



Schiffli Supplement

EmbroideryStudio *e₂*

a CorelDRAW[®] product



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Chapter 1

Introduction to ES Schiffli

Welcome to Wilcom ES Schiffli. This product has been developed to support a wide range of Schiffli work. It includes support for:

- ✦ Design repeats
- ✦ Thread Tension and Speed Change functions
- ✦ Borer operations
- ✦ All Plauen (T10) and Saurer (T15) functions
- ✦ Direct reading/writing Hiraoka DAT and Saurer SAS formats
- ✦ Pattern arrangements
- ✦ RCC designs
- ✦ Direct reading/writing of high resolution **ESS** format, accessible to **DesignWorkflow**.



Note ES Schiffli also integrates with other Wilcom Schiffli products including the WESS (Wilcom Electronic Servo System) electronic machine controller.

When creating new designs, the software provides control over design repeats and caters for various types of machine. With ES Schiffli you can view any number of full or part repeats to see how they inter-connect. A **Print Repeats** function for the Production Worksheet is available so your customers do not need to wait for design samples.

You can also save digitizing time with pattern (ABC) arrangements. Pattern arrangements mean that only the design elements to be repeated are digitized. The design file contains only the information needed to show how the design is to be repeated or mirrored.

The ES Schiffli borer operation includes full support for various machines, including borer depth control and the automatic creation of the appropriate machine control sequence (fast/slow, needles in/out, etc). These functions are also supported with digitizing tablet functionality so that users with traditional enlargement drawings also can utilize them.

ES Schiffli support in the Wilcom ES product range

There are three major areas where ES Schiffli can be used:

Area	Product	Use
Design creation	Levels 1 & 2	Adding the ES Schiffli Option to these systems will help you to create Schiffli Designs.
Design editing	Level 3	This system can be used for Schiffli editing.
Design management	DesignWorkflow	Wilcom DesignWorkflow is a central storage and management application for embroidery designs. Any design format that can be read in ES Schiffli can be stored in DesignWorkflow .

This chapter provides an overview of the Schiffli terms and concepts associated with Wilcom ES Schiffli software. It explains the basic issues to do with handling and programming Schiffli machines as they relate to ES Schiffli.



Note For an essential introduction to **EmbroideryStudio** software concepts, refer to the **EmbroideryStudio** Onscreen Manual.

Schiffli terms and concepts

In contrast to Multihead machines, Schiffli machines are large and the majority are mechanical. They have some unique characteristics:

- ✦ The fabric is stretched on a vertical frame.
- ✦ A machine can have up to 1024 needles.
- ✦ Needles move horizontally and are in one or two rows spaced one 'French inch' apart.

While it is important for all embroiderers to be familiar with the various threads and fabrics used in the manufacture of their designs, specific machine knowledge is essential to the Schiffli puncher or 'digitizer'.

Generic Schiffli machine

There are many types of Schiffli machine, each with its own capabilities and modes of operation. Some of these are common to all Schiffli machines, some may be peculiar to a particular class of machine. To deal with this situation, ES Schiffli uses the concept of the 'generic Schiffli machine'. The ES Schiffli generic machine format supports functions required for a wide range of machine types, including:

- ✦ Plauen type machines – e.g. Plauen standard, Hiraoka, Zangs and others.
- ✦ Saurer type machines – e.g. 1S, 2S-55, 1040, etc.
- ✦ Electronic Schiffli machines – e.g. Wilcom-Wei Gang, Saurer Pentamat (SHC code), Laesser, Hiraoka VE, etc.

This means that you can digitize designs for practically any Schiffli machine or, for emblem work, any supported Multihead machine. Of course designs created for a specific machine type are only guaranteed to stitch out perfectly on that machine. With ES Schiffli, however, you can convert designs for stitching on potentially any machine type that supports the 'logical' machine functions included in the design. See also [Supported Schiffli file formats](#).

With **EmbroideryStudio**, Multihead machine digitizers choose the type of embroidery machine they designing for. Supported machines use preset values. By contrast, the generic Schiffli machine allows Schiffli digitizers to set up their own machine parameters. See [Setting up your Schiffli Machine](#) for details.

Schiffli designs

Schiffli artwork must satisfy strict technical requirements. Typically artwork for Schiffli embroidery is designed like a tiled pattern. It represents a narrow 'slice' of the overall pattern which is repeated all along the fabric. This pattern has to be designed accurately so that the repeat joins on both sides and its width is a multiple of the needle spacing.

Lacework

Lacework involves the use of threads to produce overall embroidery of full-length fabrics. Some lacework is designed to be 'self holding'. Such designs

are stitched on a soluble backing which is washed or steamed off after manufacture. Thus, stitches have to be so placed that they interlock at the edges so that the lacework does not unravel.

Lacework is the most widely used application for Schiffli machines. Such work typically uses boring. Some machines require fine adjustments of tension and speed for this sort of work. ES Schiffli supports this. Designs made with ES Schiffli are not limited in stitch length because tension changes can be inserted directly. See also [Design repeats](#).

Emblem work

Many Schiffli embroidery machines are also used for stitching emblems or logos as they provide a very productive way to do this. Emblem work, however, uses only a small subset of the Schiffli machine's available functions. Typically, for example, such work does not contain the bored holes or long Satin stitches which occur in lace designs.

Stitch types and density

Schiffli designs usually have fewer and longer, carefully placed stitches. This is because:

- ✦ Schiffli yarn is thicker.
- ✦ Schiffli fills do not need to provide as much coverage as in Multihead designs.
- ✦ Schiffli stitching is typically softer and lighter than Multihead.

Generally, few stitch types and effects are used in Schiffli embroidery. Large areas of Schiffli designs are digitized with 'manual' stitches, meaning that each needle penetration is defined by the digitizer individually. Run, Stipple, Satin, Jagged Satin, and Fill – plain parallel and Geflecht – are the most frequently used stitch types. Refer to the **EmbroideryStudio** Onscreen Manual for a discussion of **EmbroideryStudio** input methods and stitch types.

Needle spacing

Needle spacing is the distance between adjacent needles on the Schiffli machine. Different machines use different spacings, a result of slight variations of the French inch:

- ✦ 27.04mm (Saurer)
- ✦ 27.07mm (Plauen & Zangs)
- ✦ 27.08mm (Hiraoka).

Needle spacing is therefore characteristic to the machine and is part of the machine format values defined in the software. ES Schiffli lets you adjust this value to suit the type of machine which will stitch the design. See [Setting exact needle spacing](#) for details.



Note ES Schiffli only needs the exact needle spacing to display or print design repeats correctly.

