft change 1a1b2c1d1b*

### 18.6.1 Weft repeat limit (65533 threads)

Sometimes users combine a weave with a weft pattern whose repeat number is not divisible by weave height. In that case, the program automatically prolongs the height of the fabric repeat until the weave height and weft pattern match. If they don't match, it stops at a height of 65533 wefts. **(If you have the ArahWeaveXL edition, this limit is set to 250000 picks.)**
When you save a jacquard card of such fabric, the program creates an extremely large file, because the file will have 65520 wefts (picks). To prevent this kind of problem, *ArahWeave* issues an error if the final repeat is cut off at 65533 threads, but a weave or a weft pattern do not have a repeat of 65533 wefts.

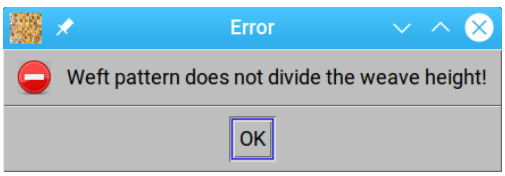



*Figure 386: Error message tells you to check the weave and weft pattern repeat*

***The fabric repeat size, expressed in the number of warp threads by the number of weft threads, is always displayed in the window title, so pay attention if you see the number 65533 in the window title.***

## 18.7 Entering a filename

Type a filename of the CAM file, or click the arrow  at the left of the **Filename** text field to auto-fill a fabric's filename into the **Filename** field. The necessary prefix or suffix will be added automatically according to specifications of the selected jacquard format. Some jacquard formats may not be able to handle long filename; use only 8 characters for filename if you run into trouble. *ArahWeave* distinguishes capital and small letters. If you are still using floppies, insert an ***empty MS-DOS*** formatted floppy, click **OK**, wait a little and your design is ready for weaving, or choose location on a hard disk, or send a file by network to the loom.

## 18.8 Selecting a file format

Select the desired electronic jacquard format from the drop down menu. The first group contains the true electronic jacquard formats, the second contains graphics file formats (you might want to use it to transfer data to another CAD system), the third contains electronic dobby formats, and fourth the drawing-in machines.


*Figure 387: Choosing CAM format*

### 18.8.1 Saving Bonas format excluding electronic functions (weft bytes)

There is special case with Bonas format implementation in some Jacquard machines, mainly in China, when electronic functions should not be written in the file (technically speaking they are written, but the 32 bits are taken from the number of hooks), otherwise a loom controller can't read a file. So, to write a file without electronic bytes, set the number of weft bytes to 0 (zero), and mark the **Weft bytes first** check-box. Program will write a jacquard file in a width that exactly matches the number of hooks set in the loom layout.

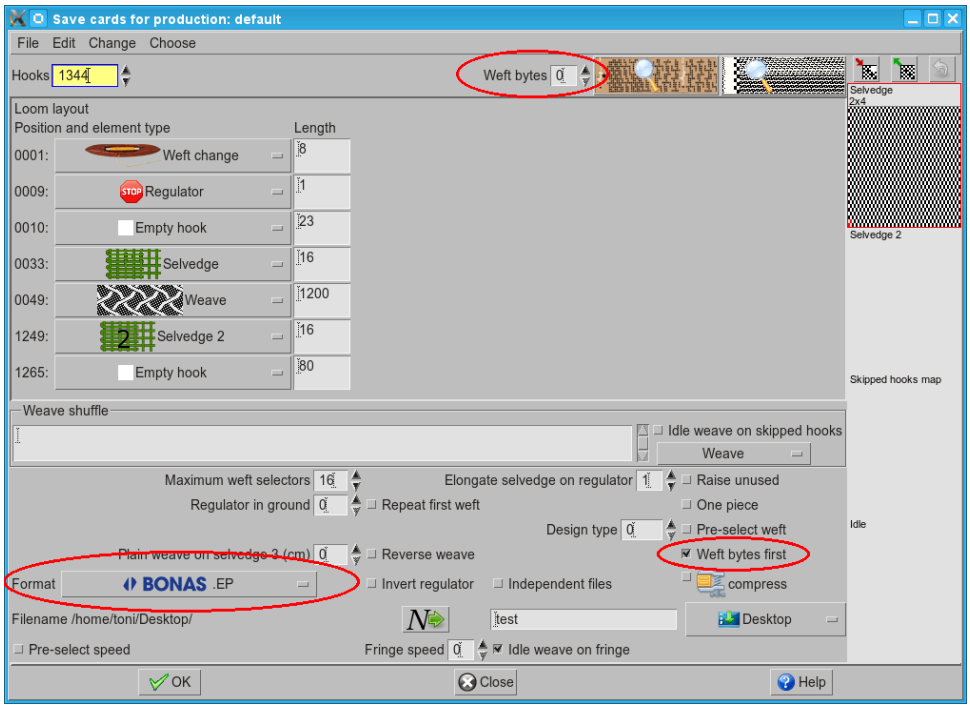



*Figure 388: Saving a file in Bonas format without weft bytes*

## 18.9 Choosing a location for saving CAM (machine) file:

Prior to saving the file, choose a location for saving a file. You have following options:

- **A:** (a floppy disk).
- **Desktop**: (it is easy to copy or attach from here).
- /**tmp**/: (to put it in the temporary directory of Linux).
- **Browse**: to select directory.
- **Send**: to send it via network to the loom.
- **USB**: When selected, the program saves a file to USB flash memory.
- **Emulator**: When selected, the program saves a file to USB flash memory, which should be formatted as a floppy disk to use with the Floppy emulator drive (please note, that user should be in the disk group in Linux system. This allows formatting of the USB memory drive to regular users.)


*Figure 389: Choosing a location for saving a file*

### 18.9.1 Writing a file to multiple floppy disks

You can save up to 1.44 MB of data on a floppy disk. If you choose a floppy disk as a destination for saving and a jacquard file does not fit on a single floppy disk, *ArahWeave* splits a file into as many as needed floppy disk files. For instance, if a file size is 3 MB, it will be split into three files: 1.44 MB + 1.44 MB + 0.28 MB. The Save cards for production dialog will pop-up, displaying buttons labeled with file names. To copy a file, insert a floppy disk, and click the first file name button. Wait until it finishes copying the first file. Eject a floppy disk, insert another one, and click the second file name button. And so on till the last one.

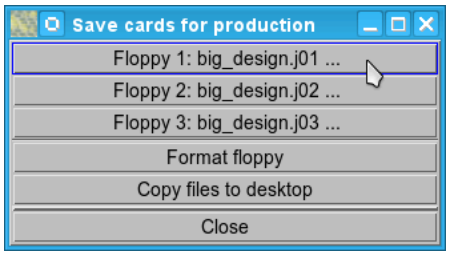



*Figure 390: Saving a file to multiple floppy disks*

The dialog also offers the possibility to copy all the files to the desktop (click the **Copy files to desktop** button). This is useful for customers, who do not have a floppy drive (for example Mac users) and only

want to email the files to the weaving mill, which will later copy them to floppy disks. This operation will only work for jacquard floppy disk formats in DOS format. So Stabuli JC3 and JC4 are not supported.

### 18.9.2 Using USB floppy disk drive emulator

A USB floppy drive emulator is a small box with a USB port, a plug-in replacement for a floppy disk drive. It has the same size and connector as an old regular floppy disk drive, so it is quite easy to replace a floppy disk drive with a USB floppy drive emulator. After you have installed an emulator into a jacquard controller, it will think it still works with an ordinary floppy disk drive.

Figure 391 shows a USB floppy emulator installed on the Stäubli JC5 controller. There are three features on the front side: a USB port, where we plug a USB flash memory drive, a two-digit display, which shows a number of the selected floppy, and two push buttons, which enable us to set a number of a floppy, from which we want to access designs. You can store up to 100 virtual floppy disk drives on the flash memory drive (from 00 to 99). *For instance, if you have saved a file to floppy no. 5, you have to set the number on the display to 05, and then insert the flash memory drive.*


*Figure 391: USB floppy emulator installed on Stäubli JC5 controller*

Before installation of the USB floppy emulator, you should check the position of a jumper on jumper pins on the backside of the emulator. For instance, the JC4 controller requires a different position of the jumper than the JC5 controller. The JC4 jumper must be on S0 position (first pair of pins), while the JC5 jumper must be on S1 position (second pair of pins).

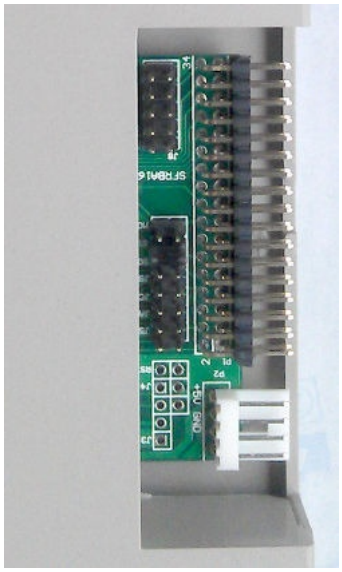


*Figure 392: Jumper pins, connector pins, and power connector are located on the backside of an emulator.*

### 18.9.3 Saving designs to a USB floppy emulator with ArahWeave

Prior saving a design to USB floppy emulator, you have to format a USB Stick in a way that it will be recognized on Jacquard controller as a “virtual floppies” carrier. To do this, set the Emulator as a destination for saving in the Save cards for production window, and choose **File** > **Format USB for floppy emulator**. The Format USB for floppy emulator dialog will open. Enter the floppy range, determined by **From** and **To** number. Figure 393 shows formatting of 21 virtual floppy disk drives – from 0 to 20.

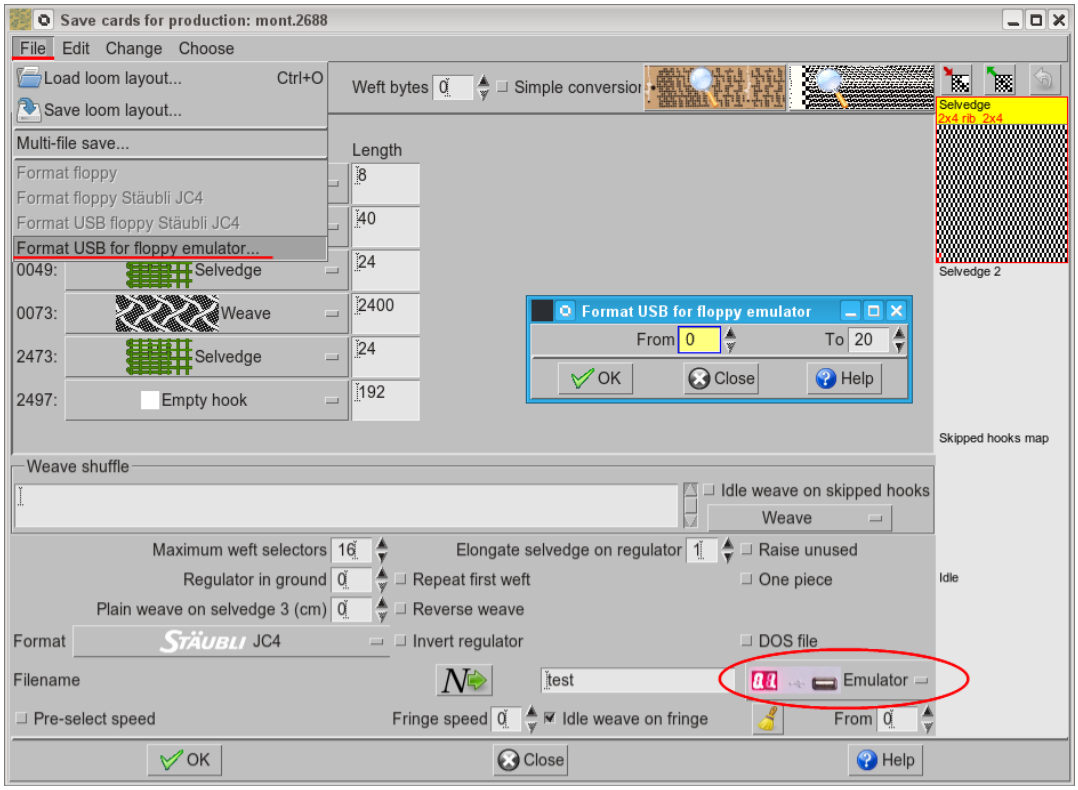



*Figure 393: Formatting a USB stick for use as a floppy disk drive emulator*

When you save a design to Emulator, you have to specify the number of the virtual floppy that you want to save a design to.

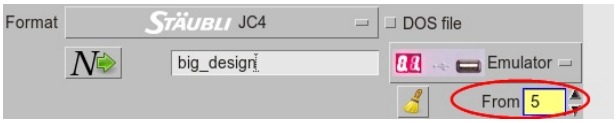



*Figure 394: Selecting a floppy number in the From field*

If a design requires more floppy disks, it will start writing from selected floppy onward. For instance, a design from Figure 394 will be written on three floppies: No 5, No 6 and No 7. When you load a design on a Jacquard controller, you will need to set the emulator number to 05, load first floppy, disconnect the memory key, then change the number to 06, connect the memory key, load a second floppy, again disconnect the memory key, set the number to 07, connect the memory key, and load the design's last part.

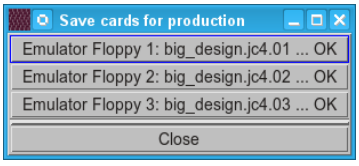



*Figure 395: Multi-floppy design*

### 18.9.4 Configuring an external (USB) floppy drive on openSUSE Linux

If you need to write only DOS files, like Bonas, Grosse, JC5, JC6 and most of newer dobby formats, you can save file to a hard drive, and then copy it to a mounted USB floppy in Dolphin file manager. Or mount a floppy first, and then use the **Save to USB** option in the Save cards for production window in ArahWeave.

But this way of writing a file to the USB floppy has one serious shortcoming. If the file is bigger than 1.4 MB, you can’t save it. Multi-floppy file writing works only, if the ArahWeave thinks that you have a

"real old" floppy drive. A USB floppy drive is recognized by the system as a regular USB memory device, like a USB memory key, except that is, by today's standards, extremely small.
So, if you want to write non-DOS file formats (JC3, JC4), or multi floppy JC5, or some older dobby formats, you have to fool the system that your USB floppy drive is actually the old a: drive. To do this, you need to edit one of the Linux configuration files, like it is described below.

- Connect a USB floppy drive to PC; no floppy inside. There shouldn't be any other USB memory devices connected.
- First, you need to find which device name is used in your system for the USB floppy drive. Open a terminal window (**System** > **Terminal** > **Konsole (Terminal)**.

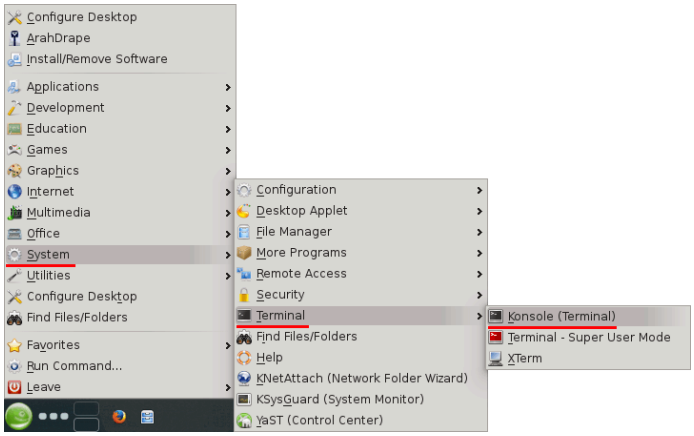



*Figure 396: Opening the terminal window*

- In the terminal type following command (press the Enter key after it): **ls /dev/sd***
  The output of the command is the device list. You can distinguish the USB floppy drive from the hard drive(s) quite easily: the USB floppy drive is usually listed as a last device, and it does not contain partitions, which are represented as numbers on the end of the names. On the image below, the floppy drive is labeled as /dev/sdb

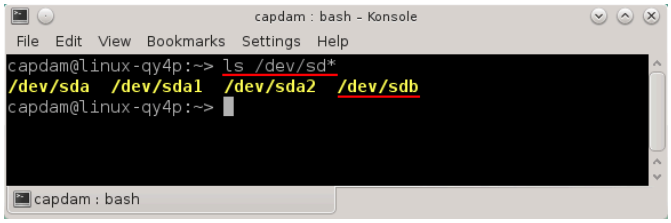



*Figure 397: The terminal window*

- Then go to **Suse menu (green icon)** > **System** > **File manager** > **File manager -Super user mode**. After opening, you will need to enter the administrator (root) password.

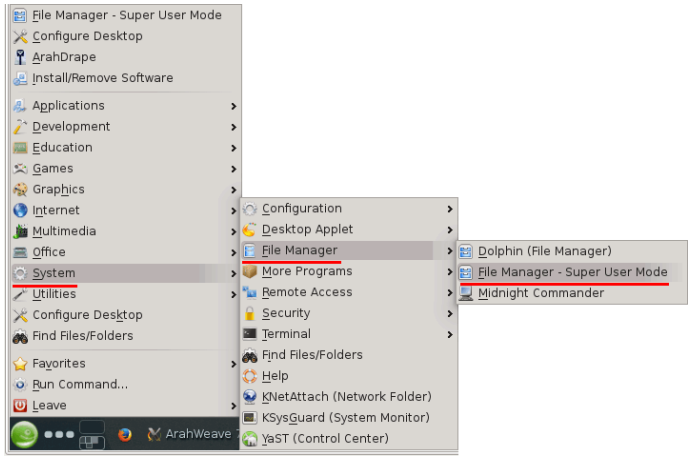



*Figure 398: Opening the file manager - super user mode*

- In the file manager, navigate to **/etc/init.d**, and right-click on the **boot.local** file icon. Choose **Open with** > **Kwrite**.

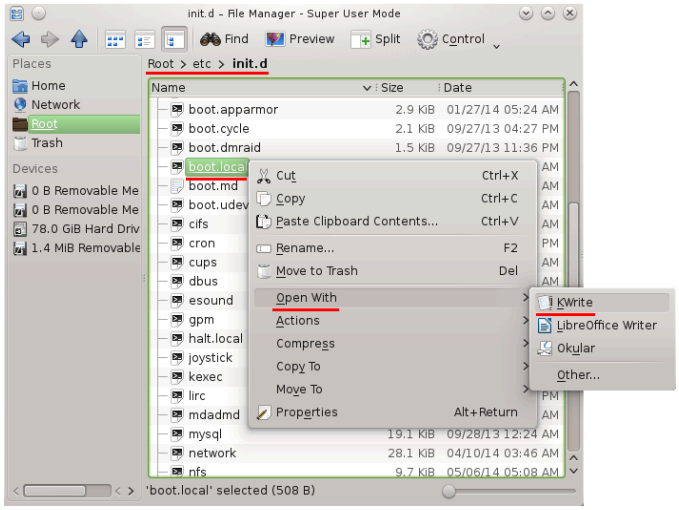



*Figure 399: Opening the boot.local file in KWrite*

- Add the following lines at the end of a file (we use **/dev/sdb** as a device name in the commands below. You should use the device name according to the output of **ls /dev/sd*** command on your system.):
**rm /dev/fd0**
**chmod 777 /dev/sdb**
**ln -s /dev/sdb /dev/fd0**
**ln -s /dev/fd0 /dev/fd0h1440**
**chmod 777 /dev/fd0***

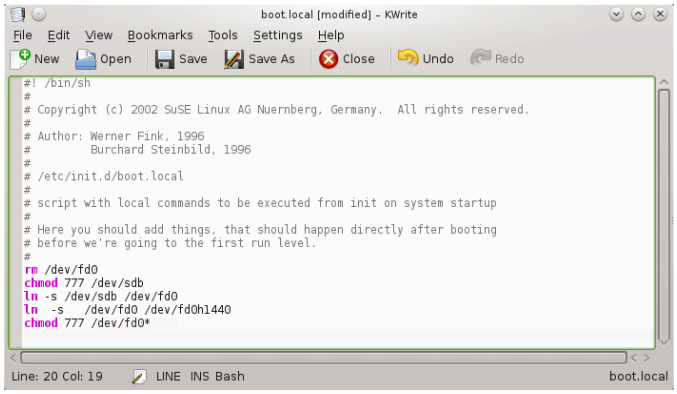



*Figure 400: Editing the boot.local file*

- Save the file (**File** > **Save**), and close KWrite editor.