Machine units

The 'machine unit' is the smallest frame movement an embroidery machine can perform. This in turn determines the closest distance between stitches. For Multihead machines this is 0.1mm and, as all machines use the same unit value, most users take it for granted. With Schiffli machines, however, there are two types of machine unit:

- ◀ 1/6mm (0.1667mm) for Plauen type machines
- ◀ 0.1mm for Saurer type machines.

ES Schiffli supports both formats. This has several advantages for the design system:

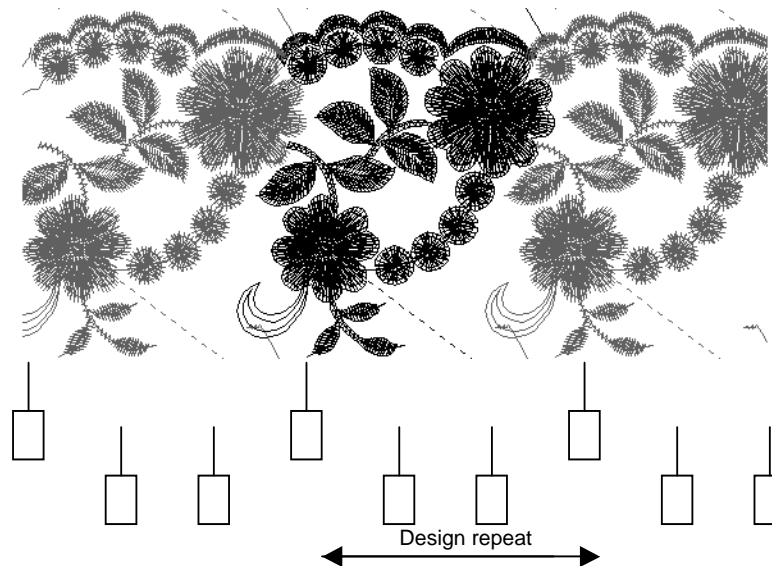
- ◀ Accurate output – final stitches do not differ from the digitized design.
- ◀ Saurer and Plauen designs are inter-convertible.

High resolution format for WESS

Wilcom Electronic Servo System (WESS) is a servo system which can drive the frame of a Schiffli machine with very high accuracy, thereby enabling very high quality embroidery. However, if the Schiffli design is stored in the traditional formats which are based on the resolution of the Jacquard card, the smallest step is constrained by the 'machine unit' – 0.17mm for Plauen and 0.1mm for Saurer. Wilcom has overcome this problem by introducing a high resolution format for use directly between ES Schiffli and WESS. This means that fine details in the ES Schiffli design can be transferred to the Schiffli machine without loss of resolution. ES Schiffli users simply save designs to the new ESS file format which supports high resolution.

Design repeats

A Schiffli design can be repeated horizontally as many times as can fit across the frame. With larger designs, needles can be selectively disengaged, thereby increasing the **needle spacing** to 2, 3, 4, etc, inches. This is called a 'design repeat'. The design repeat is characteristic to the design and in ES Schiffli is therefore part of the 'design properties'.

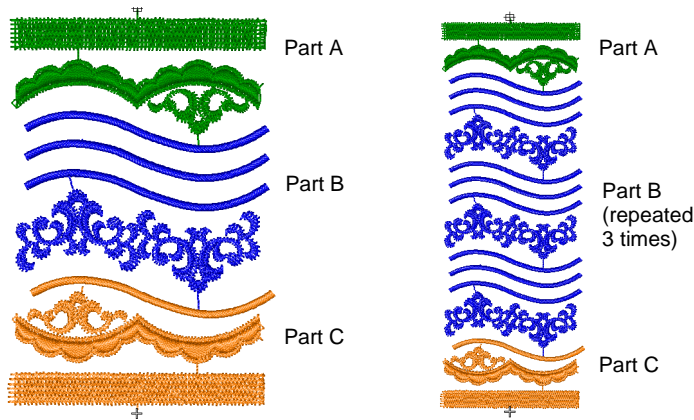


Note The pattern or design repeat has to be designed accurately so that it joins on both sides and its width is a multiple of the needle spacing.

If a repeat is one French inch wide, all needles are engaged and work in parallel when the design is being stitched. If it is two French inches wide, every second needle will be active. And so on. See **Working with design repeats** for details.

Pattern arrangements (ABC)

Some Schiffli embroidery machines can read designs where repeated parts are stored only once in the design file and only the repeat instructions are given to the machine. **EmbroideryStudio** provides tools to define pattern arrangements and output to specific formats which support the feature.



Pattern arrangements are used by digitizers to save digitizing time. Lacework especially is made up of a few patterns which are repeated many times. Pattern arrangements mean that only the design elements to be repeated are digitized. The design file contains only the information needed to show how the design is to be repeated or mirrored. See [Working with pattern arrangements](#) for details.

Schiffli machine functions

ES Schiffli makes a distinction between 'logical' and 'physical' machine functions. The logical function is what you, the digitizer, want to perform – e.g. start or stop boring. In order to achieve this, the Schiffli machine may have to do several things. The following shows a simplified encoding of the typical physical functions required to start and stop boring. See also [Logical vs physical borer depth](#).

Start Boring	Stop Boring
<ul style="list-style-type: none">• Slow• Needles Out• Borers In• Fast	<ul style="list-style-type: none">• Slow• Borers Out• Needles In• Fast

When creating Schiffli designs with ES Schiffli, you may use logical functions which are common to all Plauen and Saurer type machines. Or you may insert functions that are unique to a restricted range of machines. See also [Supported Schiffli machine functions](#).

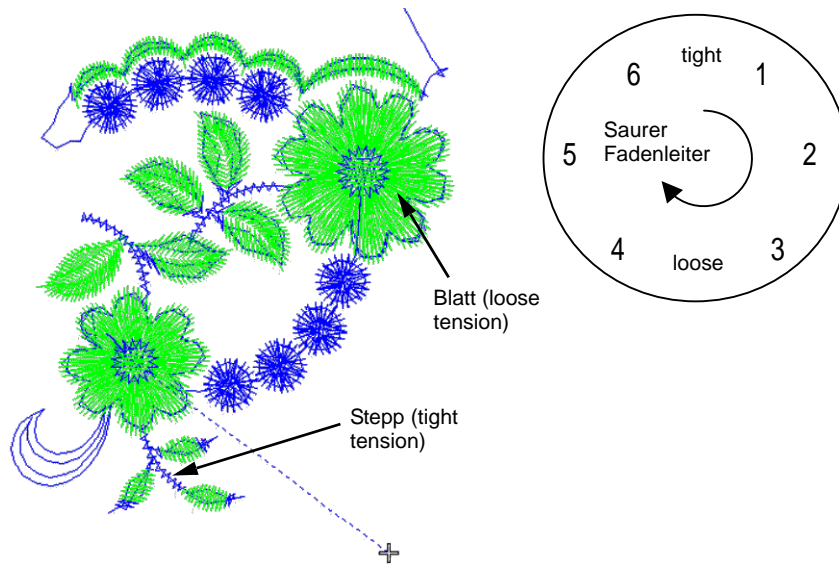
Logical functions are saved as 'object properties' in the native Wilcom **EMB** design file. This file can then be output for stitching on a particular machine. ES Schiffli automatically generates the required machine code by interpreting the logical functions. This concept may be new to Schiffli designers who are used to working on a stitch-by-stitch basis. See [Outputting Schiffli design files](#) for details.