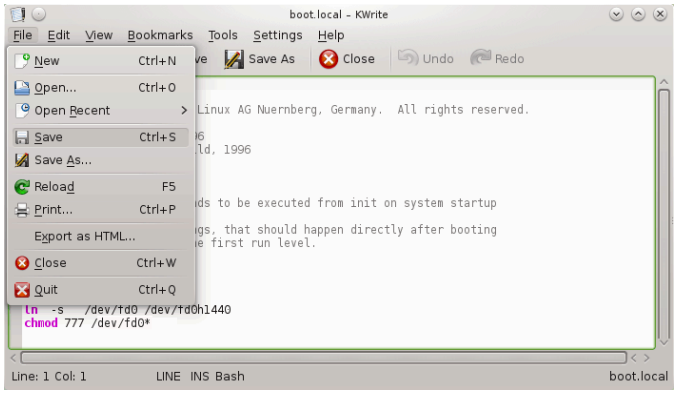



*Figure 401: Saving a file*

Restart computer. If you leave the USB floppy drive plugged in all the time, it will always use the same device label, so you won't need to modify the **boot.local** file again.
With these settings, you need to choose **a:** as a destination for saving in ArahWeave. Also for formatting, you need to choose either **Format floppy** or **Format floppy JC4**.
To save to **Dornier Dialog Panel II amv** format you need to install the "**dosemu"** program in Yast.

## 18.10 Card preview

The Card preview enables checking the data prior writing them in the Jacquard format. We want to be sure that weave design parts are at the correct locations, so on the top middle of the window, you have one button for Verdol cards preview, and another for linear card preview.

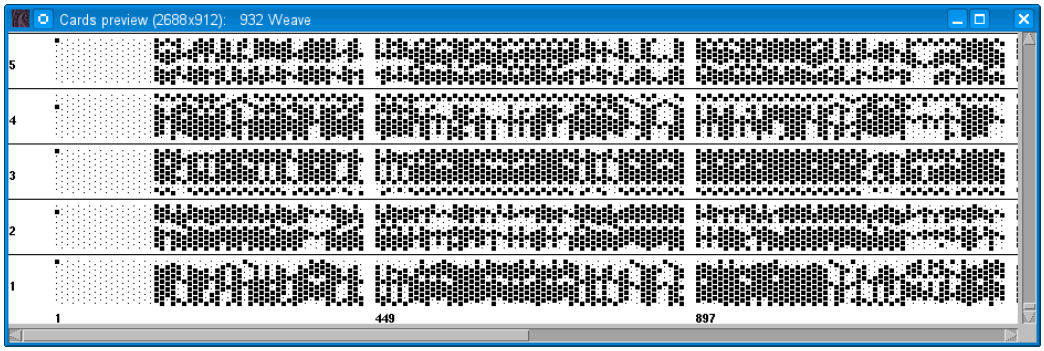



*Figure 402: Verdol type of card preview*

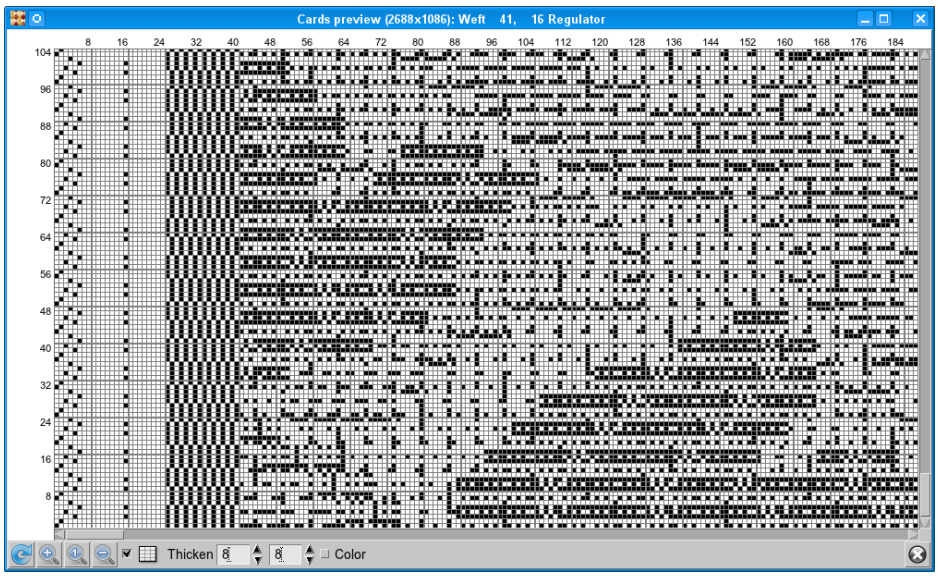



*Figure 403: Linear type of cards preview*

As you move the mouse in the preview, it shows you the current / hook / weft position. Zoom in/zoom out works the same as in the main ArahWeave window, Ctrl + mouse wheel, or you can press  or  icons.

## 18.11 Other options of the save cards for production dialog

- If you still use mechanical Jacquard machines, controlled by paper cards, instruct the program to **Repeat the first weft**, which makes it easier to attach the paper cards into an endless loop. *You should not use this option, if you have an electronic jacquard.*
- By selecting the **Raise unused** toggle button, the unused hooks will be raised. On some electronic jacquard machines, the energy consumption is lower if hooks are raised, so it is preferred to have them in that position.

- **Weft bytes first**: weft bytes are written at the right part of the cards (after "real" hooks section). Some file formats require weft bytes at the beginning (left side of the cards). If this is your case, mark the **Weft bytes first** toggle button.
- **Regulator in ground** can be used to diminish the error in weaving, when the loom switches from weaving with regulator to normal weaving. On some very dense upholstery fabrics, and sometimes also on curtains, this can be seen as a line of irregularity in weaving. If you set the regulator in ground to one, then the program will add one regulator to every second ground weft. This will effectively double the density, so you need to halve the loom density, in order to keep the proper density of weaving. The loom will then weave with the regulation (stop motion) on all areas, so the transition from weaving with regulator and without regulator will be less visible. This is the only parameter of the loom layout which gets saved in the fabric, and not in the loom layout. The reason is, that problematic regulator handling is more a property of a particular fabric than of a loom.
- **Elongating the selvedge on the regulator** does exactly that—it makes room for the extra wefts in the selvedge. It can have five distinct settings ranging from 0 to 4. A value of 0 (zero) indicates that the application does not modify the selvedge. When set to 1, it repeats the selvedge weft on the regulator with the same weaving points as the previous weft. If it is set to 2, it replicates it in the warp direction as well. At 3, it will place blank weave (warp down) on the wefts of the regulator. At 4, the warp-up weave will be placed on the regulator's weft.
- **Fil coupe selvedge** enables a special function for handling selvedges in fil coupe. Some customers complain that cutting of fil coupe threads tears off the selvedges, if fil coupe threads are woven in the selvedge. But we can also not leave them unattached on the edges, since they will randomly fall back in the fabric and create defects. By enabling **Fil coupe selvedges**, the program will put a weave for fil coupe weft only on the first six ends of the selvedge. That is enough to make them stay at their place during weaving, but they will also gracefully fall out during fil coupe shearing. Again, some people don't like this, and you can disable it.
  ***This option is available only when the ArahWeave mode is set to Expert.***
- **Invert regulator**: default sign for regulator on is a black point (up). Some looms use white point for regulator on, and black point for regulator off. If this is your case, switch on the **Invert regulator** toggle button.

The loom layout follows some implicit rules, that should be OK for the majority of cases, but it does not hurt if you know what they are:

- If the specification of layout is shorter than the number of hooks, it will be automatically repeated to fill in the unused hooks. If you want the hooks to remain unused, add an empty field at the end.
- The **Selvedge mirror** entry serves for mirroring left selvedge to the right one, if you use such layout.
- *ArahWeave* permits creation of a design with a selvedge weave, which does not divide the jacquard weave, or a weft pattern which does not divide the jacquard weave.

## 18.12 One piece designs

Some designs like blankets, shawls, napkins, or table cloths are woven as "one piece designs", so they require at least a cut mark between two pieces. Instead of drawing it in an image or in a weave, you can add wefts for **Top edge**, **Bottom edge**, **Fringe** and **Cut mark** in the Save cards for production window. You get these options after marking the **One piece** check box. For every option you can enter the number of weft threads. If you select **Top edge** or **Bottom edge**, then you need to load the weave for each one. To load a weave, double click on the **Top edge** area in the column on the right. It opens Weave editor's file dialog, from which you load the weave to be used for **Top edge**. Repeat procedure for **Bottom edge**. Between two pieces you can have fringe. Specify the length of the fringe (number of weft threads) in the **Fringe** field. If you check the **Cut mark** box then program puts two threads in a plain weave in the middle of fringes, so you can separate two fabric pieces exactly in the middle. If you want to have fringe at the beginning and at the end of repeat, turn on the **Center** button. Program splits the number of fringes, and puts half of them at the beginning, and half of them at the end of one piece design.


*Figure 404: Settings for One piece design in the Save cards for production window*

## 18.13 Creating fabric header and footer

*ArahWeave* enables the user to create a production label, which can be woven as the initial and final part of the jacquard fabric.


*Figure 405: Fabric with a woven label*

### 18.13.1 Steps in creating header and footer

To open the **Make fabric header/footer** dialog choose **Change** > **Make fabric header/footer** from the Save cards for production window menu bar.


*Figure 406: The Make fabric header/footer dialog*

- *Defining weaves*
  *ArahWeave* takes the main weave for the label directly from the weave of jacquard design. This guarantees that the quality of the label is the same as quality of main fabric, thus not causing any problems later in the finishing. But you define (load from library) weaves for three different parts of header/footer:
  **Title** – weave for characters in the text (if you don't set it, the program simply takes the inverted jacquard weave for the character weave).
  **Background** – weave of the letters background.
  **Border** – weave for the **Top edge**, which is woven after fabric's header, preventing header to be damaged, when you put fabric off the loom.
- *Choosing a starting weft*

By default, fabric's header starts with a design's first weft (pick), so it just continues (repeats) from design. If for some reason you want to use a different part of the design for the label weave, you can set a different starting point of the label weave.

- By default, the header has the same content as a footer. If you want to have them different, just uncheck the **Header = Footer** check box, and a new editing space for footer is added to the Make fabric header/footer window.
- *Setting the number of picks for label and label text*
  Enter the number of picks used for the whole label in the **Picks** field. Enter the number of picks, which will be used for the text, in the **Label** field. Apparently, the **Label** number cannot exceed the **Picks** number. Then, you can also define the number of border picks. Border is usually added at the end of header to prevent label damage, when you remove fabric from the loom.
- *Setting the text layout (orientation, alignment, position)*
  You have full freedom to position the label text any way you want. First set the orientation (mirroring), then the alignment, and then the vertical position.
  To align text within the left and right edges, use the Align left, Center, Align right, and Justify (repeat across whole design width) icons.
  To align text vertically within the top and bottom edges of the label, use the Align top, Center, and Align bottom icons.
  The text mirror feature enables you to create readable text on reversed fabric.

*Figure 407: Orientation, alignment and vertical justification options*

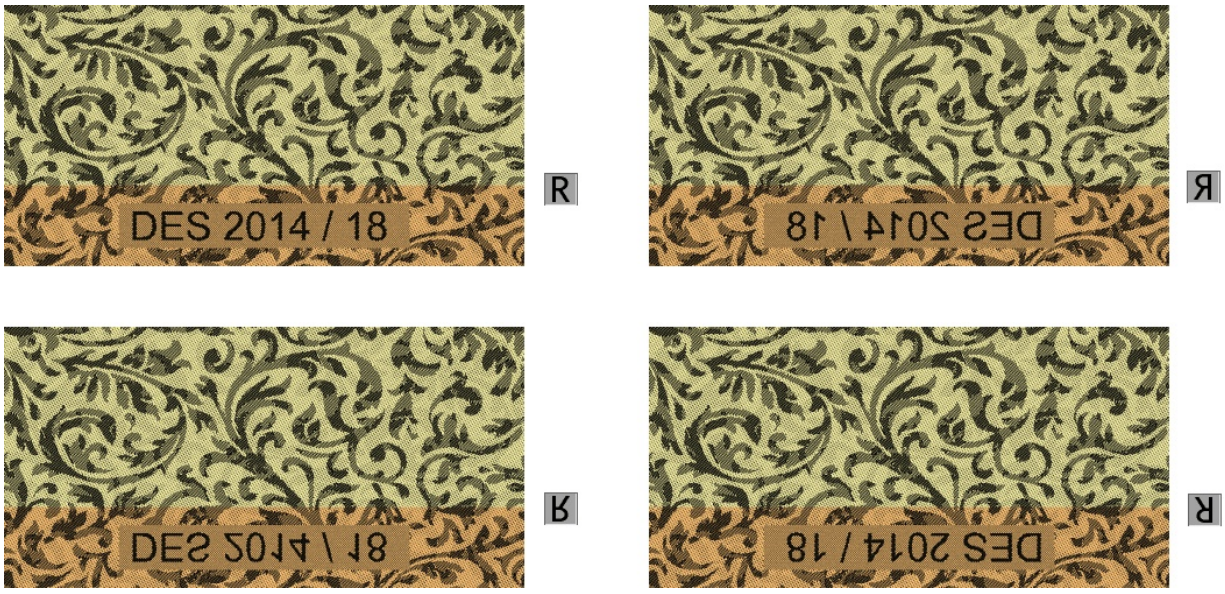



*Figure 408: Four examples of same text created with different mirroring options*

- *Enter the text you want to have in the label.*
  The text entry field for the label is next to the number of wefts for label text


*Figure 409: Text entry field for the label*

- *Setting the weft thread pattern for a label*
  By default, *ArahWeave* takes a weft color pattern from the main design. If you want that label to differ in color from the main fabric or you just want to use a different pattern, set it in the **Weft pattern** text field. Additionally, you can define the pattern for **Top edge**.
- *Setting the number of design repeats (weaving program)*

Set the number of weave repeats to be woven before the header in the **Weave repeats** field. For example, if the repeat size is half of a meter, and the length of piece on the loom should be 70 meters, then you set the Weave repeats to 140.
Picks – similar to weave repeats – here you set the number of picks to be woven before the header. Obviously, *ArahWeave* can take into account only one parameter, either number of weave repeats or number of picks.

- *Saving header/footer card files for production:*
  The last section of the Make fabric header/footer window consist of three options:
  **Modify fabric** is mainly used as a header/footer preview. *ArahWeave* adds header and footer to the initial fabric and generates a new fabric. If you want to save cards of the header and footer, you have to load the initial fabric again and use the **Make cards** function.
  **Make cards** saves three jacquard card files (the file of initial fabric, and both header and footer card file) to the location, which is set in the Save cards for production window. *ArahWeave* will also write Stäubli program file, which starts with a footer, continues with a configured number of repeats of the main design and finishes with a header.
  **Make fabrics** saves only header and footer fabric files for later use.

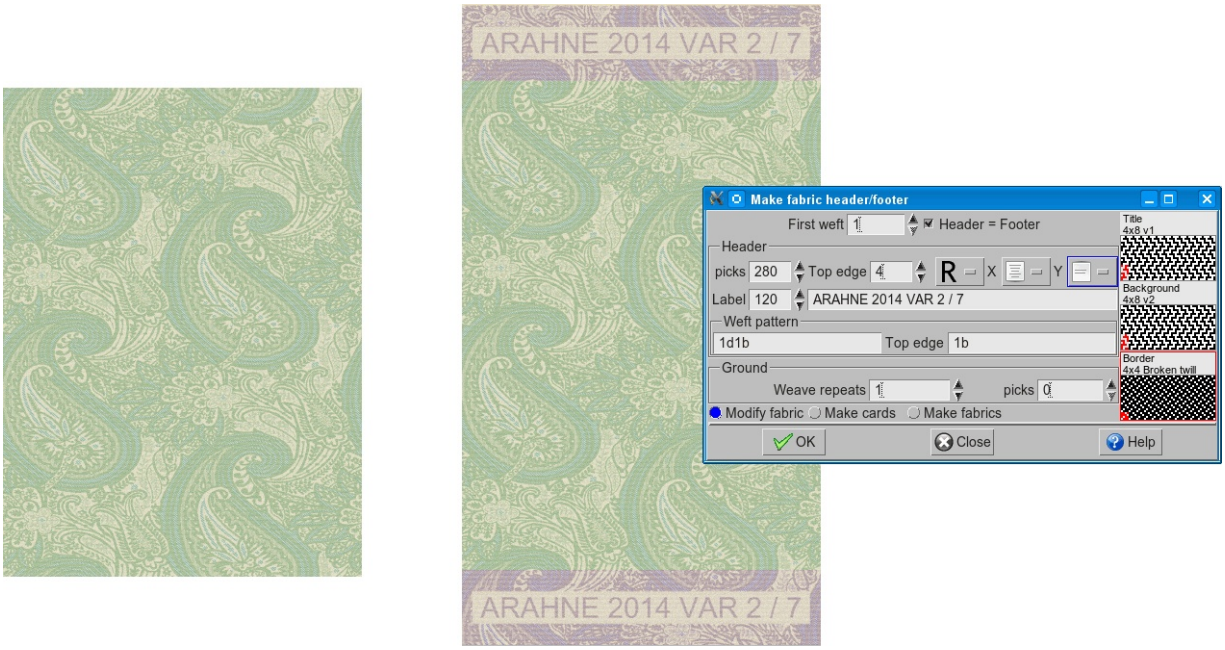



*Figure 410: The initial fabric, and the modified fabric with header and footer*

## 18.14 Weave shuffle

Weave shuffle function enables you to mix the pattern hooks in the desired order. If you leave it empty, a pattern will be unchanged and will repeat in the normal way. If you enter 1 2 3 0 the pattern will be interpreted as 1 2 3 0 4 5 6 0 7 8 9 0 10 11 12 0... where 0 means skipped (unused) hook. This can be useful for lowering the warp density without changing loom tie-up.
You can also mix groups of hooks like this 1 3 2 4 The interpretation will be 1 3 2 4 5 7 6 8 9 11 10 12 13 15 14 16 17 19 18 20... This can be useful for terry or velour fabrics, when you want your hooks to be rearranged in a special way due to the way your loom is operating. And last, but not least, you can write your complete layout from the first to the last pattern hook. This gives you complete freedom to shuffle it any way you want. The field to enter weave shuffle is visually short, but can contain large quantities of data, up to 60000 characters, which is enough for specifying 20000 hooks. This information can then be saved to a loom layout file for future reuse. If you have support from Arahne, and you do not change a loom layout every day, then Arahne will prepare the layout according to your wishes.