Note If your machine uses a WESS (Wilcom Electronic Servo System) controller, you need only output a single **ESS** file.

Tension control

With Schiffli designs, it is very important that stitching is loose and does not pull or push the fabric. Lacework has to be soft. This means that the thread tension has to be right. Larger movements pull more thread and increase tension. If there is too much, the fabric distorts and needles may break. Schiffli machines have special devices for precise tension control. The thread goes through the tensioning mechanism which allows for subtle variations. The mechanism can be controlled by the software. Special functions – Stepp (tight) and Blatt (loose) – are provided and the necessary codes added to the output file. See **Frequently used machine functions** for details.



In addition to the Blatt function, some machines use Fadenleiter for even finer tension adjustment. ES Schiffli also supports this. See **Machine-specific functions** for details.



Tip 'Overshooting' is a technique sometimes used by Schiffli digitizers to feed more thread from the cone and reduce thread tension. This can be done in ES Schiffli by means of Manual stitches.

Speed control

Schiffli machine frames are heavy. Longer stitches and hence large frame movements need more time. Changes from needles to borerers also need time. Speed in Schiffli machines, like tension, is controllable from within ES Schiffli. Special functions – Fast and Slow – are provided and the necessary codes added to the output file. See **Other machine functions** for details.

Normal operating speed in Schiffli machines is 'Fast'. This generally translates as follows:

- ◀ Saurer 1S/2S: 105 – 125 RPM (Revolutions Per Minute).
- ◀ Hiraoka 15 yard: 135 – 145 RPM.

Some machines use further fine speed adjustment like Saurer ± 5 RPM increments. ES Schiffli supports these. See [Machine-specific functions](#) for details.

Borer control

Schiffli machines have built-in borer knives under the needle line which can cut different sized holes in fabric. The Schiffli borer knife has four edges. ES Schiffli controls Borer In/Out by means of 'object properties'. With Borer In selected, each needle penetration point becomes a borer hole, regardless of the selected stitch type. See 'Digitizing boring holes' in the **EmbroideryStudio** Onscreen Manual for details.

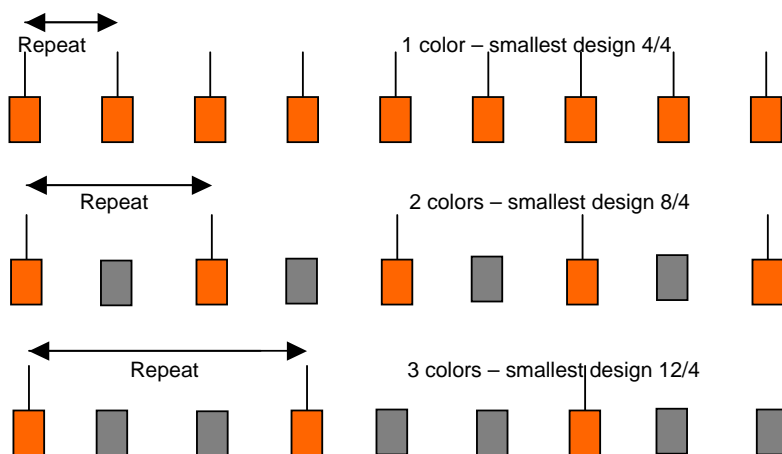
Borer depth is relevant only to designs digitized using ES Schiffli. You can control borer depth by entering the specific depth value. The depth, and hence the size of the hole being cut, can be controlled by up to 13 increments. See [Modifying borer depth](#) for details.

Color change control

Few Schiffli machines support automatic color change. That is, there is no mechanism to activate individual, or groups of, needles. Thus multicolored designs are expensive to produce because operators need to manually engage and disengage the needles, trim the threads, and re-thread the needles. For this reason, most designs use a single color. Newer Schiffli machine models, however, have automatic color change capabilities – Repeat Color Change and Individual Needle Control (Pentamat). Thus designs stitched on these machines can employ more colors. ES Schiffli provides support for color changes. See also [Working with RCC Designs](#).

RCC color change control

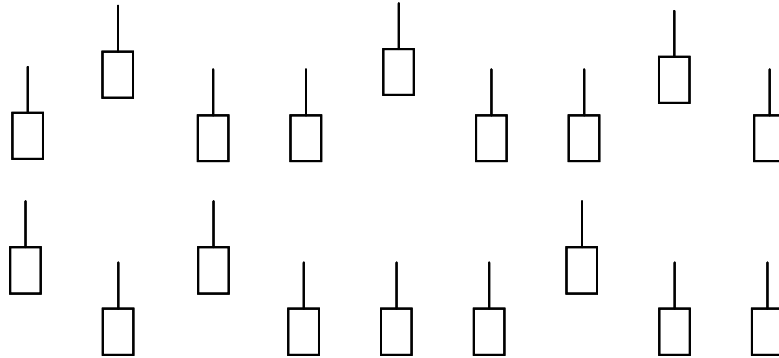
Repeat Color Change (RCC) is a mechanism available on some Plauen and Saurer type machines to push a group of needles – every needle, every 2nd, every 3rd, every 4th, etc – forward or backward. Color variation is given by the design width. For example, a 12/4 design repeat can have three differently colored (threaded) needles as shown in the diagram.



Each pattern is called a 'station'. Individual stations exist for each combination – 4/4, 8/4-1, 8/4-2, 12/4-1, 12/4-2, 12/4-3, etc. Non-Hiraoka RCC Schiffli machines are usually capable of accessing 10-12 different needle patterns by using a physical 'template' on the machine.