You can also specify ranges of numbers in the weave shuffle. This is useful, if you have numerous hooks, which should be just mirrored or mixed by large consecutive blocks. Now you can specify hook shuffle range simply by writing 5-10, which means the same as 5 6 7 8 9 10, or 10-5, which means the same as 10 9 8 7 6 5. The ranges are always consecutive and inclusive of the first and last hook. If the first number is lower than the second, then the range is rising, otherwise it is falling. You should not have any spaces between the minus (-) and the range numbers.
When you use the weave shuffle, it is important to know the total number of hooks in the shuffle. Program will calculate that for you in the **Weave shuffle** label as for example **Weave Shuffle [4800]**. This is especially useful if you have skipped hooks (shuffle with zeros), since the program will calculate both the total number of hooks in the shuffle, as the effective number of hooks (the number of hooks which are actually working). This will be displayed as **Weave shuffle [1320->1200]**.
Usually, the shuffle is applied only to the design hooks. But in some special cases, you also want it on the selvedge hooks, so you can click on the **Selvedge** toggle button within **Weave shuffle** to enable it.

### 18.14.1 Changing starting point of jacquard card with weave shuffle

Sometimes you don't want to start a Jacquard card with a first thread in the weave, but with some other. You can shift the weave, but it is faster, if you "tell" the program what the starting point should be. Just enter the desired number in the weave shuffle field, for example 1201–and the first pattern hook will be taken from the weave position 1201.

### 18.14.2 Make shuffle: double repeat halve density

A loom equipped with Jacquard offers great design flexibility with respect to dobby loom. Any kind of weave can be woven without changing the loom. But this flexibility comes at a price of one big inflexibility: you can't easily change warp density, or total number of warp threads. On dobby, you can simply use a different reed, you insert the threads in the shaft's heddles the way you want, and you have any density you wish. In jacquard the hooks are tied up to the loom in a certain way, and there is no simple way to change it. Tying hooks on a jacquard can take a few days, and costs a considerable amount of money.
So a weaver must resort to advanced tricks to weave at a lower density. We will try to weave with two times lower density, but without losing any of the working hooks. Our pattern will not have less resolution. This trick is only applicable, when you have a smaller jacquard which needs to repeat the hooks two or more times, to weave all the warp threads. On a full width (jumbo) jacquard, you can simply use the weave shuffle of "1 0", which means that every second hook will be skipped, and this is it. On a repeated layout, the shuffle of "1 0" would cut down the number of useful hooks from, for example 1200 to 600. We do not want this. We wish to lower the density two times, we don't want to change hook arrangement to the loom, and still use the full 1200 hooks for the design. Can it be done? Smart people can do it.
This function automatically writes a shuffle, which enables you to make a design with double sized width of the repeat. The design will halve the density of the current setup, because you use odd hooks (1,3,5,...) in the first half of the repeat (even hooks are unused in this part), and even hooks in the second part of the repeat (odd hooks are unused in this part). For instance, if you have 2400 design hooks, *ArahWeave* will write the following shuffle: 1, 1201, 2, 1202, 3, 1203, 4, 1204...
Figure 411 shows two fabrics woven on the same loom, but fabric on the right was made with halve density of the first fabric, so the repeat is twice bigger. The Jacquard card was modified by using the Double repeat-halve density function.

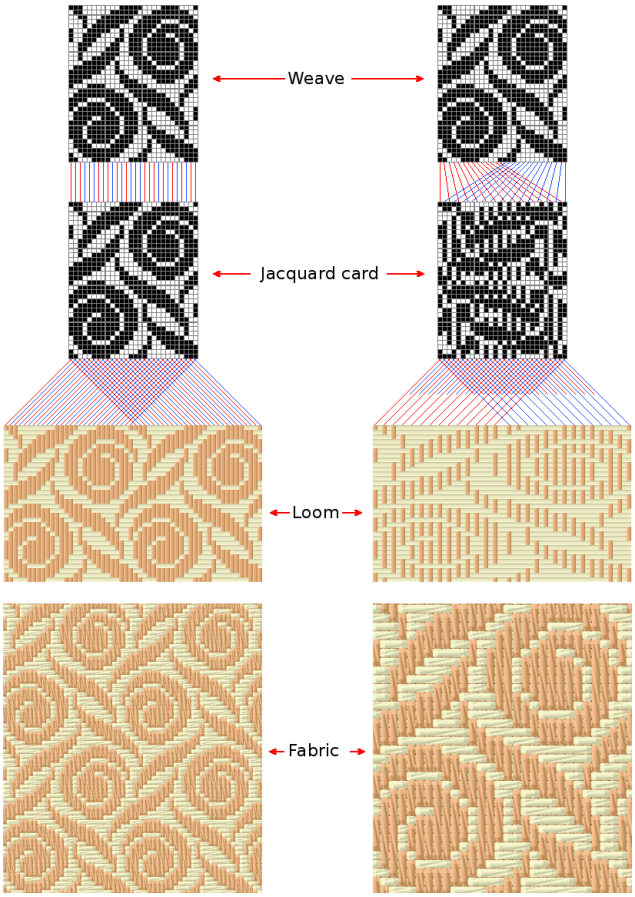



*Figure 411: Double repeat halve density*

### 18.14.3 Skipped hooks map

Instead of entering skipped hooks with zeros, you can draw an image in *ArahPaint* (or weave in the weave editor); the size of the image in horizontal direction should be equal to the number of hooks. Size in vertical direction is not important, it can be simply 2. Then draw the skipped hooks by black points. It is easy in the weave editor with a copy tool. So you get the **Skipped hooks map** image, where black points represent the skipped hooks on the loom. Save this “hooks weave”, because you will need to load it into the **Save cards for production window**.

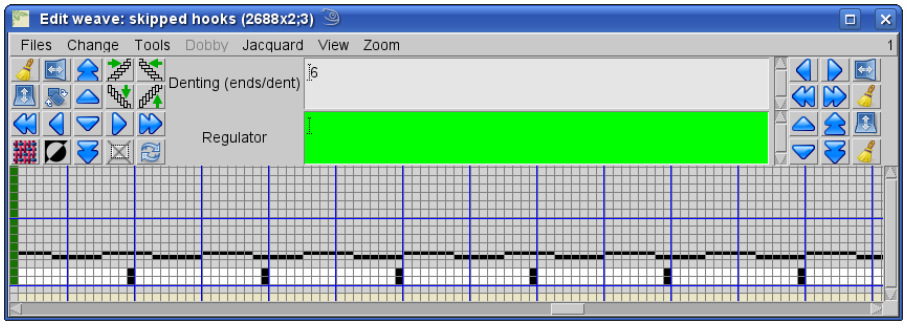



*Figure 412: Draw the skipped hooks image (weave)*

Open **Save cards for production**. The last section on the left is the **Skipped hooks map**. Load the “Skip hooks map” weave into that field. The numbers on the weave shuffle tells you how many hooks are skipped out of all hooks, and out of design hooks. In Figure 416 the number of hooks is 2688. The number of skipped hooks is 168. Out of 2400 design hooks there are 2250 working hooks.

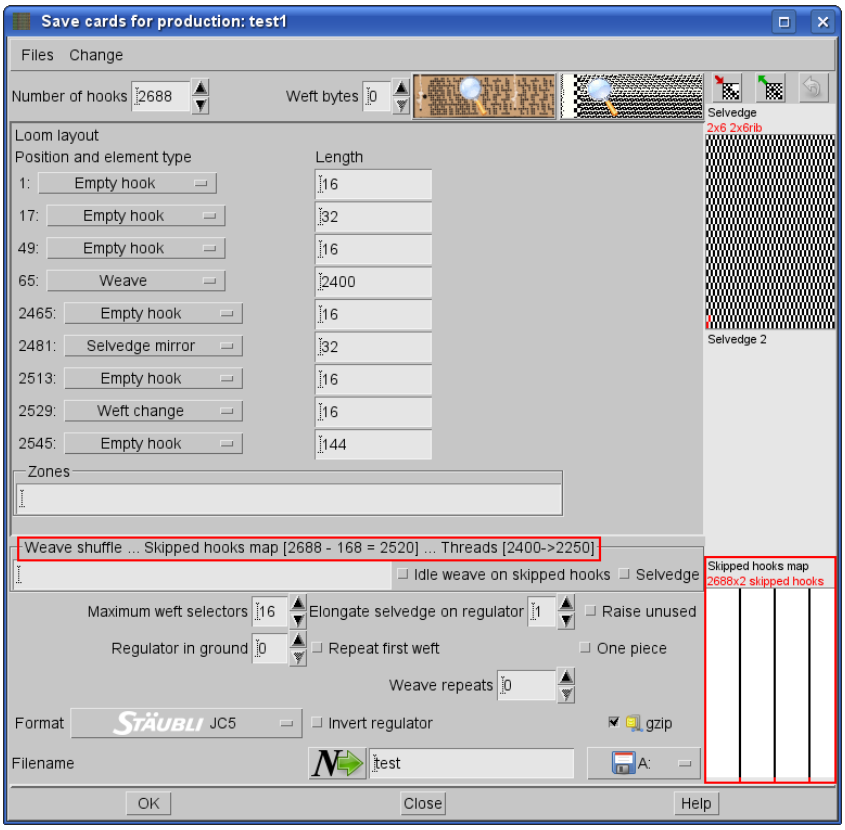



*Figure 413: Save cards for production with skipped hooks map*

The cards preview shows the position of skipped hooks.

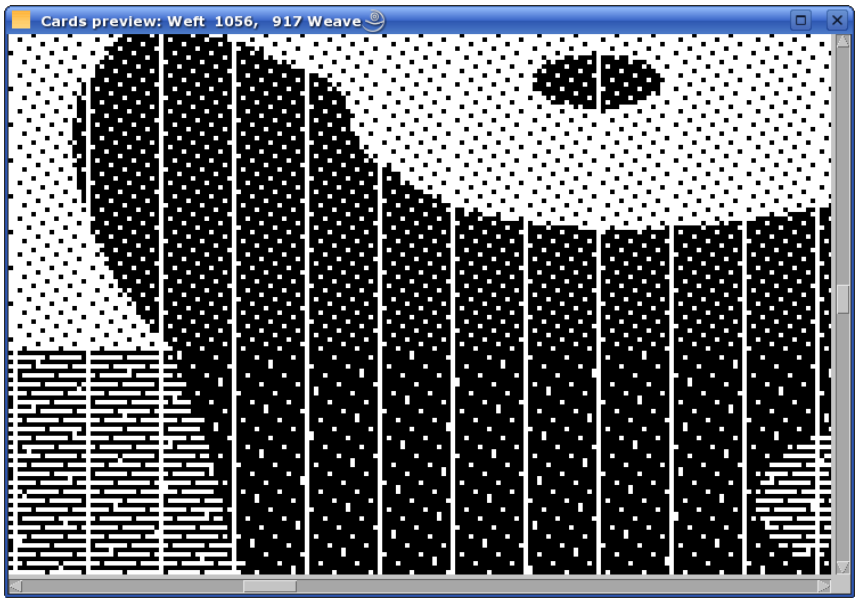



*Figure 414: Cards preview; notice the skipped hooks*

If you have mirroring, or pointed hooks, you have to write them in the weave shuffle field without skipped hooks. Only working design hooks should be written.

### 18.14.4 Extracting weave shuffle with skipped hooks from old files

Sometimes you have a very complicated loom layout (cast-out) where hooks are dropped in an irregular manner, for example in first 100 hooks designs skips every 9$^{th}$ hook, on hooks 101-1100 every 8$^{th}$ hook is skipped, and on hooks 1101-1200 again every 9$^{th}$ hook is skipped.
Sometimes you are lucky and you already have a design with such a cast-out. If only you could import this cast-out in an automatic way! Fortunately, you can. First you load this card image and remove the

empty space and weft change, so that you are left with only the weave (with skipped hooks) in the weave editor. Then, in the window **Save cards for production**, call function **Change** > **Guess skipped hooks**. Program will check which hooks are skipped and which are not, and write you the weave shuffle in an automatic way. This can serve as the base for your new loom layout.

## 18.15 Stäubli JC5 zones

If your selected jacquard format is Stäubli JC5, you have an additional field at the end of your hook specification: **Zones**. The **Zones** field allows you to divide the hook areas into distinct sections (zones), each with its own name. Normally, there are the hooks on zone one, and weft (function) bytes are on zone two. You can use the **Weft bytes first** toggle button to put them before or after the jacquard hooks zone. If you want something more complicated, you must use the **Zones** field. This is an example of a zone entry:

```
48(left selvedge)2400(design)48(right selvedge)32(control)
```

This specifies the total of 2528 hooks and gives proper names to the zones (in parenthesis). If the number of hooks does not match the sum of zones, then zones are not used. The use of zones can simplify changing of the selvedges on the loom controller, since it is easy to change the weave in the whole zone. Sometimes, a specific zone layout is required to load the design onto the Stäubli JC5 controller, if the user is not able to configure the input filters on the controller. So we must write the design with the exact same layout of zones as the controller is configured to.

## 18.16 Stäubli JC6

The new Stäubli JC6 controllers can display images and some additional information, which are stored in the JC5 card file. ArahWeave stores fabric simulation, the name of the weave, number of warp threads, weft density, names of weft colors, and amount of each weft color. These are saved automatically, if you select JC6 jacquard format. The file extension of the saved file will still be JC5, and the resulting file is compatible with JC5 controllers. The JC6 file size is slightly bigger, since it also stores the image icon.

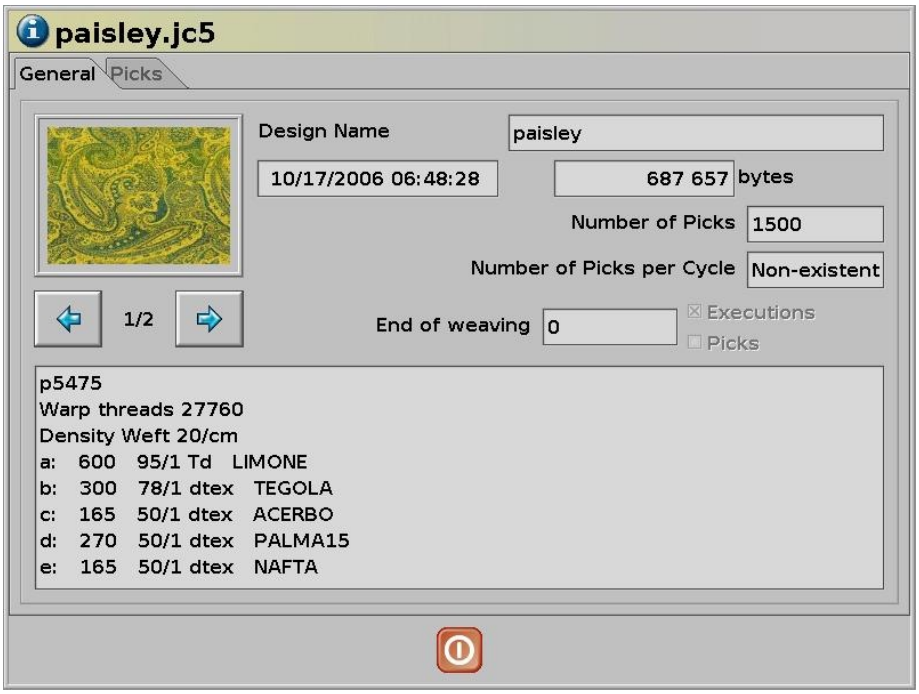



*Figure 415: Stäubli JC6 controller*


*Figure 416: Full screen simulation preview on Stäubli JC6 controller*

## 18.17 Support for Dobby CAM interfaces

You can save the weave card in following loom formats:

- CCI Tech (write)
- Dornier AMV (write)
- Dornier DoTech (write)
- Dornier DoStyle (read and write)
- Dornier DoWeave (read and write)
- JiangYin TongYuan SGA598 (write)
- Nuovo Pignone FAST (write)
- Panter (read and write)
- Picanol Des (write)
- SmitTextile G6300 (read and write)
- Somet DOP / COP (read and write)
- Stäubli 1858III (read and write)
- Toyota JAT710 (write)
- Vamatex PID / PIW (read and write)

## 18.18 Support for drawing-in machines

The support for these machines is available as the last group of entries in the selection of jacquard formats. When you select VEGA format, almost all the loom layout entries are hidden, since they are not used. But a new field appears – **Drop wire rows**, where we can select the number of rows of drop wires. Almost all other parameters for creation of drawing-in data are present in the weave window (drawing-in) and in the consumption window (denting for selvage, denting for pattern, number of threads for selvage, etc.). The only other parameter which you can enter is selvage weave – you can load it in the same way as for jacquard. The selvage shafts will always be extra to the normal pattern shafts.

*ArahWeave*, due to its dual dobby / jacquard nature, also supports complex setups, where you have dobby and jacquard on the same loom. The ground is usually woven using the dobby, while some labels or writings are inserted using jacquard in a certain portion of the fabric. This raises the complexity of warp preparation to a higher level, since we need to distinguish jacquard threads from the dobby threads. The jacquard threads should not be drafted into shafts. We are using a special notation for this purpose—positive and negative denting values. Positive denting values indicate the dobby part of the

pattern, while negative denting values indicate jacquard part of the pattern. This distinction has no influence on the fabric look in the main window and is used only in output to drawing-in machines. The negative denting values are interpreted as skip shaft but insert reed and drop wires as normal. Empty dents are also properly supported as: skip reed, no skip on shafts, no drop wires. The repeat blocks in writing the VEGA format are supported, so files are not too long.

## 18.19 Network data transfer

*ArahWeave* supports direct transfer to the jacquard controller via FTP protocol. In these instructions, we assume a basic knowledge of TCP/IP and networking administration. To make it work, you must have your jacquard controllers connected to the same network as the ArahWeave's computer. Each controller must have a unique IP address and you must know it. Before setting the ftp transfer in *ArahWeave*, you should check if it works manually. In these instructions, we will use 129.0.0.19 as the IP address of the Jacquard controller, you should use the actual address of your jacquard controller. Open a terminal window and type:

```
ping 129.0.0.19
```

and CTRL+C to stop. If it transmits packets without errors, it means that you are correctly connected to the loom via TCP/IP. Now we want to check if we can talk to the FTP server on the controller. Type:

```
ftp 129.0.0.19
```

You will be prompted for a user name, enter "anon" and press the Enter key for the password. This will work on JC5 controllers (**JC4 controller does not support the ping command, you should try connection with the ftp command**), but you may need to use specific usernames and passwords for other jacquard controllers. Please refer to the documentation of your jacquard controller regarding the usernames and passwords of the FTP server. While you are connected to the ftp server via ftp command, you should try to send a file. We will set the binary transfer, send the file `test.jc5` and logout.

```
bin
put test.jc5
bye
```

If this all worked without errors, we can integrate FTP into *ArahWeave*. You need to set up the loom network configuration file (**.looms** file) in the default directory of your loom configurations. To open it in ArahWeave, choose **Help** > **Save setup**, click on the **Expert** tab, and click the **Loom network configuration** button.