INC color change control

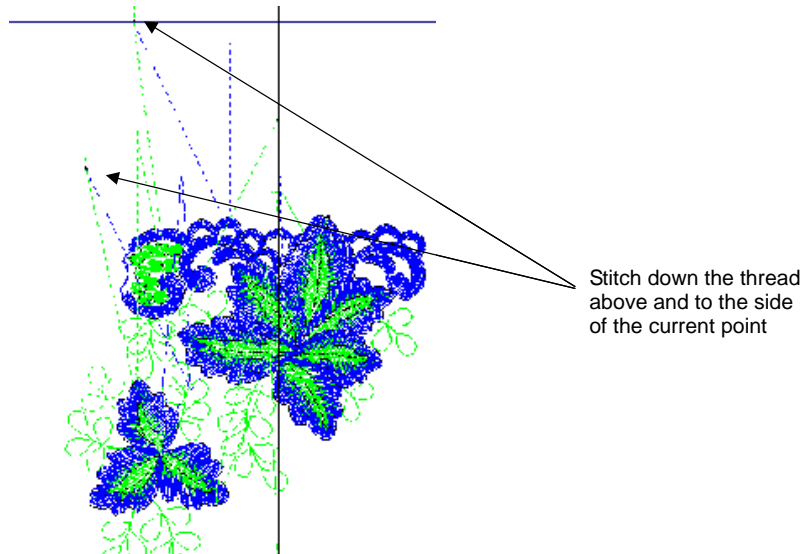
Individual Needle Control (INC) was a mechanism originally developed for Saurer Pentamat machines whereby each needle position across the whole machine could be activated or de-activated individually, either under program or manual control. Hiraoka and Laesser have developed their own implementations of individual needle control, sometimes called Single Needle Control (SNC). INC type machines can handle user-defined stations with any number of needles each of which may be in or out.



Note INC type machines can handle the standard design repeat stations used by RCC machines. ES Schiffli allows you to define RCC type stations only.

Trimming control

Few Schiffli machines have an automatic thread trim mechanism. Long stitches are usually trimmed manually. During production, connecting threads hang loosely over the fabric. Also when changing colors (RCC machines only), the thread of the previous color remains connected between the fabric and the previous needle. Digitizers must anticipate where the threads will be to avoid over stitching them. Typically tacking is used to lock threads above and to the side of the current point. Schiffli designers frequently avoid the need for trimming by designing fancy connecting lines between main stitched areas.





Note In ES Schiffli, objects need to be connected by manually digitized travel stitches or manual trims of long stitches with tacking. Automatic connectors do not provide the type of object-to-object connection normally used in Schiffli designs.

ES Schiffli provides an explicit Trim function. This has two main uses – for trimming threads on Schiffli machines equipped with trimmers, and for viewing TrueView™ samples of the final embroidery. See [Trim function](#) for details.

Schiffli storage media

Traditionally Schiffli designs are stored on Jacquard cards of which there are two types – Plauen and Saurer. Named after Joseph M Jacquard, inventor of the Jacquard loom, Jacquard cards contain a stitch-by-stitch interpretation of the design together with machine functions, exactly as the embroidery machine will read it, encoded as a series of holes. The Schiffli machine uses a mechanical controller or 'Automat' to decode the pattern of holes into frame movements and functions – tension, speed changes, borer actions, etc.

More recently, the embroidery industry has used paper tape as a recording media. Thus Jacquard card electronic encoding produces a 'tape file' which is essentially an electronic image of the card. ES Schiffli outputs two tape file formats – T10 (for Plauen) and T15 (for Saurer). As the newer Schiffli machines can read floppy disks, there are various Schiffli machine floppy disk formats. You therefore need to convert the basic tape file to the required disk format.

Experienced Schiffli digitizers can read the Plauen or Saurer type tapes and even make modifications to them. The FIXPAT program which comes with ES Schiffli provides the same functionality. This utility displays the design in card format (T10 or T15) just as the punched holes would appear. In this way you can visually check certain parts of the design. Furthermore, the program provides search capabilities to find and change machine functions or insert new ones.

Saurer card format

Saurer cards have the following characteristics:

- ✦ 22 holes in all.
- ✦ The center four holes encode M/c functions.
- ✦ The sides – 9-9 holes – encode X/Y coordinates.
- ✦ Transport holes (larger) are on the edge of the card.

Some function holes are a toggle, counting from the start of design:

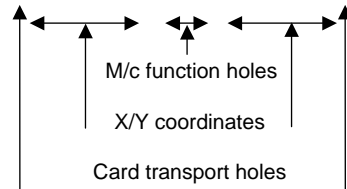
- ✦ even number = initial state (slow).
- ✦ odd number = opposite state (fast).

The meaning of the encoding is interpreted by the Wilcom FIXPAT program in the format **X=, Y=, M/c function** as shown below.

```

<start of pattern>
1  ---  ---  ---  ---  ---  ---  X=  0 Y=  0
2  ---  ---  ---  000- ---  ---  X=  0 Y=  0 Feston
3  ---  ---  ---  0--- ---  ---  X=  0 Y=  0 Boring-
4  ---  ---  ---  -0-0 ---  ---  X=  0 Y=  0 Ch. spd
5  ---  ---  ---  00--- ---  ---  X=  0 Y=  0 Boring+
6  ---  ---  ---  0--- ---  ---  X=  0 Y=  0 Boring-
7  ---  ---  ---  000- ---  ---  X=  0 Y=  0 Feston
8  ---  ---  ---  ---  ---  ---  X=  0 Y=  0
9  ---  ---  ---  --00 ---  ---  X=  0 Y=  0 Stupfel
10 ---  ---  ---  ---  ---  ---  X=  0 Y=  0
11 ---  ---  ---  ---  ---  ---  X=  0 Y=  0
12 ---  ---  ---  ---  ---  ---  X=  0 Y=  0
13 ---  ---  ---  --00 ---  ---  X=  0 Y=  0 Stupfel
14 ---  ---  ---  ---  ---  ---  X=  0 Y=  0
15 ---  ---  ---  ---  ---  ---  X=  0 Y=  0
16 ---  ---  ---  ---  ---  ---  X=  0 Y=  0
17 ---  -0- 0--- ---  00- -00- X= 70 Y= -70
18 0--- 0--- ---  00- 0--- -0- X=  8 Y= -26
19 0--- ---  ---  -0- -0- -0- X=  1 Y=  58
20 -0- ---  ---  ---  -0- -0- X=  2 Y=  2
21 ---  ---  ---  ---  -0- ---  X=  0 Y=  0 Needles

```



Plauen card format

Plauen cards have the following characteristics:

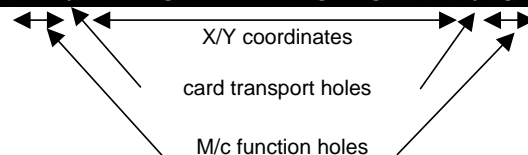
- ◀ 46 holes in all.
- ◀ The center 36 holes encode X/Y coordinates.
- ◀ The sides – 5-5 holes – encode M/c functions and sign of coordinates.
- ◀ M/W phase toggle.
- ◀ Transport holes (larger) separate coordinates and functions.