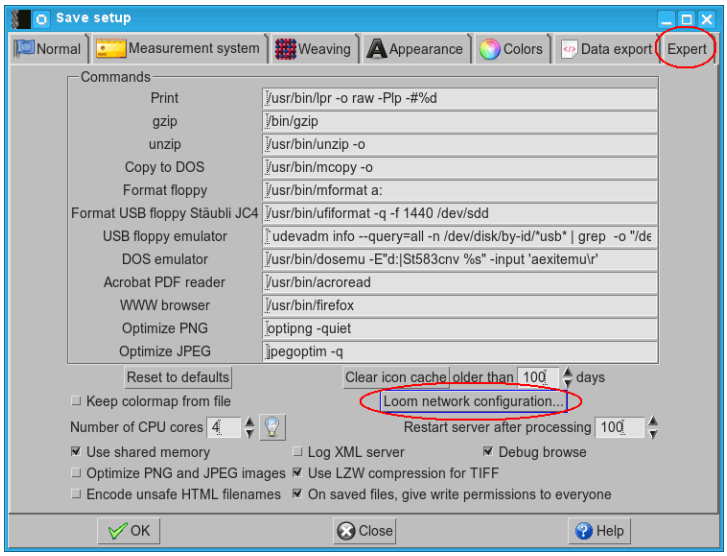



*Figure 417: Starting Loom network configuration editor*

If you start the editor for the first time and there is no .looms file, the editor is opened with blank data. First set the number of looms (rows) that you have in the network.

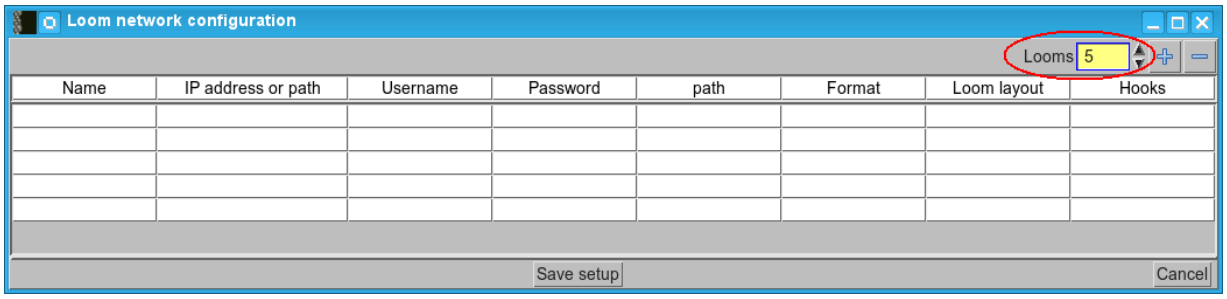



*Figure 418: The loom network configuration editor*

To enter data in the cell, click on it, and type in the data. If there is something already in, it will be overwritten. To edit data, which is already in, click on cell, and **press F2** on the keyboard.
You must enter the loom (or location) name which will be visible to the user of the program (so users do not need to remember IP addresses). Then you must also enter the IP address (or a ftp server name or a path of a directory), then username, password, path (if you want the files to be placed in a different path from the default directory into which ftp users log in), jacquard format, and the number of hooks of particular loom. If you do not know the number of hooks, or if it does not matter, just enter 0, the **Hooks** field cannot be empty. If any of the other parameters is not necessary, just leave it blank.
Note that jacquard format must be written in the same way as it appears in the menu, but instead of the correct "Stäubli JC5" (with umlaut), you can enter "Staubli JC5". You can have up to 300 looms configured in this way. Once you have finished with editing, click the **Save setup** button. Program will create the .looms file, where all these settings are saved. *ArahWeave* requires a restart before you can use newly created or changed the .looms file.

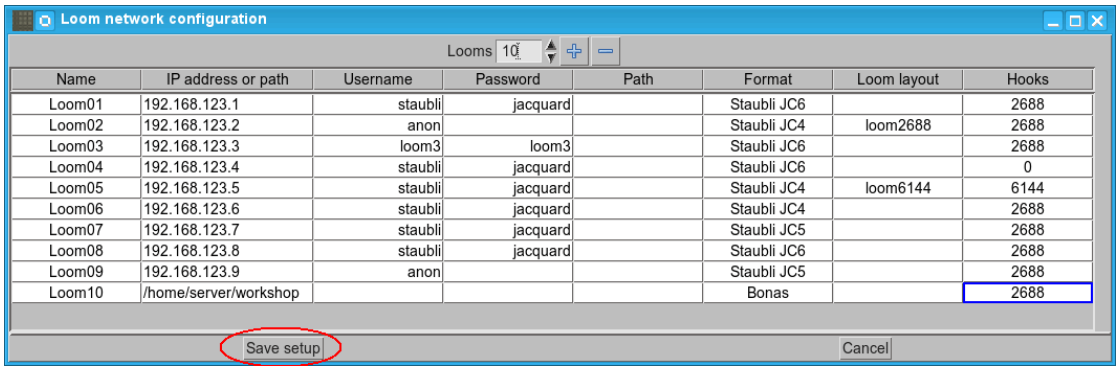



*Figure 419: Loom network configuration editor with data*

### 18.19.1 Sending file to the loom

There are two ways of sending file to the loom:

- First way: sending a file from the **Save cards for production** window:
  Choose **Send** (Figure 420) as the file destination in the Save cards for production window, and click **OK.** After the system has created a file and written it to /tmp directory, it opens the **Send file to production** dialog.

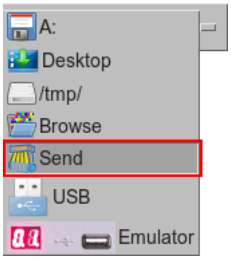



*Figure 420: Selecting a file destination*

  The displayed list of looms is created dynamically, based on two criteria: **number of hooks** and **file format** to prevent sending a file to the wrong loom. For instance, if you create 2688 hooks file in Staubli JC4 format, the list will display only looms, which have 2688 hooks and have a JC4 loom

controller. To send a file, click on the looms to which you want to send the file, and click the **OK** button. Figure 421 shows an example, where the Jacquard file will be sent to three selected looms. You will be informed of the success or failure of each file transfer.

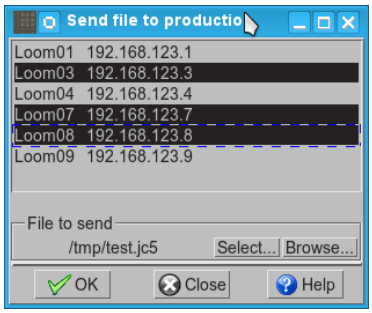



*Figure 421: Send file to production*

- Second way: sending a file directly from the **Send file to the production** window:
  Choose **Weave** > **Send file to production** from the main window. The **Send file to production** window displays all looms, which you have in the **.looms** configuration file. Click **Browse** to choose the Jacquard card, which you will send to the selected loom. With **OK** you confirm sending the file.

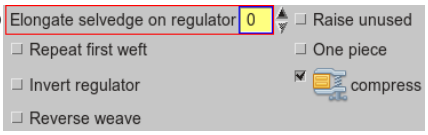
## 18.20 Extracting data from card using loom layout

This is the opposite operation of **Save cards for production**. Use it, when you have only the card file, but not the fabric or weave file, and you need to create a simulation or save the weave in different Jacquard format.
Load the card into the weave editor. Load a corresponding loom layout into **Save cards for production** window. Then choose **Change** > **Extract data using loom layou**t from the **Save cards for production** window. If the settings are correct, you get the jacquard weave and the regulator pattern in the weave editor and the weft pattern in the **Edit warp and weft pattern** window.

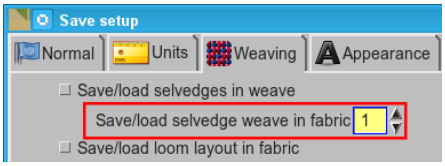
### 18.20.1 Getting selvedge weave from card file

If you want to get selvedges from the card file into Save cards for production window using the **Extract data using loom layou**t function, these two option must be set as described below:

- The **Elongate selvedge on regulator** option should be set to zero (0).




- The **Save/load selvedge weave in fabric** in the Weaving part of the Save setup should be on (the number 1 in the text field means selvedge 1 in the Save cards for production window).




## 18.21 Converting the jacquard card from one loom layout into another

Nowadays, most mills buy jacquard machines in an incremental manner. They do not buy 100 jacquards of equal brand, model and size, but start with a small number and add new ones as their needs are growing. Often, this also means that they choose a different brand or model, or that the new jacquard will have a different loom layout, for some technical reason. *ArahWeave* has a simple system for converting a file ready for weaving from one jacquard format and layout to a different one. Obviously, this only works for jacquard machines with an equal number of design hooks. You cannot simply convert a 2400 hook design into a 1200 hook design. But you can easily convert a Grosse 1200 hook card file into a Stäubli JC5 card file. The selvedges, hook positions and weft change or regulator can be different between the two files.
This operation is mainly intended for repetitive operations, when you are often converting designs from one particular layout to a different layout. First, you need to understand and save loom layouts of both (all) jacquard looms you want to convert among. Then use command Weave > **Load jacquard**

**cards**, if your jacquard file is already on the hard disk. As a second step, choose **Weave** > **Save cards for production**, and load the loom layout, which corresponds to that file. Once the correct layout has been loaded, apply function **Change** > **Extract data using loom layout**. This will use the information in your current loom layout to throw away the empty space on the hooks, retaining just the weave. It will also extract weft change and regulator, if present. If you would now save the design, it would be saved in the same way as you already have it. So you need to go in **File** > **Load loom layout** and load the layout of the jacquard to which you want to save the design. You can save it as it is, or modify weft change, selvages, or whatever is necessary.
The main advantage of this approach is that you can do it even for old designs, which were developed by external design studios, or other design systems. If the design was developed in *ArahWeave*, there is no reason to work in this manner, since you can simply load the fabric and the loom layout you want to use, and save the jacquard card design once again, for each jacquard layout.

# 19 Database connectivity by XML

## 19.1 Introduction

ArahWeave enables you to integrate its design data with the company's production management system (ERP-Enterprise Resource Planning).
Arahne has developed several tools to import and export data to and from ArahWeave. It may look complicated, but don't be scared. It is possible to make this kind of connection, and you will not be the first one to implement it.

## 19.2 Data import

All the import and export data formats are based on XML. XML is a simple standard which allows vendors to describe the format of data exchange files. We are using a very basic version of XML - one XML file, and one DTD file which describes the valid structure of the XML file. You can use the DTD file to verify your imported or exported files. The DTD file is not actually used in import or export; it just defines the structure of the XML file, so you know which fields are obligatory and which are optional. If you place the DTD file in the same location as the corresponding XML file, then some browsers will be able to verify the correctness of the XML file structure, and display a tree structure of the XML file.

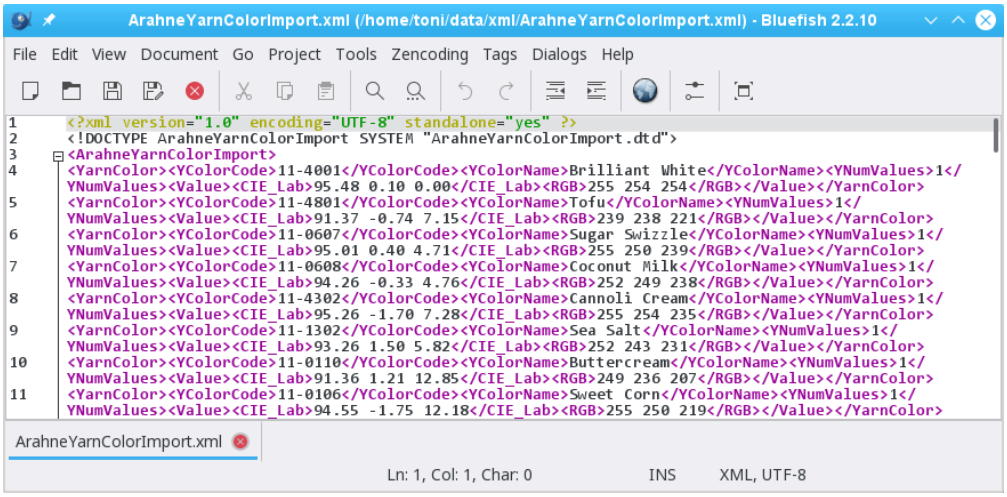



*Figure 422: XML file in a text editor*

Even before describing the data formats, we must know where they come from. In the simplest situation, you just copy the XML import file to the standard location (data/xml) for *Arahweave's* XML files (or to another location defined in `.arahne` configuration file). You can change the default XML location by exporting an XML file to a different location, and then saving the setup.

In a more complex setup, you can use the FTP protocol to get the import file from a different computer. The FTP specification and the actual import/export is executed in **Help** > **Save setup**, the **Data export** tab. To use the FTP, fill in the box labeled **Send XML data by FTP**. You must specify the IP address (as numbers or as domain name), the username, the password, and whether to use the passive mode FTP. The FTP location is the same for export and for import. To use FTP in XML import, you must enable FTP in the **Import data** box, and optionally, you can specify a directory for XML import files. This can be useful, so the export and import files are not mixed in the same directory. Another option during import is to delete old files. Use with caution! It is most useful during the testing phase of import, since the program will automatically delete all the previously imported files. Once the system will run normally, you should not need to use this kind of destructive import, since all the data should have a clear creation path and be inserted only once, without fear of duplication.

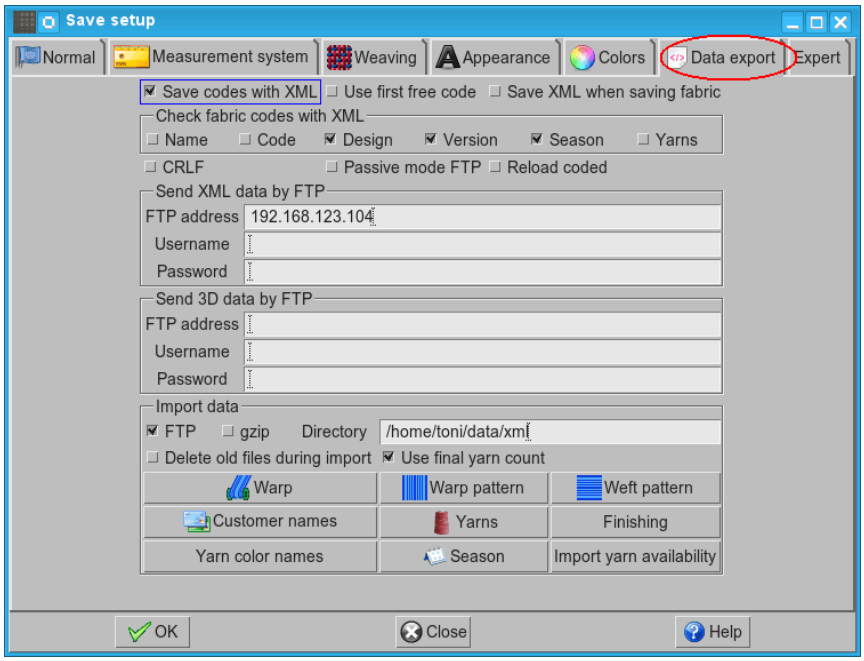



*Figure 423: Data export in Save setup*

Now let's start with the specification of the actual import files. If you have any experience with databases, you will wonder what is a unique key in our definitions. All the entries containing a word Code should be unique.

### 19.2.1 Warp patterns

They are specified by the following simple DTD file named **`ArahneWarpPatternImport.dtd`**

```
<?xml version="1.0" encoding="UTF-8"?>
    <!ELEMENT ArahneWarpPatternImport (Pattern*)>
    <!ELEMENT Pattern (Code, Value)>
     <!ELEMENT Code (#PCDATA)>
     <!ELEMENT Value (#PCDATA)>
```

The XML file for warp import must have the name **`ArahneWarpPatternImport.xml`** and this is a small example of such a file:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ArahneWarpPatternImport SYSTEM "ArahneWarpPatternImport.dtd">
<ArahneWarpPatternImport>
    <Pattern>
        <Code>00001</Code><Value>2a 1b</Value>
    </Pattern>
    <Pattern>
```

```
        <Code>00002</Code><Value>1a 20(1c 1d)</Value>
    </Pattern>
    <Pattern>
        <Code>00003</Code><Value>5a 70[1d 2c2b]</Value>
    </Pattern>
</ArahneWarpPatternImport>
```

The value of Code is equal to the code of your warp pattern in the database. Avoid using "/ " or "\" in the codes, since the code is then used as a filename to store the warp pattern. The value of the warp pattern is any regular warp pattern which you can write in *ArahWeave*. Capital and lowercase letters are not important, you can use spaces or not, you can have several levels of parenthesis. If you use the parenthesis, use only () or [], not both within the same pattern. Allowed yarn letters go from A-Y, and the longest permitted warp pattern has 65520 threads. As each pattern is imported, it is also interpreted and checked for correctness. At the end of import, the program notifies you of the number of correctly imported files and the number of failed ones, if any. In the testing phase, when you want to see on which pattern is the import failing, you can run the program from the console by typing

```
aw/aweave
```

and the patterns which fail to import will be written to the text console.
You can start the warp pattern import by pressing on the **Warp pattern** button in the **Import data** box of the Save setup window, **Data export** tab. During import, the current fabric is redrawn as each pattern is interpreted. This is normal, and serves you as a feedback of the program's activity. Once they are imported, you can browse them in a graphical way, as described in section 7.3.

### 19.2.2 Weft patterns

They are handled in exactly the same way as warp patterns, and everything written above still holds. Only the filenames of the DTD and XML files are slightly different.

This is the file **`ArahneWeftPatternImport.dtd`**

```
<?xml version="1.0" encoding="UTF-8"?>
    <!ELEMENT ArahneWeftPatternImport (Pattern*)>
    <!ELEMENT Pattern (Code, Value)>
        <!ELEMENT Code (#PCDATA)>
        <!ELEMENT Value (#PCDATA)>
```

And this is the corresponding XML file **`ArahneWeftPatternImport.xml`**

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ArahneWeftPatternImport SYSTEM "ArahneWeftPatternImport.dtd">
<ArahneWeftPatternImport>
    <Pattern>
        <Code>00001</Code>
        <Value>2a 1b</Value>
    </Pattern>
    <Pattern>
        <Code>00002</Code>
        <Value>1a 20(1c 1d)</Value>
    </Pattern>
    <Pattern>
        <Code>00003</Code>
        <Value>5a 70[1d 2c2b]</Value>
    </Pattern>
</ArahneWeftPatternImport>
```

### 19.2.3 Yarn color names

In databases, everything needs to be coded. So every color name needs to have a code. This import file allows you to specify color names. First, here is the DTD file **ArahneYarnColorImport.dtd**

```
<?xml version="1.0" encoding="UTF-8"?>
    <!ELEMENT ArahneYarnColorImport (YarnColor*)>
    <!ELEMENT YarnColor (YCode?, YColorCode, YColorName, YNumValues?, Value?)>
        <!ELEMENT YCode (#PCDATA)>
        <!ELEMENT YColorCode (#PCDATA)>
        <!ELEMENT YColorName (#PCDATA)>
        <!ELEMENT YNumValues (#PCDATA)>
        <!ELEMENT Value (CIE_Lab, RGB, Percent?)>
            <!ELEMENT CIE_Lab (#PCDATA)>
            <!ELEMENT RGB (#PCDATA)>
            <!ELEMENT Percent (#PCDATA)>
```

And now a small sample XML file **ArahneYarnColorImport.xml**

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ArahneYarnColorImport SYSTEM "ArahneYarnColorImport.dtd">
<ArahneYarnColorImport>
    <YarnColor>
        <YColorCode>332323</YColorCode>
        <YColorName>Rossignol</YColorName>
        <YNumValues>1<YNumValues>
        <Value><CIE_Lab>75.23 65.23 15.23</CIE_Lab><RGB>255 10 12</RGB></Value>
    </YarnColor>
    <YarnColor>
        <YColorCode>333523</YColorCode>
        <YcolorName>Girasole</YcolorName>
        <YNumValues>1<YNumValues>
        <Value><CIE_L>85.23 12.03 75.23</CIE_Lab><RGB>2550210 17</RGB></Value>
    </YarnColor>
    <YarnColor>
    <YColorCode>234523</YColorCode>
    <YColorName>Printed 5 colors</YcolorName>
    </YarnColor>
    <YarnColor>
        <YColorCode>434543</YColorCode>
        <YColorName>melange 50</YColorName>
        <YNumValues>2<YNumValues>
        <Value><CIE_Lab>83.23 1.03 -1.23</CIE_Lab><RGB>0 0 0</RGB><Percent>50</Percent></Value>
        <Value><CIE_Lab>23.23 -1.03 -4.23</CIE_Lab><RGB>0 0 0</RGB><Percent>50</Percent></Value>
    </YarnColor>
</ArahneYarnColorImport>
```

As you can see, this XML file allows you to specify a name for every yarn code, and also the optional CIE Lab values of the colors. Most ERP systems do not contain actual yarn colors specified in a colorimetric way, so they omit the Lab values. But if you had all the colors measured by photo spectrometer, and

inserted in this XML file, you could load them in. Some yarn colors can be multicolor, for example in mélange.

Although the **ArahneYarnColorImport.xml** file can be imported on request, it is actually read every time you run the program, if it is stored at the standard XML location. The importing of this file does not generate new color files in Arahweave's data files. It only helps the program to display correct yarn color names during yarn browsing.

### 19.2.4 Yarns

The database view of the yarn is somewhat different from the CAD view of the yarn. ArahWeave worries about the right color, shape, luster, hairiness, diameter, everything to make a nice fabric image. Database, on the other hand, only cares about numbers and codes. There is some intersection of interests, and this is what we try to import from the database to ArahWeave.

The **ArahneYarnImport.dtd** is shown below:

```
<?xml version="1.0" encoding="UTF-8"?>
<!ENTITY % cUnit "count Unit (Tex|Nm|NeC|NeW|Np|Ny|NeL|NeS|Td|Run|dtex) #REQUIRED">
<!ENTITY % lUnit "lengthUnit (mm|cm|m|in|ft|yd) #REQUIRED">
    <!ELEMENT ArahneYarnImport (YarnImport*)>
    <!ELEMENT Yarn (YCode, YName, YCount, Ply, Twists, TwistContraction, Model?, DimensionFactor?,
HairLength?, HairProbability?, Fibre*)>
        <!ELEMENT YCode (#PCDATA)>
        <!ELEMENT YName (#PCDATA)>
        <!ELEMENT YCount (#PCDATA)>
        <!ATTLIST YCount  %cUnit; >
        <!ELEMENT Ply (#PCDATA)>
        <!ELEMENT Twists (#PCDATA)>
        <!ATTLIST Twists %lUnit; >
        <!ELEMENT TwistContraction (#PCDATA)>
        <!ELEMENT Model (#PCDATA)>
        <!ELEMENT DimensionFactor (#PCDATA)>
        <!ELEMENT HairLength (#PCDATA)>
        <!ELEMENT HairProbability (#PCDATA)>
        <!ELEMENT Fibre (#PCDATA)>
        <!ATTLIST Fibre percentage CDATA #REQUIRED >
```

A sample of ArahneYarnImport.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ArahneYarnImport SYSTEM "ArahneYarnImport.dtd">
<ArahneYarnImport>
    <Yarn>
        <YCode>202245</YCode><YName>Lana 40</YName>
        <YCount countUnit="Nm">40</YCount>
        <Ply>2</Ply>
        <Twists lengthUnit="m">600</Twists><TwistContraction>0</TwistContraction>
        <Fibre percentage="100">WO</Fibre>
    </Yarn>
    <Yarn>
        <YCode>202234</YCode>
        <YName>Lana 48</YName>
```

```
        <YCount countUnit="Nm">48</YCount>
        <Ply>2</Ply><Twists lengthUnit="m">700</Twists><TwistContraction>2</TwistContraction>
        <Fibre percentage="100">MD</Fibre>
    </Yarn>
    <Yarn>
        <YCode>302231</YCode>
        <YName>Misto 12</YName>
        <YCount countUnit="Tex">12</YCount>
        <Ply>1</Ply><Twists lengthUnit="m">400</Twists><TwistContraction>0</TwistContraction>
        <Fibre percentage="60">CO</Fibre><Fibre percentage="30">MD</Fibre>
        <Fibre percentage="10">PL</Fibre>
    </Yarn>
</ArahneYarnImport>
```

Yarn code and yarn name fields need no explanation. Some customers use "/" in the yarn codes, and program allows that, using some tricks. When it is saving the imported yarn in yarn directory, it flips the "/" character into "\", since filenames in Unix cannot contain "/". When it loads such yarn, it flips the yarn code back to the original. So your yarn codes will be correct in all the cases.
Yarn count is entered with the unit of the count. You can use any unit supported by ArahWeave.
Number of plies is also obvious, and the number of twists are again entered with its own length unit.
Twist contraction tells us by how much does the yarn count shrink due to twisting. Just leave it at zero, if you do not need it.
And finally you can enter up to 6 fiber components, each with its own relative percentage. The fiber codes must be composed of two letters. It is better if they are written according to the standard which is used in *ArahWeave*. Once you load the yarn with fiber composition, the program will be able to calculate the fiber composition of final fabric
Note that yarn is colorless – the same yarn can exist in many different colors. Also, we do not expect to import any of the yarn visual properties, since ERP systems do not store this kind of information.

### 19.2.5 Yarn to color association with prices and availability

Finally we have all the components to specify which yarns do we actually have. We need to associate the yarn code to yarn color code, and tell how many kilos of yarn do we have, and how much does it cost. The DTD file to specify the format is **`ArahneYarnToColor.dtd`**

```
<?xml version="1.0" encoding="UTF-8"?>
    <!ELEMENT ArahneYarnToColor (Yarn*)>
    <!ELEMENT Yarn (YCode, YColorCode, YStockKG, YPriceKG, Season*)>
        <!ELEMENT YCode (#PCDATA)>
        <!ELEMENT YColorCode (#PCDATA)>
        <!ELEMENT YStockKG (#PCDATA)>
        <!ELEMENT YPriceKG (#PCDATA)>
        <!ELEMENT Season (#PCDATA)>
```

And this is an example of a valid XML file ArahneYarnToColor.xml

```
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<!DOCTYPE ArahneYarnToColor SYSTEM "ArahneYarnToColor.dtd">
<ArahneYarnToColor>
    <Yarn>
        <Ycode>Chenille</Ycode>
        <YColorCode>0014</YColorCode>
        <YStockKG>360</YStockKG>
```

```
        <YPriceKG>6</YPriceKG>
    </Yarn>
    <Yarn>
        <Ycode>Chenille</Ycode>
        <YColorCode>0016</YColorCode>
        <YStockKG>360</YStockKG><YPriceKG>6</YPriceKG>
    </Yarn>
    <Yarn>
        <Ycode>Chenille</Ycode>
        <YColorCode>0021</YColorCode>
        <YStockKG>360</YStockKG>
        <YPriceKG>6</YPriceKG>
    </Yarn>
    <Yarn>
        <Ycode>Boucle</Ycode>
        <YColorCode>V009</YColorCode>
        <YStockKG>34</YStockKG>
        <YPriceKG>15</YPriceKG>
    </Yarn>
    <Yarn>
        <Ycode>Boucle</Ycode>
        <YColorCode>V007</YColorCode>
        <YStockKG>52</YStockKG>
        <YPriceKG>15</YPriceKG>
    </Yarn>
</ArahneYarnToColor>
```

The elements of this XML file are obvious: yarn code, yarn color code, yarn stock quantity in kilos, and yarn price in whatever currency you like to use. Season is an optional yarn property. A normal weaving mill will try to reduce the number or yarns in contemporary use, to minimize fragmentation of yarn stock. So for only a smaller set of yarns will be used in a particular season. A yarn in certain color can have up to six seasons. In the yarn browser, this allows us to show only yarns of a particular season, instead of all the yarns, which were ever used in the mill's history.

## 19.3 Export of data – user's view

Why is export of data difficult? Because artists do not understand accountants.

In *ArahWeave*, we try to give the designer total freedom. Want to change the weave? Click, and you have a new fabric. Want this stripe to be larger? Click on the yarn, draw into the fabric, done. Want a darker red on that yarn? Click, drag, done.

In ERP systems, it doesn't work like that. Everything needs to be coded and tagged, you need to have your building blocks ready, and then you assemble your skyscraper. If you need to change the yarn color in fabric into darker red, you first need to create that color, give it a code, apply that code to the yarn, then if you change the width of the stripe, this makes a new warp pattern, so it needs to be saved with a new code, and in turn this needs to be associated with the new warp, which needs to be associated with a new fabric, and only then you can move on to weaving this piece.

Not that one is better than another – they just serve two different purposes: creativity and production. How do we marry the two approaches? By allowing the freedom to the artist, and when the sale of the masterpiece is confirmed, we pass it to the accounting department. That means, that after the fabric simulations were confirmed by the buyer, we need to fill in the codes, so that the fabric can be

exported. Fabrics without proper codes are useless in the ERP, so *ArahWeave* must ensure that you have all the codes, prior to exporting.
That means that before exporting a fabric, you will need to load a fabric and fill in some details which you did not care about in the creative phase. First, choose **Fabric** > **Information**, and fill in the **Name**, **Quality**, **Design** and **Version**. Second, all the yarns must have associated the yarn code and color code. The easiest way to do it is to use the yarn browser in the **Yarns** window. Using the yarn browser, you can simply click yarn by yarn, and fill in all the yarn technical data. By default, toggle button Load only codes will be enabled. This means that the program will only load the values relevant to XML export, without the actual yarn color or yarn image, and other yarn simulation parameters.
If you have set all the values, you can proceed to **File** > **Save technical data as XML**. Program will automatically set the XML filename equal to the name of your fabric, and it will add the .xml at the end. If the FTP sending is configured, then the fabric's XML file will be sent to the specified location. Otherwise the XML file will just be saved to the XML directory.
In the **Data export** section of save setup, we have some other options we did not mention earlier.
If you enable **Save codes with XML**, then the program will also save the warp and weft patterns before exporting XML. It will do it in a smart way: first it will check if an equal warp or weft pattern already exists. If it does, then it will apply its code to the fabric. If not, then the warp or weft pattern will be saved with a new name. We have another option, which controls how the new name is generated. If the **Use first free code** option is active, then the program will find "holes" in your coding and use the first free code. If not, then it will increment the last code if found, leaving the empty areas of codes.
The checking of existing warp and weft patterns is smart, since it does not compare the way the pattern is written, but its meaning. So the program will know that `1a 1b 1a 1b 1c` is the same as `2(1a 1b) 1c`, and it will use the same warp or weft pattern code.
Finally, it is very useful to enable the **Check fabric codes with XML** option , since then the program will verify if all the required fields have been filled in. If not, it will warn you about it and inform you exactly what is missing on which yarn.
Maybe you will be surprised that we do not deal a lot with coding weaves in the export. Our view is that the ERP system does not need to know too much about them. Weaves are big, so they cannot be stored in ERP. In the past, some companies spent a lot of time coding the dobby cards and reusing them. Now, this is all nonsense. Any decent mill will have electronic transfer of dobby and jacquard cards. So there is no time saving by trying to reuse the old ones, making all the codes and stuff. The weave should be born and die with the fabric article. The ERP system only needs to know enough to understand which warps are compatible. The actual weave is irrelevant to ERP, as this is handled by the *ArahWeave* CAD.

## 19.4 Export of data – expert's view

In order to import the XML fabric, you will need to write a program which will read the Arahne fabric XML file and fill in the appropriate tables in your database. There will be many fields you probably won't need, so you can skip them. And there will be other fields, which it will not contain, for example custom code. Here, you need to work with the weaving mill and fill in the missing fields with proper defaults. Alternatively, you can implement a second phase of import, where the operator will fill in some fields in a manual way. Even with manual checking of some fields, the time savings achieved by automatic transfer will be very big. Anyone who spent her or his life retyping warp patterns, will confirm this.
The current versions of ArahneFabric XML and DTD file is available for download from Arahne's web site:
https://www.arahne.si/xml/ArahneFabric.dtd
https://www.arahne.si/xml/SampleFabric.xml
We will not repeat the actual XML files here, to save the rainforest.

All the entry fields have logical names, so you can understand what they mean. Try to use ArahWeave and export a couple of XML files, and you will see how they look. If you have a valid support contract, we will also gladly help you in the implementation and explain all the details.

## 19.5 Case study: Protex - Computer House di Prato

The implementation of the connectivity is sometimes done by weaving mill internal IT staff. But more often it is done by an external company, which supports the weaving mill ERP system. In Italy, we have done this with our partner Computer House di Prato (CHP), with which we share many customers.
CHP's ERP is called Protex, and it is using a database running on Oracle in Linux or Unix, with a Windows graphical interface on new versions, or text based terminal interface on older versions. Programmers of CHP have written two modules for Protex, one called PROCAD, which periodically writes the import files for *ArahWeave*, with all the yarns, names and yarn availability. *ArahWeave* then reads this data by FTP, when the user requests data import or yarn availability.
The other program is called CAD-LINK and it is periodically checking if ArahWeave has sent it any fabric XML file by FTP. If it finds any files, it imports them and deletes them. If there are errors in the imported XML fabric file, it sends an e-mail to the Protex administrator, so failed imports get noticed.

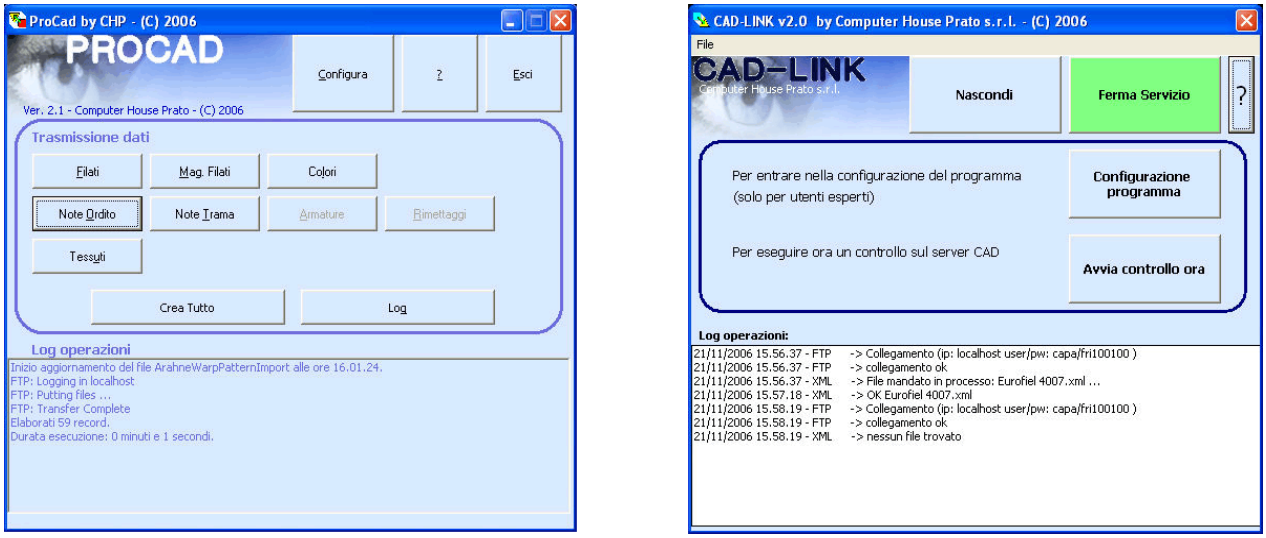



*Figure 424: PROCAD and CAD-LINK*

# 20 Saving Setup (Preferences)

## 20.1 Setting default fabric

When you open *ArahWeave*, it displays the default fabric. If you want to change it, load a fabric that you want to be the default one, and choose **Help** > **Set current fabric as default** from the main menu bar.

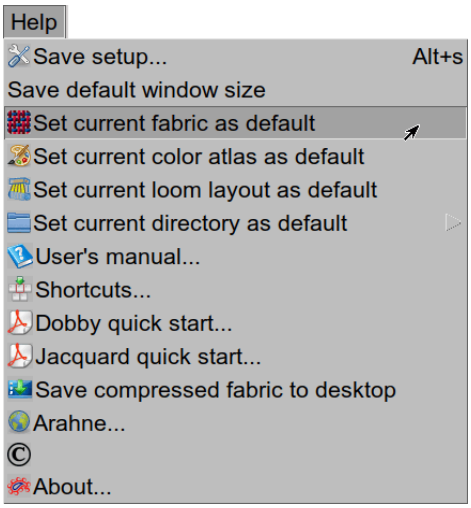



*Figure 425: Setting current fabric as default*

## 20.2 Changing default location for opening and saving files

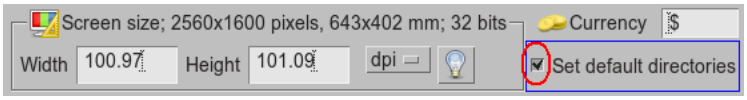



*Figure 426: Setting the default directories*

To change the default file or directory, where the files are saved, you have to load the desired file from a specific location into *ArahWeave* (fabric file in the main *ArahWeave* window, weave file in the Weave editor, yarn file in the **Edit yarns** window, image file in the **Jacquard conversion** window, loom layout file in the **Save cards from production** window, etc...). Then choose **Help** > **Save setup**. Check the **Set default directories** button, and click the **OK** button in the **Save setup** window.

There is also an option to save the position of default opening location for particular directory directly from the menu:

- Fabrics: **Help** > **Set current fabric as default**.
- Colors: **Help** > **Set current color atlas as default**.
- Loom layouts: **Help** > **Set current layout as default**.
- Yarns, Weaves, Images, Cards, HTML, XML: **Help** > **Set current directory as default**, and select a type of files, for which you want to keep a current opening location.

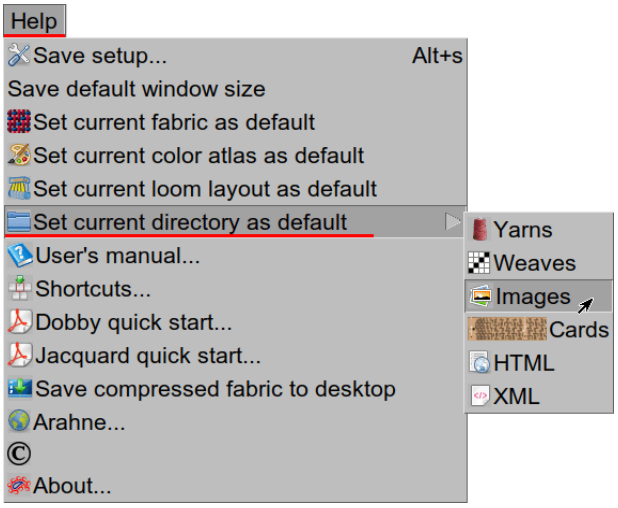



*Figure 427: Setting current directory as default*

## 20.3 Weaving section

The **Save setup** dialog has a special weaving part for all weaving related settings. To access them, choose **Help** > **Save setup**, and click the **Weaving** tab.