Functions are toggled according to whether they are set for M or W phase. The example shows the meaning of the coordinates and functions as interpreted by the Wilcom FIXPAT program in the format **X=, Y=, M or W phase, M/c function**.

```

20 ---  ---  ---  ---  ---  ---  ---  -M Y=  0 X=  0
21 ---  ---  ---  -0- ---  ---  -0- -00-W Y=-42 X= 42 Bdp-
21 ---  ---  ---  -0- ---  ---  -0- -00-W Y=-42 X= 42 Bdp-
22 ---  ---  ---  -0- ---  ---  -0- -M Y=-16 X=  5
23 ---  ---  ---  -0- ---  ---  -0- -W Y= 35 X=  0
24 ---  ---  ---  -0- ---  ---  -0- -M Y=  1 X=  2
25 ---  ---  ---  -0- ---  ---  -0- -W Y=  0 X=  0
26 ---  ---  ---  -0- ---  ---  -0- -M Y=  0 X=  0 Nin
27 ---  ---  ---  -0- ---  ---  -0- -W Y=  4 X=  3
28 ---  ---  ---  -0- ---  ---  -0- -M Y= -8 X= -5 Fast
29 ---  ---  ---  -0- ---  ---  -0- -W Y= 10 X=  0
30 ---  ---  ---  -0- ---  ---  -0- -M Y= -9 X=  5
31 ---  ---  ---  -0- ---  ---  -0- -W Y=  5 X= -9
32 ---  ---  ---  -0- ---  ---  -0- -M Y=  6 X=  3
33 ---  ---  ---  -0- ---  ---  -0- -W Y=  1 X= 15
34 ---  ---  ---  -0- ---  ---  -0- -M Y=  0 X= 15
35 ---  ---  ---  -0- ---  ---  -0- -W Y= -1 X= 19
36 ---  ---  ---  -0- ---  ---  -0- -M Y= -3 X= 19
37 ---  ---  ---  -0- ---  ---  -0- -W Y= -3 X= 19
38 ---  ---  ---  -0- ---  ---  -0- -M Y= -7 X= 21
39 ---  ---  ---  -0- ---  ---  -0- -W Y= -9 X= 18
40 ---  ---  ---  -0- ---  ---  -0- -M Y=-10 X= 19
41 ---  ---  ---  -0- ---  ---  -0- -W Y=-10 X= 15

```



Supported Schiffli formats

Schiffli designs can be opened in **EmbroideryStudio**, edited and saved in Wilcom **EMB** file format, as well as **ESS** and **ESL**, Wilcom's Schiffli **stitch file** formats. Designs can also be read and written in many other machine-specific formats. See **Supported Schiffli file formats** for details.



Note ESL is used for RCC designs only. ESS is the primary machine file format for Wilcom-developed Schiffli servo control systems. When the ESS file is read directly by a Wilcom Electronic Servo System (WESS), high resolution and stitch accuracy is possible.

Schiffli disks

As the newer Schiffli machines can read floppy disks, there are several Schiffli machine floppy disk formats. These include:

- ✦ SLC (Saurer Low Level Code)
- ✦ SHC (Saurer High Level Code)
- ✦ Hiraoka
- ✦ Laesser
- ✦ Heinzle.

You need to convert the basic stitch file into the specific disk format required. For the most part, this can be done directly through **EmbroideryStudio**, or indirectly by means of the ES Schiffli Disk Converter. See **Supported Schiffli file formats** for details.



Note All Schiffli disks are DOS/Windows readable and do not require special hardware.

Key issues for Schiffli digitizers

The key issues for Schiffli digitizers are as follows:

- ✦ Schiffli machines are large, the frame has a mass, which in turn implies a speed limit on their operations.
- ✦ Lacework is soft, the thread tension has to be low. This is controlled by speed limits on older machines, thread 'pushing' techniques on newer machines.
- ✦ Up to 1000 needles can be engaged at a time. This creates a pulling force for larger stitches or movements which has implications for tension and speed limit control.
- ✦ Mechanical Schiffli machines have no memory; the digitizer has to think ahead to control speed and tension.
- ✦ There are no trimmers on older machines; the digitizer has to take account of thread hanging off the fabric.
- ✦ Needles cannot be engaged automatically, therefore color change is time consuming and typically avoided.

Schiffli digitizing

Digitizing Schiffli designs in ES Schiffli is very similar to digitizing Multihead designs. The major differences are:

- ✦ Handling of design repeats (for display purposes only)
- ✦ Handling pattern arrangements
- ✦ Handling of Start and End Jumps

- ◀ Inserting Tension and Speed Changes in the middle of stitching sequences
- ◀ Handling of Borer operations
- ◀ Stitching elaborate sequences for certain fills.

You should first become familiar with general **EmbroideryStudio** usage before studying the Schiffli-specific usage. **EmbroideryStudio** has a certain philosophy but once you understand the logic of the software, similarities between individual functions become obvious. See the **EmbroideryStudio** Onscreen Manual for details.



Note Ex-Wilcom CED users will find the use of **EmbroideryStudio** functions very similar. However, the logic of the software is very different at a foundation level. **EmbroideryStudio** software is a lot more automated and you need to learn to focus not on individual stitches but on the design as a whole. Editing too is a lot easier than in earlier versions.

Chapter 2

Setting up your Schiffli Machine

Multihead machine users are usually not as familiar with the settings of their embroidery machines as Schiffli users who often have years of operating experience. With **EmbroideryStudio**, Multihead machine digitizers choose the type of embroidery machine they are designing for or outputting to. Supported machines use preset values. By contrast, the generic ES Schiffli machine provides a single set of preset values which Schiffli digitizers can adjust to suit the particular machine characteristics. These customizable settings, or 'machine format values', are common to all Schiffli machines.

If you need to prepare designs for different machines, it is possible to create as many separate machine setups, based on the generic ES Schiffli machine, as you like. There are various reasons why you may want to do this. For example, if the maximum stitch length supported by your machine is 12mm, you can define a custom Schiffli machine format and adjust the maximum stitch length accordingly. When starting a new design, choose the particular machine you need.



Note The values you set do not affect the availability or otherwise of the machine functions provided in ES Schiffli. This means that you, the digitizer, need to be aware of the functions supported by your particular machine. See also [Supported Schiffli machine functions](#).

This section describes how to customize machine formats to meet your machine's particular requirements.

Configuring your ES Schiffli installation

When you install ES Schiffli, the default design template may or may not be automatically replaced by a Schiffli-specific one. For Schiffli work, you need to select this template. The Schiffli template sets the machine format to Schiffli and also turns off all the automatic connector settings.



Note The design template does not change the stitch settings as you will want to set your own values. For further details, see the 'Object Properties, Styles and Templates' chapter in the **EmbroideryStudio** Onscreen Manual.

Before you can use ES Schiffli, however, you need to give the program some further details about its intended application.

Setting up the machine

Firstly you need to define one or more machines. This means that when you start a new design, you can select the appropriate machine type for the design. When you use the software for the first time, you may want to change the Schiffli machine settings or even create your own machine formats based on the generic Schiffli machine. See [Creating custom machine formats](#) for details.



Tip You don't need to change the Schiffli machine format as such in order to output to different machine types. However, you do need to adjust encoding options to suit the target machine. See [Outputting Schiffli design files](#) for details.

Setting needle spacing

Secondly you should define the needle spacing. ES Schiffli uses the exact needle spacing in order to display or print design repeats correctly. Needle spacing is therefore characteristic to the machine and forms part of the pre-defined machine format values. ES Schiffli lets you set up and adjust this value to suit the machine that will stitch the design. See [Setting exact needle spacing](#) for details.

Creating custom machine formats

EmbroideryStudio provides a standard Schiffli format for all machines. However, you may want to customize the default settings. There are two ways to do this:

- ✦ Create a new format based on the original, and make it available to all designs. See [Creating custom machine formats for general use](#) for details.
- ✦ Modify the format for a specific design, thereby creating a custom format for use only with that design. See [Customizing machine formats for specific designs](#) for details.



Note If necessary, you can update the standard Schiffli machine format itself. However, you should only do this if the default values are no longer of use.

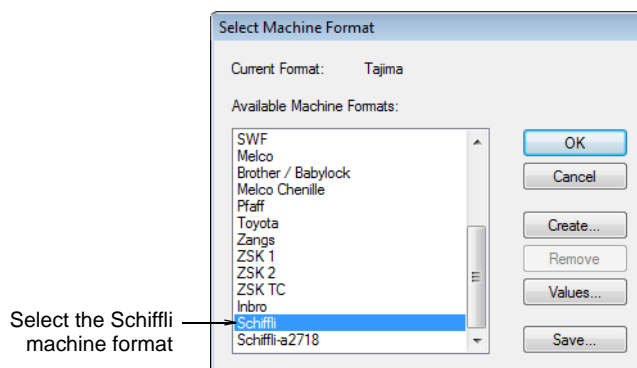
Creating custom machine formats for general use

You can create a new machine format based on the standard Schiffli machine format and make it available to all designs.

To create custom machine formats for general use

- 1 Select **Machine > Select Machine Format**.

The **Select Machine Format** dialog opens. The generic Schiffli machine format is selected by default.



- 2 Choose whether to create a new format or modify the current format:
 - ✦ To create a new format based on the current, click **Create**.
 - ✦ To modify the current format, click **Values**.

The **Machine Format Values > Standard** tab opens.

The screenshot shows the 'Standard' tab of the 'Machine Format Values' dialog box. The 'Machine Type' is set to 'Schiffli'. The 'Format Name' field contains 'Schiffli-1'. The 'Comment' field is empty. The 'Maximum Stitch' is 16.5 mm, 'Minimum Stitch' is 0.5 mm, and 'Maximum Jump' is 16.5 mm. The 'Trim' section has 'Output Trims' checked and 'Format Trim as Jumps' set to 1. The 'Boring' section has 'Starting Borer Depth' set to 7 and 'Numbering' set to 'Plauen'. Annotations with arrows point to the 'Format Name' field labeled 'Enter format name' and the 'Maximum Stitch' field labeled 'Adjust settings'.

- 3 In the **Format Name** field, enter a new name for the format as required.
If you are creating a new format, the name of the base format plus number appear as the default – i.e. **Schiffli-1**.
- 4 In the **Comment** field, enter any information that will help you identify the machine format – e.g. **Plauen** or **Saurer**.
- 5 Adjust the machine format settings as required. See [Adjusting machine format settings](#) for details.
- 6 Click the **Advanced** tab and adjust the needle spacing as required. See [Setting exact needle spacing](#) for details.
- 7 Click **Save**.
If you have entered a new name, the new format appears in the **Available Machine Formats** list.
- 8 Click **OK**.

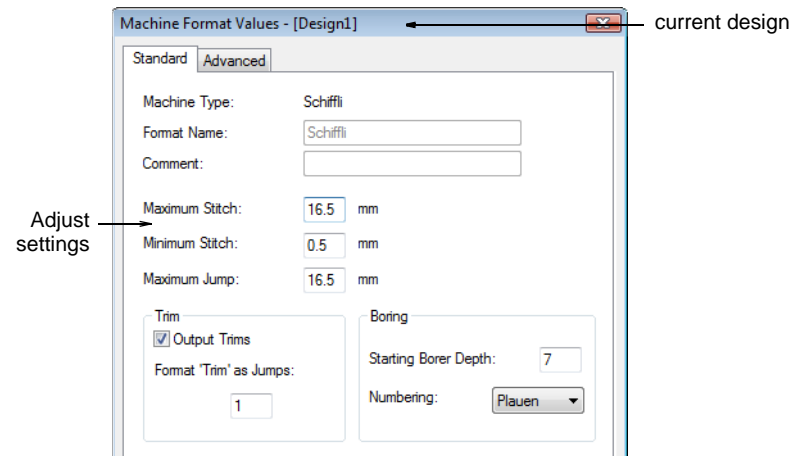
Customizing machine formats for specific designs

You can create a custom machine format for use with the current design. Use this feature if you need to modify machine format values for a design without changing the original format.

To customize machine formats for a specific design

- 1 Open the design whose machine format you want to modify.
- 2 Select **Machine > Machine Format Values**.