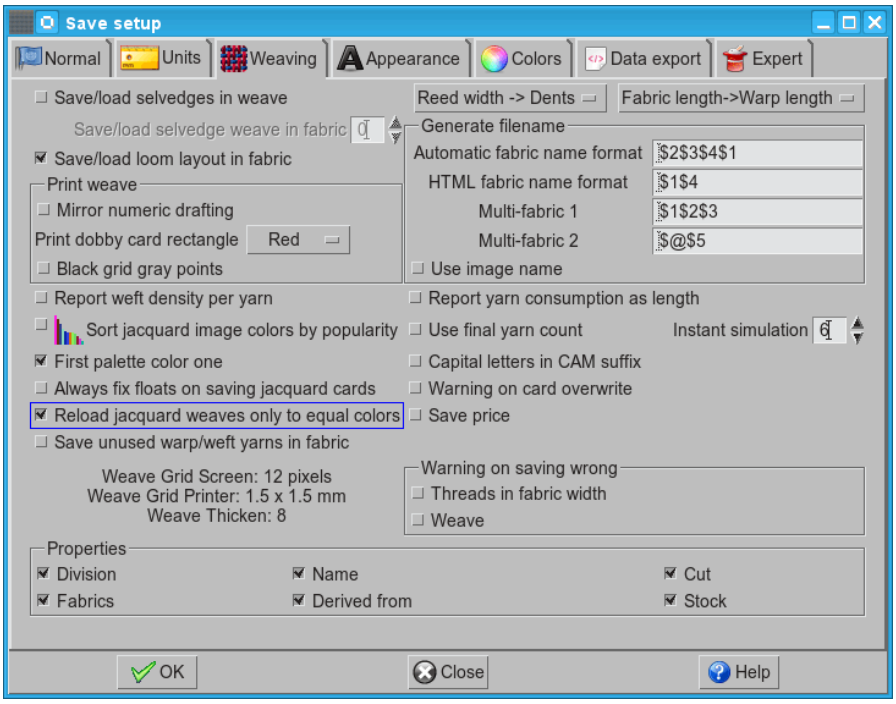



*Figure 428: Save setup - weaving*

- You can change the option button from **Reed width -> Dents** to **Dents -> Reed width** to use **Number of dents in fabric width** instead of **Threads in fabric width** in the **Consumption** window.
- With the **Fabric length -> Warp length** option button you choose either the **Fabric length** or **Warp length** is your input in the **Consumption** window.
- **Report yarn consumption as length**—if it is on, then the consumption is calculated in length of yarn instead of weight of yarn
- The default **Reed unit** is 1 centimeter, but you can change to whatever your reed unit might be.
- **Save/load selvedges in weave**—if it is on, then the selvedge, which is currently loaded in the **Save cards from production** window, is saved with a weave. When you load such a weave, then it overwrites the selvedge which is currently loaded in the **Save cards from production** window.
- **Save/load selvedge weave in fabric**—if it is set to 0, then the selvedge weave is not saved in the fabric. If it is set to one of the three possible numbers 1,2, or 3 (Selvedge or Selvedge 2 or Selvedge 3 respectively), then the selvedge, which is currently loaded in the **Save cards from production** window, is saved with a fabric. When you load such a fabric, then it overwrites the selvedge which is currently loaded in the **Save cards from production** window.
- **Use final yarn count**—if it is on, then the program takes the yarn count number for calculating the simulation (diameter of the yarn) or yarn consumption as the absolute yarn count regardless if it is single yarn or multiply yarn. The display of yarn count is also different, if you use final yarn count.
- **Mirror numeric drafting**—choose either the first shaft is the nearest or the farthest to the weaver.
- **Print dobby rectangle in light red**—default color for dobby rectangle is red—but if you photocopy (black&white) the print, then you can't distinguish between rectangle and weave. Solution? Print it in light red.
- **Black grid gray points**—if it is on, the program prints warp points in gray color and weave grid in black color, which is just opposite to the defaults.
- **Report weft density per yarn**—in some textile areas in Italy they use density per yarn color to help them to calculate the consumption, so we included this as an option in *ArahWeave*.
- **Sort Jacquard image colors by popularity**—does just as it sounds; it sorts colors of the image in the **Jacquard conversion window** by colors popularity. If the option is off, then ArahWeave sorts colors like they are written (saved) in the image file.
- **Always fix floats on saving jacquard cards**—if you have set the float limits (see chapter 5.10) in the fabric, and the option is on, then *ArahWeave* automatically checks and corrects long float errors.

- **Reload jacquard weaves only to equal colors**—if you load a different image, weaves will be retained only if colors are exactly the same, and the program will not try to map the weave to the most similar color.
- **Capital letters in CAM suffix**—some users still have a lot of loom files written in old DOS systems, which don't distinguish between capital and lowercase letters—thus this option allows you to save CAM files in the same way.
- **Warning on card overwrite**—if the option is on, then ArahWeave warns you, when you use the already existing file name for CAM file.
- **Save unused warp/weft in fabric**—by default, ArahWeave saves only yarns, which are used in fabric, in the fabric file. Next time, when you load that file, only saved (used) yarns are loaded, the other yarns in the **Edit warp and weft** pattern dialog (25 yarns for each) are default yarns. But if you enable the **Save unused warp/weft in fabric** option, then all current yarns from the **Edit warp and weft pattern** dialog are saved in the fabric file, and thus loaded when you open the fabric file next time.

Then there is the **Properties** section. You can control which text fields and options are present in the Properties window (**Fabric** > **Properties**).

- **Division**
- **Fabrics**
- **Name**
- **Derived from**
- **Cut**
- **Stock**

The **Warning on saving wrong** section consists of two options:

- **Threads in fabric width**—if the number of threads is not "compatible" with denting and reed number, *ArahWeav*e warns you before saving a fabric.
- **Weave**—if the weave of the fabric, which you want to save, has unfinished (or no existing) drafting into shafts, *ArahWeav*e warns you before saving a fabric.

### 20.3.1 Generating filename, fabric simulation title or HTML fabric name format

The **Generate filename** section of Save setup enables you to declare, which data from the fabric properties (**Fabric** > **Properties**) is used for generating:

- Fabric filename
- Fabric name in HTML technical data file (this is also used as a Fabric name on printout)
- Fabric name on multi-fabric printout

The format of fabric name formula has only one rule: the number of field which will be used in the fabric name, should stand after the dollar sign ($), which is there to indicate that the used number is the field number and not character which would be part of the text. After the field number you can enter whatever character you want, like space, slash, hyphen, and it will be used in the generated filename.

The text fields in the Properties dialog have following numbering labels:

| Field | Label |
|---|---|
| Division | $8, $9 * |
| Name | $1 |
| Quality | $2 |
| Design | $3 |
| Version | $4 |
| Season | $5, $6 * |
| Designer | $7 |
| Notes | $N |

* $8 only takes first word (anything till first space character) from the division code (or name), while $9 takes the whole name. Same applies to Season: $5 takes only first word and $6 takes the whole code. Beside Properties, four additional signs were introduced for automatic title generation:

| | |
|---|---|
| Fabric filename | $0 |
| Jacquard image filename without suffix | $I ** |
| Scissors | $@ *** |
| Directory name | $D |

** It is the capital letter I.

*** Scissors sign may be used only on multi fabric print.

Let's see an example: if you have written **$1 – $2 $3–$4** as a rule in the **Automatic fabric name format field** fabric name format, and have entered following text in the Properties window: Pale Blue as a **Name** (Field 1), **B** as a **Quality** (Field 2), 14 as a **Design** (Field 3), and 08 as a **Version** (Field 4), then the generated name would be: Pale Blue - B 14-06. To generate a filename, click  icon in the Save fabric dialog.

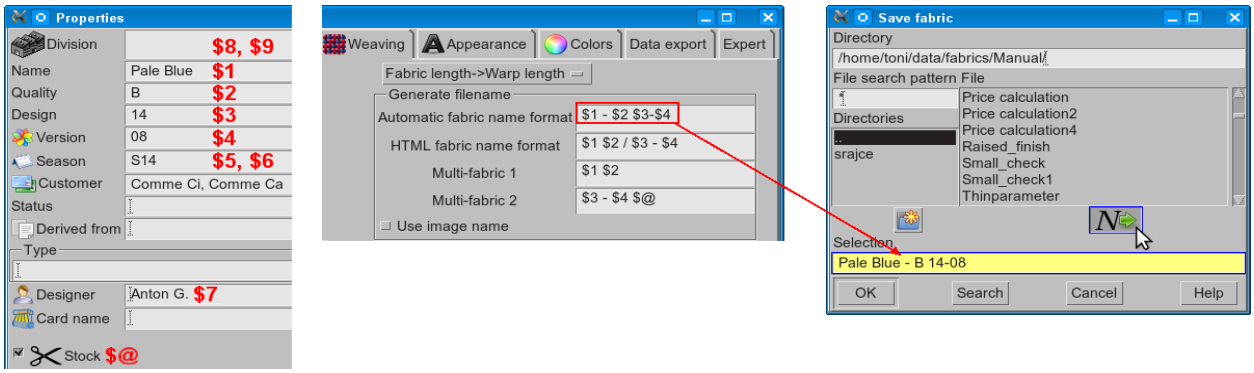



*Figure 429: The fabric properties, which can be used in automatic generated fabric name, the fabric name rules, and generated file name*

## 20.4 Personalizing ArahWeave

The **Appearance** section of the **Save setup** window contains most of the program's look-and-feel settings.

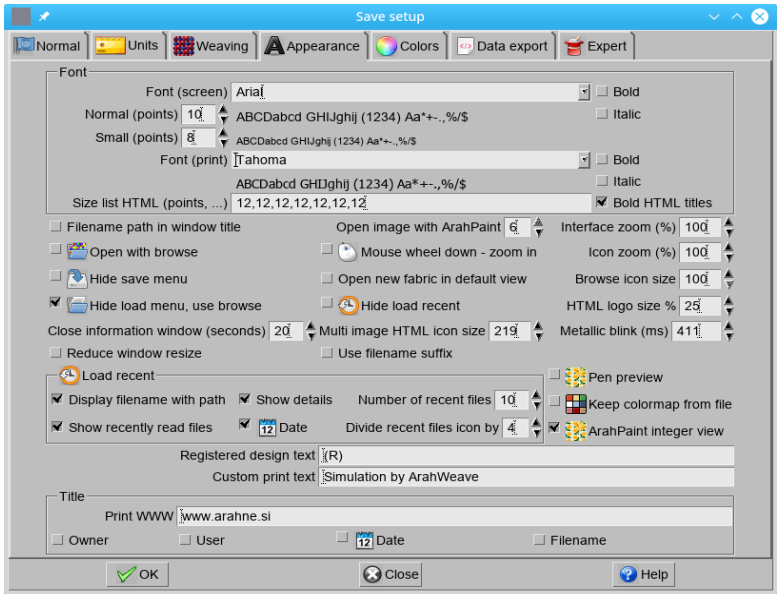



*Figure 430: The Appearance section of the Save setup dialog*

### 20.4.1 Setting user interface font

You can choose your preferred font style for user interface from the drop-down menu. The font menu shows only font styles, which are available for the currently selected language. If you are using Latin script, then the default font (**Sans**) is normally a good choice. Choose **Garuda** or **Tahoma** for Thai language, you can use **FZKaiTi** or similar font for Chinese; Chinese language package should be installed in Linux.

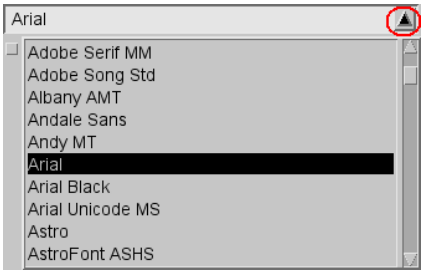



*Figure 431: Choosing font*

*ArahWeave* uses two font sizes: **Normal** (most of the program text) and **Small** (filenames in the browse window, color names). You can adjust the size by changing the number of points in an adequate field. The Calculation of thread consumption window, the Price calculation window, and the Yarn windows use a web browser engine to display HTML code in tables in their windows. To set the font size in these tables, edit the font size numbers in the **Size list HTML (points,...)** field. The **Bold HTML titles** button serves to disable the default bold titles in the HTML code, because sometimes (especially when you use Chinese language) characters in bold style are difficult to read.

### 20.4.2 Setting the font for printing

You set the print font in the same way as font for screen (user interface).

### 20.4.3 User interface colors

Click the **Colors** tab in the **Save setup** window to set the user interface colors. You can change following user interface colors:

- **Background color** of the program
- **Mouse pointer color**
- **Background color** of the **Weave editor** (on some LCD monitors the default color is too light, so it is difficult to distinguish the background from the editing area)
- First level grid color in the **Weave editor** (**Grid 1**)
- Second level grid color in the **Weave editor** (**Grid 2**)

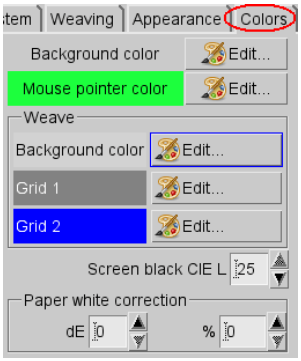



*Figure 432: Colors section of the Save setup*

To change color, click the **Edit** button. Use the **Color editor** to specify or define a color for the selected portion of the user interface. Color field displays the spectrum of available colors. The cross hairs indicate the current color. Click anywhere or drag in the color field to select a color. Enter a value for the luminosity, or drag the pointer on the slider to set the luminosity. You can also use the eyedropper tool (  ) to select any color from your screen. You confirm the changes by clicking the **OK** button.

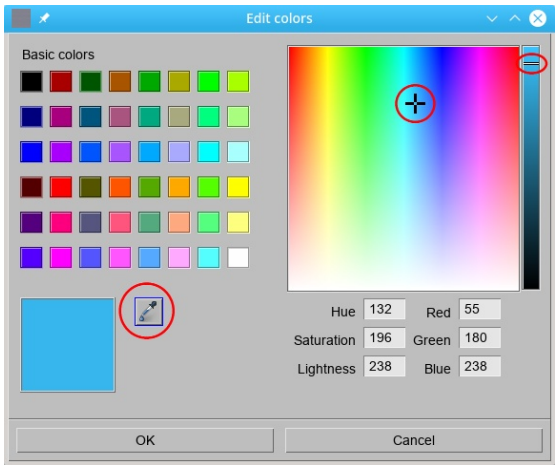



*Figure 433: Color editor used to select user interface colors*

### 20.4.4 Miscellaneous settings

#### 20.4.4.1 Open with browse

If you select it, then ArahWeave opens a fabric browser automatically at startup.

#### 20.4.4.2 Hide save menu

Some customers work really fast, and sometimes hit **Save** instead **Save as**. And there is no way back, when a file is overwritten. But, if you enable **Hide save menu**, then this will never happen to you again.

#### 20.4.4.3 Hide load menu, use browse

As the option name indicates, the Load file menu opens the graphical Browse window and not the text based Load file dialog.

#### 20.4.4.4 Mouse wheel down – zoom in

You can change the default direction of the mouse wheel zooming.

#### 20.4.4.5 Open new fabric in default view

When you load a new fabric, it will use the default view setting, regardless of current view.

#### 20.4.4.6 HTML logo size %

It is quite difficult to predict the size of the logo in the HTML printout. So you can adjust **HTML logo size %** to your liking.

The logo file is the same as it is used on printout – it is stored in `/home/capdam/data/html` directory and the filename should be **logo.gif** but it can be in any graphics format.

#### 20.4.4.7 Registered design text

The text, which you have in the **Registered design text** field, will be printed (or saved) in the fabric simulation printout (if you enable it in the **Print fabric to printer** dialog).

#### 20.4.4.8 Custom print text

The text, which you have in the **Custom print text** field, will be printed (or saved) in the fabric simulation printout (if you enable it in the **Print fabric to printer** dialog).

### 20.4.4.9 Title

In the Title section, you can declare what data is used for the right-side part of the title. You can include **Owner** (the Owner's name from Save setup), User ( name of the user's account), **Date**, and the fabric **Filename**.

Here you can also enter the web site address, you want to be printed in the title.

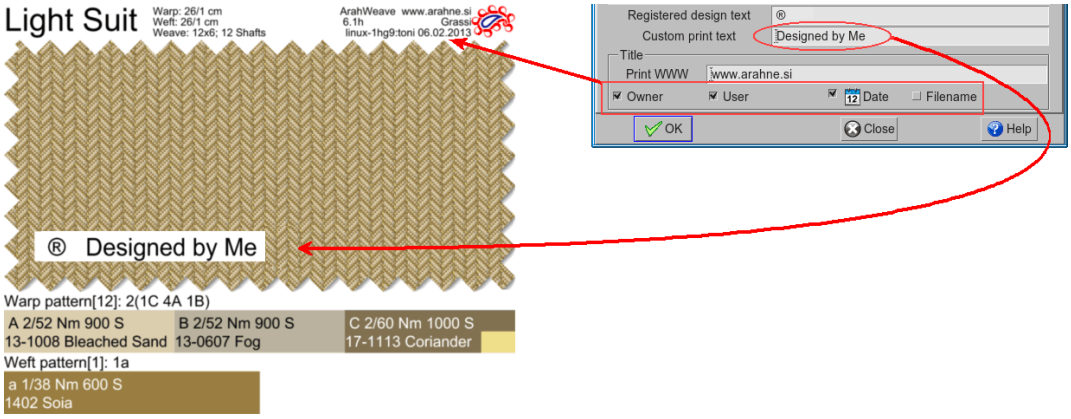



*Figure 434: Registered design text, custom print text and the title in the printout*

# 21 Running ArahWeave in server mode from the command line

If you use ArahWeave on your desktop, starting it from the command line is usually unnecessary (unless you need debugging information from the terminal). However, if you want ArahWeave to start automatically from a time-dependent script, or if you want ArahWeave to start alongside other services from a script, you can include the command that starts ArahWeave in server mode.

If you start ArahWeave from the command line the folder, where it is installed (usually it is /home/UserName), the command is `./aw/aweave -nosplash -server`. (Figure 435).

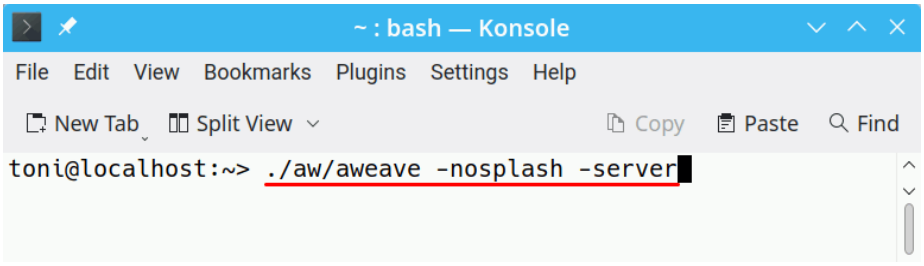



*Figure 435: Starting ArahWeave in server mode from the command line*

If you include the command in a script, use the full path to the program:

`/home/UserName/aw/aweave -nosplash -server`

(UserName is the actual user's name).

When the program is in server mode, the title bar displays, in addition to regular information, the number of processed files.

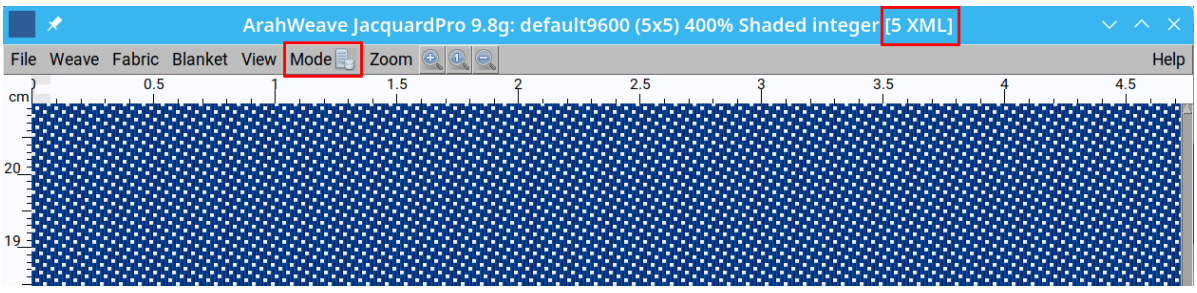



*Figure 436: The number of processed files is displayed in the title bar.*

If you need a high performance ArahWeave server, we suggest you install it on a multicore computer, and start several copies of ArahWeave servers. You can safely start the same number of ArahWeave servers as the number of CPU cores of your computer. ArahWeave server has been designed in a way to allow concurrent operations of several programs.