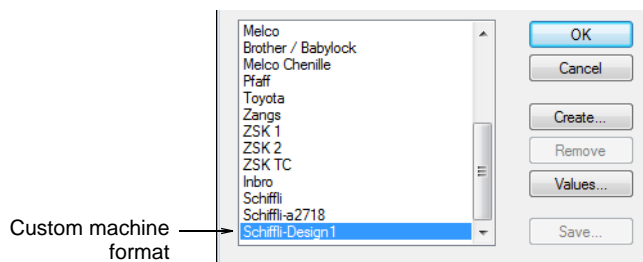
The **Machine Format Values > Standard** tab opens.



Note You cannot change the **Name** or **Comment** fields. The custom machine format is automatically named using the current machine format and design name – e.g. **Schiffli-MyDesign**.

- 3 Adjust the machine format settings as required. See [Adjusting machine format settings](#) for details.
- 4 Click the **Advanced** tab and adjust the needle spacing as required. See [Setting exact needle spacing](#) for details.
- 5 Click **OK**.

A new machine format is created for the design. It appears in the **Select Machine Format** dialog and is saved with the design.



Adjusting machine format settings

Different Schiffli machines require different settings. You can modify values relevant to your particular machine. Modifiable values are stitch and jump length, trim functions, borer functions, and needle spacing.

Setting stitch and jump length values

With some machines you can set the maximum frame movement, minimum stitch length to recognize, or automatic jump length.

To set machine stitch and jump values

- 1 Access the **Machine Format Values** dialog. See [Creating custom machine formats](#) for details.

Enter maximum stitch length → Maximum Stitch: 16.5 mm
Enter minimum stitch length → Minimum Stitch: 0.5 mm
Enter maximum jump length → Maximum Jump: 16.5 mm

- 2 In the **Standard** tab, enter the **Maximum Stitch** value.

The value you enter depends on the tape code used by your machine. The default maximum stitch length value for Schiffli is 16.5mm.

- 3 In the **Minimum Stitch** field, enter the smallest stitch to allow when outputting to the selected machine format.

This sets the default **Small Stitches** value. For details, see **Removing small stitches automatically** in the **EmbroideryStudio** Onscreen Manual.



Tip Generally the minimum stitch length is increased for dense materials, thick threads, or older machines in order to prevent thread breakage or inaccurate stitching.

- 4 In the **Maximum Jump** field, enter the maximum length of jumps.

This sets the default **Auto Jump** value. For details, see **Adjusting Auto Jump settings** in the **EmbroideryStudio** Onscreen Manual.



Tip Shorter jump values generally improve stitch quality and reduce wear on the machine but may increase stitch-out time.

- 5 Click **Save** and then **OK**.

Setting trim function encoding

Most machines with trimmers interpret Jumps as a Trim function. Some understand specific Trim codes. ES Schiffli currently outputs Trim functions as Jumps. You can select the number to be interpreted as a Trim.



Tip In ES Schiffli, jump stitches are assumed to be present only for stitches that will be trimmed. To hide them in TrueView™ display, they must be encoded as Trims. Thus, if you want a realistic view of the design as it would appear after manual trimming, **Output Trims** must be selected and the number of Jumps set to one. See also [Other machine functions](#).

To set trim function encoding

- 1 Access the **Machine Format Values** dialog.
See [Creating custom machine formats](#) for details.



- 2 In the **Standard** tab, select the **Output Trims** checkbox to include Trim functions when outputting to the selected machine format.



Note If you deselect the **Output Trims** checkbox, the Trim functions are not removed from the **EMB** design but simply ignored for the selected machine format. However, Jumps may be removed.

- 3 Enter the number of Jumps to be interpreted as a Trim.

With **Output Trims** selected, Trim functions are interpreted in the design as the specified number of Jumps. The default value is one (1). You can adjust the number of consecutive Jumps as required.

- 4 Click **Save** and then **OK**.

Setting borer depth numbering

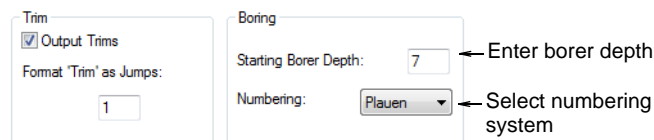
Schiffli machines have built-in borer knives under the needle line which can cut different sized holes in the fabric. The Schiffli borer knife has four edges. ES Schiffli controls Borer In/Out by means of 'object properties'. With Borer In selected, each needle penetration point becomes a borer hole, regardless of the selected stitch type. See **Digitizing boring holes** in the **EmbroideryStudio** Onscreen Manual for details.

Borer depth is relevant only to designs digitized using ES Schiffli. You can control borer depth by entering the specific depth value. The depth, and hence the size of the hole being cut, can be controlled by up to 13 increments. See **Modifying borer depth** for details.

Borer depth is specified slightly differently for Plauen (1-13) and Saurer (0-12). The default starting borer depth value is 7 for Plauen machines. However, you can set the Schiffli borer depth numbering to Plauen or Saurer as required.

To set borer depth numbering

- 1 Access the **Machine Format Values** dialog. See **Creating custom machine formats** for details.



- 2 In the **Standard** tab, enter the numbering system for specifying the Borer depth in the **Numbering** field.

- ◀ Plauen for Plauen machines
- ◀ Saurer for Saurer machines.

The **Starting Borer Depth** field adjusts accordingly:

- ◀ Plauen default = seven (7)
- ◀ Saurer default = six (6).

- 3 Adjust the starting borer depth as required.
- 4 Click **Save** and then **OK**.

Setting exact needle spacing

ES Schiffli uses the exact needle spacing in order to display or print design repeats correctly. Needle spacing is the distance between adjacent needles on the Schiffli machine. Different machines use different spacings, a result of slight variations of the French inch. Needle spacing is therefore characteristic to the

machine and is part of the machine format values. ES Schiffli lets you set up and adjust this value to suit the type of machine which will stitch the design.

To set exact needle spacing

- 1 Access the **Machine Format Values** dialog. See [Creating custom machine formats](#) for details.
- 2 Select the **Advanced** tab.

Format Name:

4/4 Repeat

Needle Spacing mm ← Physical distance between two active needles

- 3 Adjust the needle spacing value as required:
 - ◀ 27.04mm (Saurer)
 - ◀ 27.07mm (Plauen & Zangs) – the Schiffli default
 - ◀ 27.08mm (Hiraoka).
- 4 Click **Save** and then **OK**.

Chapter 3

Design Repeats and Pattern Arrangements

A Schiffli design can be repeated horizontally as many times as can fit across the frame. With larger designs, needles can be selectively disengaged, thereby increasing the **needle spacing** to 2, 3, 4, etc, inches. This is called a 'design repeat'. A related technique, pattern arrangements, is used by digitizers to save digitizing time. Lacework especially is made up of a few patterns which are repeated many times.