## 21.1 Server configuration options in the Save setup

- In the Save setup (**Help > Save setup**; the Expert tab), you can specify the number of processed files before ArahWeave is restarted.

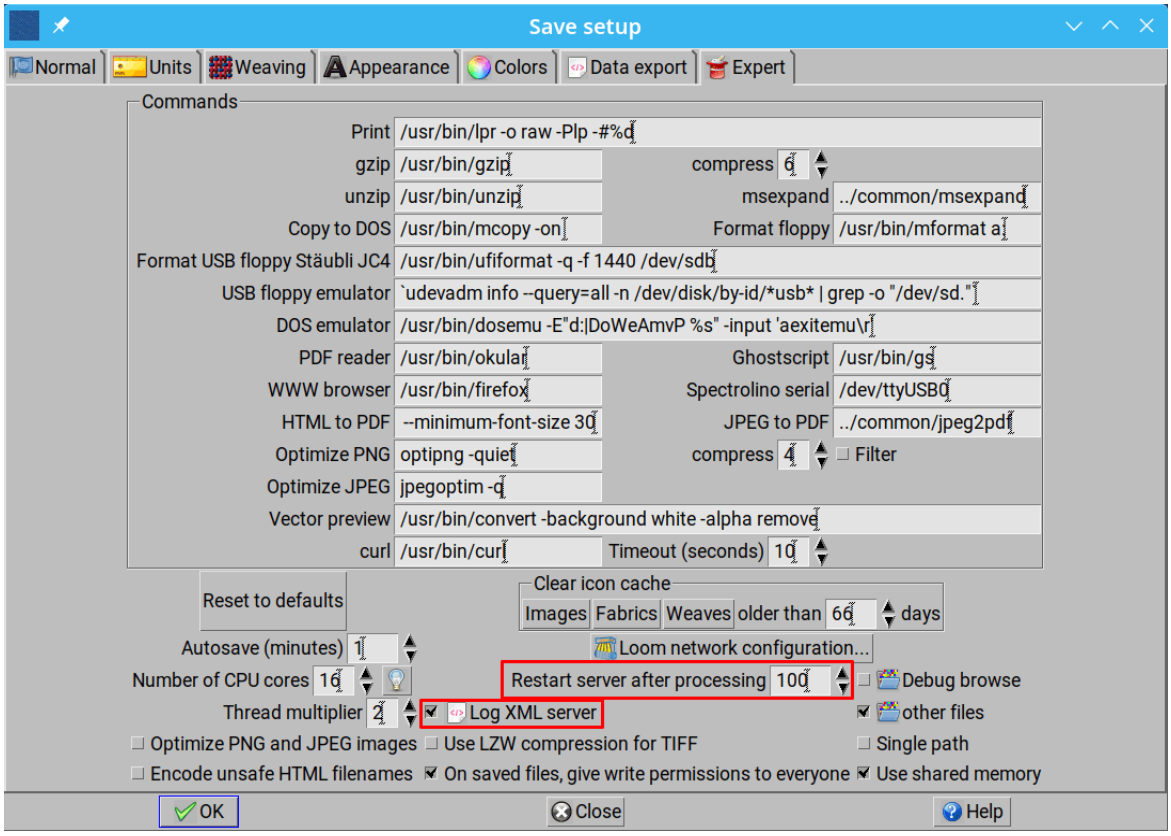



*Figure 437: Setting the number of processed files before restarting the server, as well as enabling the server log files.*

- You can enable writing of log files. They are written in `/tmp/arahneServerLog` folder. Once XML files have been executed, log files are copies of all incoming XML files and reply XML files. This can aid in error debugging by determining whether other programs have passed correct information in the XML. If the server fails to execute an XML file, the reason will be provided in the reply XML. The filename of the reply XML will be the same as the filename of the input XML, with the exception that it will be placed in the "out" directory.

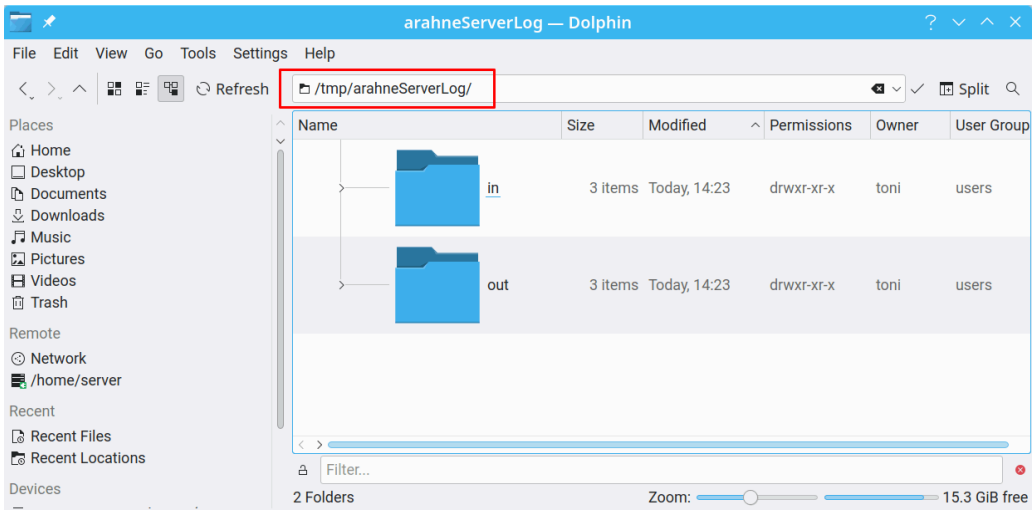



*Figure 438: Server log files*

- The processing delay in milliseconds can be set in the **Data export** tab. It refers to the interval between incoming XML file checks. The XML processing delay is measured in milliseconds. If your server's jobs are small and you require a highly interactive system, you can set the delay to as little as 100 milliseconds (0.1 second).

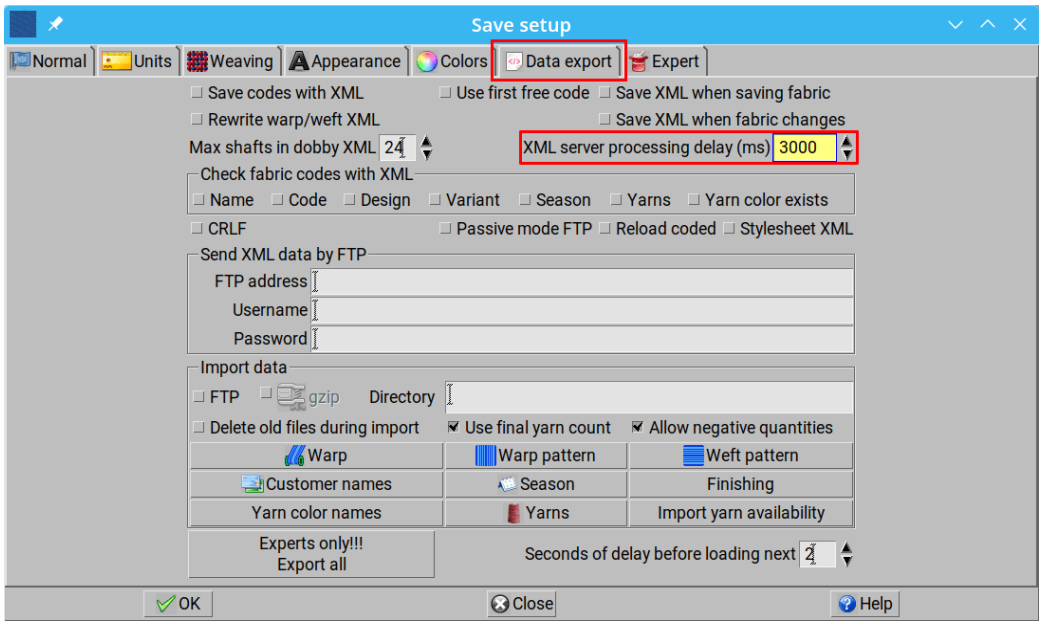



*Figure 439: Setting the interval between two checks of the input folder.*

# 22 Supported formats

## 22.1 Weaving CAM formats

You can write these formats from **Save cards for production** window, and read from the **Browse Jacquard cards** window, or the **Browse weaves** or **Load weave** window. *ArahWeave* recognizes file format automatically, and displays file icon in the browse window. All CAM formats are treated as binary, black and white images.

| Name | Read Write | Filename extension | Type | Notes |
|---|---|---|---|---|
| STÄUBLI JC3 | rw | .JC3 | jacquard | • non-DOS formatted floppy; only one design per floppy<br>• multiple floppy support for large designs<br>• can be written as a DOS file, for sending by email |
| STÄUBLI JC4 JC4B | rw | .JC4 | jacquard | • non-DOS formatted floppy; several designs per floppy possible<br>• multiple floppy support for large designs<br>• can be written as a DOS file, for sending by email |
| STÄUBLI JC5 | rw | .JC5 .ZC5 | jacquard | • optional compression (good)<br>• multiple floppy support for large designs |
| STÄUBLI JC6 | rw | .JC5 .ZC5 | jacquard | • same as JC5, but with fabric simulation for the file icon on the loom, weft yarn count and color information in the text field |
| BONAS | rw | .EP | jacquard | • optional compression (poor)<br>• multiple floppies |
| GROSSE | rw | .WEA | jacquard | • multiple floppies support (filenames on all floppies are same; if you send files by email you have to rename them, and when you copy them back to floppies, you have to rename them back to original filename |
| SCHLEICHER | rw | .S01 | jacquard | |
| AVL Compu-Jacq | rw | .JP1 | jacquard | • handloom electronic jacquard format<br>• includes support for display of weft colors |
| JTS TAKEMUR | rw | .DAT | jacquard | |
| tis electronics Actrom | rw | .P .S01 | jacquard | • including support for multiple floppies<br>• two files for one design! |
| Varitex | rw | .PAT | jacquard | • for narrow weaving |
| ELTEX Eltex | r | .EJP | jacquard import | • for narrow weaving |
| Arahne weave | rw | | native | • textile CAD manufacturer<br>• compressed format<br>• ideal for browsing of weaves, will load fastest<br>• unified format for jacquard and dobby weaves<br>• contains shaft information<br>• contains weave system information<br>• optional separate weaves for left and right selvedges |
| Sophis card | rw | | punch | • textile CAD manufacturer (reverse engineering) |
| Sophis weave | r | | import | • textile CAD manufacturer (reverse engineering)<br>• only normal weaves are supported, not compound weaves |
| EAT card | rw | | punch | • textile CAD manufacturer (reverse engineering) |
| AM weave | r | .BBI | import | • textile CAD manufacturer (reverse engineering) |
| VIABLE SYSTEMS, INC. | r | .PUN | punch | • textile CAD manufacturer (reverse engineering) |
| QTE | r | .QTE | import | • textile CAD manufacturer (reverse engineering) |

| Name | Read Write | Filename extension | Type | Notes |
|---|---|---|---|---|
| PNG | rw | .PNG | image | • Arahne's default format<br>• compressed format<br>• supported in browsers and mailing programs |
| GIF | rw | .GIF | image | • compressed format<br>• supported in browsers and mailing programs |
| TIFF | rw | .TIF<br>.TIFF | image | • optional compression |
| BMP | rw | .BMP | image | • optional compression<br>• For use with Digital Weaving TC-1 |
| Weaving Information File | rw | .WIF | dobby | • for interchange of weaving files among hobbyist programs<br>• up to 99 shafts<br>• up to 24 weft selectors<br>• warp/weft pattern<br>• warp/weft colors<br>• warp/weft density |
| GCi Tech | w | .SF2 | dobby | • up to 24 shafts<br>• variable weft density<br>• fringe<br>• regulator |
| DORNIER | w | .AMV | dobby | • writing to floppy |
| DORNIER DoStyle | rw | | dobby | • up to 28 shafts<br>• variable weft density<br>• variable warp tension<br>• variable weft speed |
| DORNIER DoTech | w | .PAT | dobby | |
| DORNIER DoWeave | rw | .DES | dobby | |
| JiangYin TongYuan SGA598 | rw | .DY | dobby | • up to 20 shafts<br>• up to 8 weft selectors<br>• up to 4 variable densities, regulator interpreted as second weft density |
| Nuovo Pignone FAST | rw | .ARM | dobby | • filename limit 6 characters<br>• up to 20 shafts<br>• up to 8 weft selectors<br>• variable weft density<br>• regulator<br>• pile height |
| PANTER | w | .D | dobby | • up to 28 shafts<br>• variable weft density |
| PICANOL | w | .des | dobby | • up to 24 shafts<br>• up to 8 weft selectors<br>• fringe<br>• loom speed<br>• up to 8 variable densities |

| Name | Read Write | Filename extension | Type | Notes |
|---|---|---|---|---|
| SMIT TEXTI G6300 | rw | .ARM | dobby | • up to 24 shafts<br>• up to 16 weft selectors<br>• fringe<br>• double weft insertion<br>• up to 16 variable weft densities |
| SOMET | rw | .DOP | dobby | • dobby information (can also contain weft change) |
| SOMET | rw | .COP | dobby | • weft change information |
| STÄUBLI 1858 III | rw | .DB1 | dobby | • up to 28 shafts (26, if used with variable density)<br>• up to 8 weft selectors<br>• regulator<br>• up to 4 variable weft densities |
| SULZER TEXTIL | rw | .UWF | dobby | |
| VAMATEX | rw | .PID | dobby | • up to 27 shafts<br>• up to 12 weft selectors<br>• fringe<br>• regulator<br>• variable weft density |
| VAMATEX | rw | .PIW | dobby | • up to 12 weft selectors<br>• fringe<br>• regulator<br>• variable weft density |
| TOYOTA AT710 | w | | dobby | • up to 20 shafts<br>• weft change information<br>• variable weft density, with absolute density values<br>• fringe<br>• regulator<br>• double weft insertion |
| Tsudakoma TSUDAKOMA | rw | .DP5 | dobby | • up to 20 shafts<br>• weft change information<br>• variable weft density, with absolute density values<br>• fringe<br>• regulator<br>• double weft insertion |

## 22.2 Image formats

All image formats are automatically detected, no user intervention is necessary. The weaving CAM formats are also read as black and white images, but we will not repeat them here.
For saving in selected format, just add the filename extension. Without extension, the program will save the image as a PNG file.

| File format | Read Write | Filename extension | 1-bit | 8-bit colormap | 24-bit true color | Notes |
|---|---|---|---|---|---|---|
| PNG | rw | .PNG | ✔ | ✔ | ✔ | • Arahne's default format<br>• very good compression<br>• Alpha channel transparency is not supported |

| File format | Read Write | Filename extension | 1-bit | 8-bit colormap | 24-bit true color | Notes |
|---|---|---|---|---|---|---|
| GIF | rw | .GIF | ✔ | ✔ | | • good compression<br>• interlaced GIF is not supported<br>• transparent colors in GIF are not supported |
| JPEG | rw | .JPG .JPEG | | ✔ grayscale only | ✔ | • lossy compression – saving image several times will lose details;<br>• not appropriate for saving cleaned up jacquard images |
| TIFF | rw | .TIF .TIFF | ✔ | ✔ | ✔ | • optional compression |
| WebP | rw | .WEBP | | | ✔ | • not appropriate for saving cleaned up jacquard images<br>• Alpha channel transparency is supported |
| BMP | rw | .BMP | ✔ | ✔ | ✗ | • optional compression, but very bad<br>• 24-bit is not supported in Arahne's programs |
| PBM | r | .PBM .PGM | ✔ | ✔ | ✔ | • not compressed |
| Sophis image | r | | | ✔ | | • textile CAD manufacturer<br>• (reverse engineering)<br>• not compressed |
| CSS JacquArt | r | .APF | | ✔ | | • textile CAD manufacturer<br>• optional compression |
| EAT image | r | | | ✔ | | • textile CAD manufacturer<br>• reverse engineering<br>• not compressed<br>• .eatpc not supported |
| IAM image | r | .PAT | | ✔ | | • textile CAD manufacturer<br>• reverse engineering<br>• not compressed |
| Colorado image | r | | | ✔ | | • textile CAD manufacturer<br>• reverse engineering<br>• compressed |
| NedGraphics | r | .PAT | | ✔ | | • textile CAD manufacturer<br>• not compressed |
| Text | w | .TXT | | ✔ | | • for manual card punching |

## 22.3 Other CAM formats

**ArahWeave also supports drawing-in machines and few warpers.**

| Name | Read Write | Filename extension | Type | Notes |
|---|---|---|---|---|
| CCI Tech | w | .SF2 | warper | |
| Vega | w | .VIF | drawing-in | • shafts<br>• reed<br>• empty dents<br>• drop wires |
| SuperVega | w | .SVI | drawing-in | • shafts<br>• reed<br>• empty dents<br>• drop wires |
| Delta 100/110/200 | w | .DAT | drawing-in | • the filename of the drawing-in file is: prog0001.dat<br>• the filename of the warp pattern file is: scha0001.dat<br>• number in the filename can be from 000 to 999 |
| Suzuki | w | .MZ | warper | |
| JiangYin TongYuan | w | .CEL | warper | |

## 22.4 XML FORMATS

All XML files should be placed in the default xml location, specified in the .arahne configuration file. If the files are only shared by NFS, then this location is usually /home/capdam/data/xml
If the files are shared by a web server, then this location is usually /srv/www/htdocs/xml
For simulation/weave orders/replies we place the XML files in subdirectories, to avoid confusion. *ArahWeave* imports also XML files by ftp from the specified host, this is configured in the **Data export** section of **Save setup**, and saved in .arahne configuration file.

| Name | Read Write | Format DTD (document type definition) | Notes |
|---|---|---|---|
| xyz.xml | w | ArahneFabric.dtd | • xyz corresponds to fabric name<br>• contains all fabric related data, which EDP software would need |
| ArahneWarpPatternImport.xml | r | ArahneWarpPatternImport.dtd | • warp patterns and codes, no colors<br>• all patterns in one file |
| ArahneWeftPatternImport.xml | r | ArahneWeftPatternImport.dtd | • weft patterns and codes, no color<br>• all patterns in one file |

| Name | Read Write | Format DTD (document type definition) | Notes |
|---|---|---|---|
| ArahneYarnColorImport.xml | r | ArahneYarnColorImport.dtd | • list of yarn colors<br>• all colors in one file |
| ArahneYarnImport.xml | rw | ArahneYarnImport.dtd | • yarn definitions from database point of view<br>• all yarns in one file |
| ArahneYarnToColor.xml | r | ArahneYarnToColor.dtd | • association of yarn color code to yarn code, with price and availability<br>• all yarns in one file |
| ArahneFabricStatus.xml | r | ArahneFabricStatus.dtd | • list of different statuses, like Sample, Production, Test... |
| ArahneFabricTypeBits.xml | r | ArahneFabricTypeBits.dtd | • list of fabric types, finishing processes |
| ArahneFinishingBits.xml | r | ArahneFinishingBits.dtd | • list of finishing processes |
| ArahneDesigners.xml | r | ArahneDesigners.dtd | • list of designers |
| ArahneFinishingImport.dtd | r | ArahneFinishingImport.dtd | • list of different finishing processes with code for each process |
| ArahneCustomerImport.dtd | r | ArahneCustomerImport.dtd | • list of customers |
| ArahneSeasonImport.dtd | r | ArahneSeasonImport.dtd | • List of seasons, like Spring 2018, ... |

### 22.4.1 ArahWeave server mode XML files

| Name | Read Write | Format DTD (document type definition) | Notes |
|---|---|---|---|
| xyz.xml<br>...xml/simulationOrder/in | r | ArahneSimulationOrder.dtd | • xyz corresponds to simulation order<br>• specifies request for generation of fabric simulation based on warp, jacquard card, weft density and weft yarns |
| xyz.xml<br>...xml/simulationOrder/out | r | ArahneSimulationOrderReply.dtd | • xyz corresponds to simulation order reply<br>• reports success or reason for failure |
| xyz.xml<br>...xml/weaveOrder/in | r | ArahneWeaveOrder.dtd | • xyz corresponds to weave order<br>• specifies request for creating card files and sending them to the loom |

| Name | Read<br>Write | Format DTD<br>(document type definition) | Notes |
|---|---|---|---|
| xyz.xml<br>...xml/weaveOrder/out | w | ArahneWeaveOrderReply.dtd | • xyz corresponds to weave order reply<br>• reports success or reason for failure |
| xyz.xml<br>...xml/deleteOrder/in | r | ArahneDeleteOrder.dtd | • xyz corresponds to delete cards from loom order<br>• specifies request for deleting jacquard card file from the loom |
| xyz.xml<br>...xml/deleteOrder/out | w | ArahneDeleteOrderReply.dtd | • xyz corresponds to delete order reply<br>• reports success or reason for failure |
| xyz.xml<br>...xml/reloadCardOrder/in | r | ArahneReloadCardOrder.dtd | • xyz corresponds to reload card from loom order<br>• specifies request for reloading jacquard card file from the loom |
| xyz.xml<br>...xml/reloadCardOrder/out | w | ArahneReloadCardOrderReply.dtd | • xyz corresponds to delete order reply<br>• reports success or reason for failure |
| xyz.xml<br>...xml/headerFooterOrder/in | r | ArahneHeaderFooterOrder.dtd | • xyz corresponds to header/footer order<br>• specifies request for generation of header and footer fabrics with weaving program and optional text. |
| xyz.xml<br>..xml/headerFooterOrder/out | w | ArahneHeaderFooterOrderReply.dtd | • xyz corresponds to header/footer reply<br>• reports success or reason for failure |
| xyz.xml<br>..xml/statusOrder/in | r | ArahneStatusOrder.dtd | • xyz corresponds to staus order<br>• it serves only to test if ArahWeave server is running, it does not perform any operation |
| xyz.xml<br>..xml/statusOrder/out | w | ArahneStatusOrderReply.dtd | • xyz corresponds to status order reply |

# 23 Glossary

This is not a true glossary, only some tips to help you out of confusion in textile terms. It lists the synonyms for a given term. Some of these terms do not really mean exactly the same thing, but are often interchanged in the industry. We only use one term, so that a reader will not assume we are talking about two different things.

- warp thread = end
- weft thread = pick
- weft density = pick gear
- weave = weave structure = binding
- pattern draft = dobby weave with all the elements: weave, drafting, tie-up, dobby card
- regulator = warp let-off = stop-motion = dead pick = cramming
- shaft = heald
- fabric = cloth
- drafting = draw-in = heddling = threading
- dobby card = peg plan = chain
- yarn = thread
- warp yarn = end
- weft yarn = pick = filling = fill
- multi-layer weave = compound weave = double weave
- weft change = weft selector = box motion
- extra weft = lancee = supplemental weft = figuring weft = tissue pick
- blanket = colorway
- cone = bobbin
- fill coupe, antique cut

# 24 Keyboard accelerators

Keyboard accelerators (also called hot-keys) should enable an experienced user to work faster, by being able to select some commonly used functions directly from the keyboard instead of the menu. We have decided not to translate accelerators – that means that we have the same key accelerator layout for all the languages. Mostly, they are mnemonic in English (the first letter resembles the function in English). Accelerators work only if the appropriate window is active; normally the active window is indicated in a different window frame color. We have tried to link one key to one program function, but in some cases it was also logical to make the same key activate different functions, depending on the active window (part of the program we are working on at the moment).

## Main window

| | | Ctrl | Ctrl Shift | Alt | Shift |
|---|---|---|---|---|---|
| 1 | Zoom 100% | | | Simulation 1 | |
| 2 | Zoom 200% | | | Simulation 2 | |
| 3 | Zoom 300% | | | Simulation 3 | |
| 4 | Zoom 400% | | | Simulation 4 | |
| 5 | Zoom 500% | | | Simulation 5 | |
| 6 | Zoom 600% | | | Simulation 6 | |
| 7 | Zoom 700% | | | Simulation 7 | |
| 8 | Zoom 800% | | | Simulation 8 | |
| 9 | Zoom 900% | | | | |
| 0 | Zoom 1000% | Fit to window | | | |
| F2 | Edit weave | | | | |
| F3 | Edit thread pattern | | | | |
| F4 | Edit colors | | | | |
| F5 | Edit yarns | | | | |
| F6 | Simulation | | | | |
| F7 | Center | | | | |
| F8 | Consumption | | | | |
| F9 | Warping | | | | |
| F11 | Price | | | | |
| A | Integer view | Select all (text) | | | |
| B | Browse fabric | | | Browse weave | |
| C | | Copy | | | Shaded integer/Weave view |
| D | Density | | | | Decomposed colors view |
| E | Weave Dimensions | | | | Decomposed colors warp view |
| F | View fringe on/off | | | | Decomposed colors weft view |
| G | Straight drafting | | | | |
| H | Fix floats face and back | Save technical data as HTML | | | |
| I | Information on weave | Fabric properties | | | |
| J | Jacquard conversion | | | | |
| K | Save cards for production | | | | |
| L | Float | View in 3D | | | |
| M | Mark long floats | | | | |
| N | Remove extra warps/wefts | | | | |
| O | Edit decomposed | Load | | | |
| P | Cross section view | Print | | | |
| Q | Simulation 4 | Quit | | | |
| R | One repeat view on/off | Ruler view on/off | | | |
| S | Shaded integer view | Save | Save as | Save setup | |
| T | Edit simulation window | Save fabric texture | | | |
| U | Metric / imperial units | Revert to saved | | | |
| V | View jacquard colors | Paste | | | |
| W | Weave view | Close windows | | | |
| X | Clear drafting | Cut | | | |
| Y | | Redo | | | |
| Z | | Undo | | | |
| + | Zoom in | Increase warp yarn size | | Increase weft yarn size | |
| - | Zoom out | Decrease warp yarn size | | Decrease weft yarn size | |
| ( | Double weave size (or selection) in warp | | | | |
| ) | Double weave size (or selection) in weft | | | | |
| * | Reverse horizontal | | | | |
| . | Dobby view on/off | | | | |
| ! | Regulator view on/off | | | | |
| & | Make yarn color shades | | | | |
| < | Optimize number of shafts | | | | |
| > | Suggest shaft merge | | | | |
| # | Remove selvedges | | | | |
| $ | Price view on/off | | | | |
| **Left click** | Move fabric or draw warp / weft pattern* | Fill warp / weft pattern | | | Insert yarn in warp / weft pattern |
| **Right click** | Open Weave editor at clicked position | | | | Delete yarn in warp / weft pattern |
| **Middle click** | Invert weave point / draw with weave** | | | | |
| **Wheel up / down** | Scroll up, scroll down | Zoom in, zoom out | | | Scroll left, scroll right |
| **Wheel left / right** | Scroll left, scroll right | | | | |

* A yarn must be selected in thread pattern editor. The thread pattern repeat must be ≥ 10

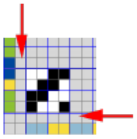
** Area must be selected in weave editor

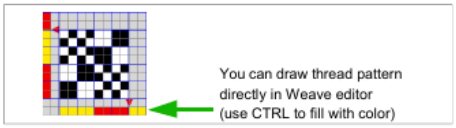
## Weave editor

| | | Ctrl | Alt | Shift |
|---|---|---|---|---|
| 1 | | Numeric drafting | | |
| 2 | | Numeric weave | | |
| A | | Select all | | |
| B | | | Browse weave | |
| C | Crop to selection | | | Yarn colors on/off |
| D | | Clear selection | | Decomposed colors view |
| E | Weave dimensions | Extend weave | | Decomposed colors warp view |
| F | | Find repeat in selection | | Decomposed colors weft view |
| G | Straight drafting | | | |
| H | Fix floats face and back | | | |
| I | Information on weave | | | |
| L | Float | | | |
| M | Mark long floats | | | |
| N | Remove extra warps/wefts | | | |
| O | Edit decomposed | Load weave | | |
| P | Cross section view | Print weave | Print drafting | |
| Q | | | | |
| S | | Save weave | | |
| U | | | | |
| V | View jacquard colors | | | |
| X | Clear drafting | | | |
| Y | Guess decomposed weave layout | | | |
| Z | Replace similar | | | |
| + | | Reinforce warp | | |
| - | | Reinforce weft | | |
| ( R R | Double weave size (or selection) in warp | Multiply x 2 in warp | | |
| ) R R | Double weave size (or selection) in weft | Multiply x 2 in weft | | |
| , | Magic weave correction | | | |
| . | Dobby view on/off | | | |
| ! | Regulator view on/off | | | |
| < | Optimize number of shafts | | | |
| > | Suggest shaft merge | | | |
| Space | Invert weave | | | |
| Left click | Black weave point* | | | Make selection |
| Right click | White weave point | | | |
| Middle click | Make selection | | | |

* Drawing with weave, when selection is made

## Gray area in Weave editor






| | | Ctrl | Alt | Shift |
|---|---|---|---|---|
| Left click | Duplicate row / column | Insert black row/column | Insert negative row/column | Insert white row/column |
| Right click | Delete row / column | | | |
| Middle click | Resize to row / column | | | |

| | |
|---|---|
| Enter | Blink selected color in image* |
| Space | Invert weave* |
| Right | Move weave right* |
| Left | Move weave left* |
| Up | Move weave up* |
| Down | Move weave down* |
| Left click, double click, drag | Select, browse, exchange* |
| Right click | Copy selected to* |
| Middle click | Exchange* |

* When weave is selected ** In extra weft when weave selected. Capital letters = fil coupe protection inside

## Jacquard conversion

| | | Ctrl | Alt |
|---|---|---|---|
| 1 | Load default weave – cut* | | |
| 2 | Load plain weave* | | Multiply weave x 2* |
| 3 | Load twill weave* | | Multiply weave x 3* |
| 4 | Load broken twill weave* | | Multiply weave x 4* |
| 5 | Load satin 5 weave* | | Multiply weave x 5* |
| 6 | Load satin 6 weave* | | Multiply weave x 6* |
| 7 | Load satin 7 weave* | | Multiply weave x 7* |
| 8 | Load satin 8 weave* | | Multiply weave x 8* |
| 9 | Load satin 9 weave* | | Multiply weave x 9* |
| 0 | Load default weave – miss* | Fit to window | Multiply weave x 10* |
| A | | | |
| B | | Browse image | |
| C | | | |
| D | | Show color gamut | |
| E | | Guess image from weave | Contrast stretch |
| F | | | |
| G | | Show grid On/Off | |
| H | | | |
| I | | | |
| J | | Convert 24 / 8 bit | |
| K | | | |
| L | | | |
| M | Force extra weft yarns A-Y** | Multi image convert | |
| N | | | |
| O | | Load image | |
| P | | Print picture | Print picture with grid |
| Q | | | |
| R | | Repeat on/off | |
| S | | | |
| T | | | |
| U | | | |
| V | | | |
| W | | | |
| X | | | |
| Y | | | |
| Z | Extra weft if needed** | | |
| + | | Reinforce warp* | |
| - | | Reinforce weft* | |
| = | Resize to divisible | | |
| . | Force extra weft for entire row** | | |
| **Escape** | Erase forced extra weft yarn** | | |
| **Delete** | Clear weave* | | |
| **Enter** | Blink selected color in image* | | |
| **Space** | Invert weave* | | |
| **Right** | Move weave right* | | |
| **Left** | Move weave left* | | |
| **Up** | Move weave up* | | |
| **Down** | Move weave down* | | |
| **Left click, double click, drag** | Select, browse, exchange* | | |
| **Right click** | Copy selected to* | | |
| **Middle click** | Exchange* | | |

* When weave is selected ** In extra weft when weave selected. Capital letters = fil coupe protection inside

## All browse windows

| | |
|---|---|
| **?** | Start slideshow |
| **!** | Write a list of files in csv format |
| **U** | |
| **Delete** | Delete |
| **Up** | Change selected file – move up |
| **Down** | Change selected file – move down |
| **Left** | Change selected file – move left |
| **Right** | Change selected file – move right |
| **Page up** | Change selected file – move one page up |
| **Page down** | Change selected file – move one page down |
| **Home** | Change selected file – move to first file |
| **End** | Change selected file – move to last file |
| **Enter** | Load |
| **Left click** | Select |
| **Double click** | Load |
| **Left click on the file name** | Rename |

Alt

| | |
|---|---|
| | |
| Reload | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Pressing a first letter of a directory or a file name in the browser positions selection on a directory starting with with that letter

## Fabric browse

Alt

| | |
|---|---|
| **S** | Load and save all fabrics |
| **Q** | Create quality simulations |

## Weave browse

| | |
|---|---|
| **Right click** | Fabric simulation with offset |

## Image browse

| | |
|---|---|
| **Q** | |
| **Right click** | Full screen image preview |
| **Left click on preview** | Move preview |
| **Middle click on preview** | |
| **Escape** | Exit preview |

Alt

| |
|---|
| Create all icons |
| |
| Zoom in / Zoom out |
| |

## Color editor

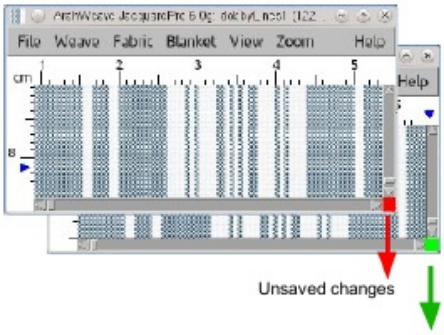
Ctrl

| | |
|---|---|
| **F** | |
| **?** | Random color |

Find color

### Fabric save status

Left click on red / green square closes all windows

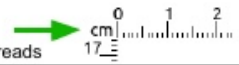



### Move view, selection or selected object

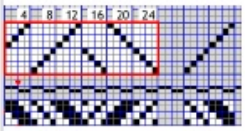
| | | |
|---|---|---|
| Move up | | Move down |
| Move left | | Move right |
| Up one page | Page up / Home | Move bottom left |
| Down one page | Page down / End | Move bottom right |

### Ruler in fabric simulation

| | |
|---|---|
| Left mouse button | Moves the ruler starting point |
| Right mouse button | Positions cursor on specific yarn in Thread pattern editor |
| Click on unit switches between cm/inch and threads | |




### Drafting in Weave editor



Shift

| | | |
|---|---|---|
| **Left click** | Copy card to weave | Split shaft in two |
| **Right click** | Delete drafting | |
| **Middle click** | Copy weave to card | |
| **Drag down** | Move shaft | |
| **Drag right** | Draw straight drafting | |

### Thread pattern editor
### Denting in weave editor
### Regulator in weave editor

Enter

The selected yarn blinks in the fabric simulation

Works inside repeat. Move fabric to bottom left

# 25 Limits

*ArahWeave* is a very powerful program, but it has its limits. Mainly, these limits were imposed so that we could perform more efficient range checking on user entry, faster file loading, to improve reliability. Sometimes they are also motivated by deeper technical reasons. In any case, you have the right to know what they are, so you do not buy the program, and later discover you cannot do your job. Obviously, we can also raise some of these limitations, should it prove to be necessary.

- Maximum weave size: ArahWeave Pro 65520 by 65520 threads; ArahWeave Pro XL 262 080 by 262080 threads
- Maximum number of shafts: 99
- Maximum size of image for jacquard conversion: 65520 by 65520
- Maximum number of hooks in jacquard loom layout: 65520
- Maximum number of entries in the description of loom layout: 50
- Maximum number of warp threads in consumption calculation: 65520
- Maximum number of threads in one dent: 125
- Empty dents (0 threads per dent) are supported, but fabric cannot start with an empty dent, and cannot have only empty dents
- Maximum number of consecutive wefts with active regulator: 125
- Fabric cannot start with an active regulator.
- Accurate fabric simulation, where top layer yarns completely cover bottom layers: 3 warp systems, 3 weft systems. It is possible to make simulations of fabrics with more layers, but they will appear more open, not completely closed.
- Maximum weave system: 16 warps and 16 wefts.
- Number of different yarns in warp or in weft: 25 (A-Y)
- Maximum number of different color components within one yarn (for mélange, mouliné, space dyed): 6 (all of them can be calibrated colors); internally *ArahWeave* generates two darker and two lighter variations of each color, so the actual maximum number of colors in simulation of one yarn is 30.
- Maximum number of fabrics / images / weaves / yarns / warp patterns / weft patterns in the browsers: unlimited. We have tested the system with over 150.000 files loaded contemporary and it worked without problems.
- Maximum number of sections in blanket in warp and in weft: 30
- Maximum number of threads in one blanket section: 3000
- Maximum number of threads in one weft blanket section: 65000
- Maximum number of fabrics / weaves, which can be assembled together in a weft blanket: 80
- Maximum number of color / yarn variations of a single fabric / weave in weft blanket: 32
- Maximum number of colors in a color database: 65520
- Limits for entry of CIE Lab values: 0<=L<=100, -120<=a<=120.0, -120<=b<=120;
- Two decimal points Fabric density: minimum 1 thread per cm; maximum 50000 threads/cm
- Reed number: minimum 1 (dent/cm); maximum 1000 (dents/cm); 2 decimal points
- Reed space, raw width, finished width: minimum 5 cm; maximum 10000 cm; 2 decimal points
- Fabric zoom level: minimum 5% (twenty times smaller); maximum 2000% (twenty times bigger)
- You can only work on one fabric at a time, but you can contemporary run as many copies of *ArahWeave* as you like.

# 26 Acknowledgements

Program written by Dušan Peterc.
Manual written by Dušan Peterc and Anton Gregorčič.
Front page and shortcuts design by Ana Bertoncelj.

In various screenshots of this manual, we use fabrics and data of the following Arahne customers: Arazzo, Danzo, IBI Kranj, Paganini Tessuti, Pure Country Weavers, Lanificio di Sordevolo, Svilanit, Tekstina, Tessilbiella, Velana. Color shading photo of Illy coffee on the island of Kos by Dušan Peterc.
Chinese program text translation: Peak Ding
Finnish program text translation: Antti Alalammi
French program text translation: Alexander Peterc, Vincent Masurel
German program text translation: Polona Dobnik Durbrovski, Andreja Gutmaher, Jan Peter Elsebach
Italian program text translation: Riccardo Sattier, Dušan Peterc. Manual translation: Davide Sasso, Anna Negri, Stefano Bellanca; inspection and correction by Antonio Danzo.
Portuguese program text translation: Joaquim Alves Pereira
Spanish program text translation: Jaime Vives Piqueres, Manual translation: Flavia Esperón
Thai program text and manual translation: Vichai Tantikunakonrat
Turkish program text and manual translation: Sabri Sever