This section describes how to prepare artwork for your design, set up design repeats and pattern arrangements for lace and emblem designs.

Artwork for Schiffli

There are two sources of artwork for use with ES Schiffli:

- ✦ Enlargement drawings (used with a digitizing tablet)
- ✦ Scanned images or graphics files from third-party software (used for on-screen digitizing).

Schiffli enlargement drawings are usually in 6:1 scale for accuracy and ease of use. As Schiffli designs need to conform with the repeat requirements, it is important that the artwork you use is properly sized and in the correct horizontal position. Always check the position of your artwork before starting to digitize.



Note If, by mistake, the design is incorrectly sized or rotated, it is possible to change these parameters at a later stage. When scaling or rotating the design, all offsets will be properly placed in the final design. See the **Arranging and Transforming Objects** chapter in the **EmbroideryStudio Onscreen Manual** for details.

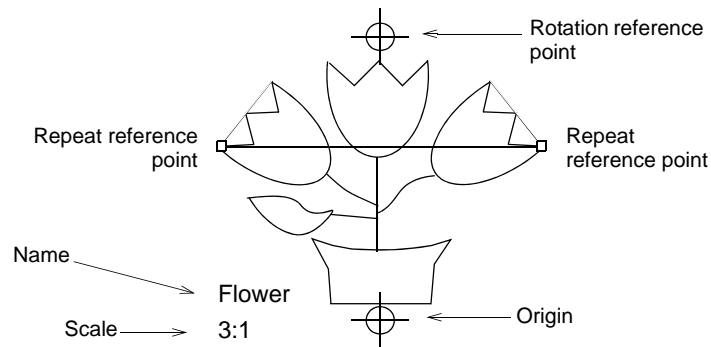
Checking enlargement drawing rotation and size

When checking the design, small errors are usually acceptable. Usually 0.3mm in real size is the smallest error the human eye can discern. Most old Schiffli machines cannot accurately make stitches smaller than 0.5-0.8mm in any case.

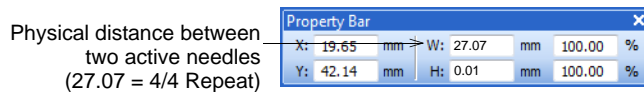
To check enlargement drawing rotation and size

- 1 Digitize two drawing reference points.
See the **Input Methods** chapter in the **EmbroideryStudio Onscreen Manual** for details.
- 2 Digitize a horizontal stitch run between two repeat points.

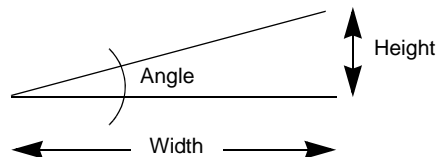
Make sure you digitize them accurately.



- 3 Select the Run stitch object and check the dimensions in the **Property Bar**.



- 4 Check the **Height** field to see that the value is equal to zero (0).



If the height value is not zero, then your design may not be positioned horizontally. There are three possible reasons:

- ✦ You may have digitized the stitch run incorrectly. Delete the Run stitch object and try again.
 - ✦ You may have digitized the drawing reference points incorrectly. Re-define them and check again.
 - ✦ You may have marked the drawing reference lines incorrectly on your drawing. You need to check that the vertical line formed by the two reference points is really vertical compared to the rest of your design.
- 5 Check the **Width** field to see that value is a multiple factor of your repeat in millimeters.
 - 6 To check or adjust the repeat size, select **Machine > Machine Format Values > Advanced**.
See [Setting exact needle spacing](#) for details.
 - 7 Compare the **Needle Spacing** setting in millimeters with the width of your Run stitch object. If these settings are not the same:
 - ✦ you may have digitized your stitch run inaccurately
 - ✦ you may have entered your drawing scale incorrectly
 - ✦ your enlargement drawing may not have the proper enlargement scale – e.g. instead of 6:1 it may be 5.95:1.
 - 8 If you eliminate the first two reasons and you find that the drawing scale is the source of the difference, you can re-enter the drawing scale in the **Digitizing Tablet** dialog to match the real drawing scale. You can calculate this easily as:

$$\text{New Drawing Scale} = \text{Old Drawing Scale} \times (\text{X size of Run Stitch object} \div \text{mm value of Design Repeat})$$

Preparing artwork for on-screen images

ES Schifflli allows you to use scanned images or graphics files – e.g. from floppy disk or emailed – to digitize the design on-screen. The same considerations apply as for checking the enlargement drawing. However, while with enlargement drawings you adjust the drawing scale, with electronic images, you adjust the on-screen image size and rotation.



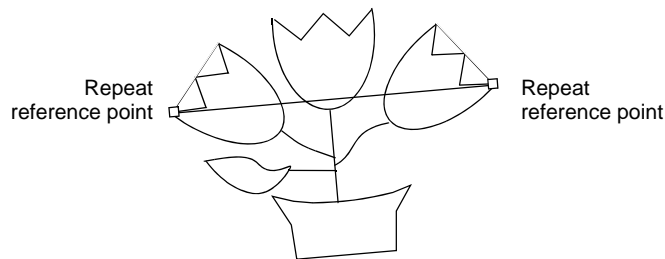
Note If you are new to on-screen digitizing, note that the on-screen image is always the original size – i.e. 1:1. If you want greater accuracy, you can zoom in – e.g. 6:1 scale – but this just means a closer view, not a change in design size.

Adjusting an image to repeat

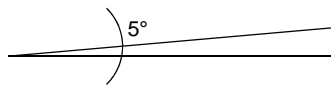
To adjust an image to repeat, you need to measure the distance between two repeat points. You will need to choose clearly identifiable points on the design which are easy to click.

To adjust an image to repeat

- 1 Select **View > Measure**.
- 2 Click the first (left) repeat reference point, then place the cursor over the second point.

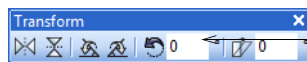


- 3 Check the **X** and **Y** values and the angle.



If the angle is not zero the image may need to be rotated. You need to decide the acceptable tolerance.

- 4 If you need to rotate it, select the image and enter the exact rotation setting in the **Transform** toolbar.



Enter exact rotation value – e.g. -5°



Tip Rotating the image can reduce definition and resolution. For better quality, it is sometimes easier just to rotate the paper in the scanner and re-scan the image.

- 5 Once the rotation is fixed, measure the two points again and compare the **X** value, **Design Repeat** value, and digitizer tablet adjustment.

Again you need to decide what tolerance is acceptable. First you need to calculate the necessary scale factor, which is:

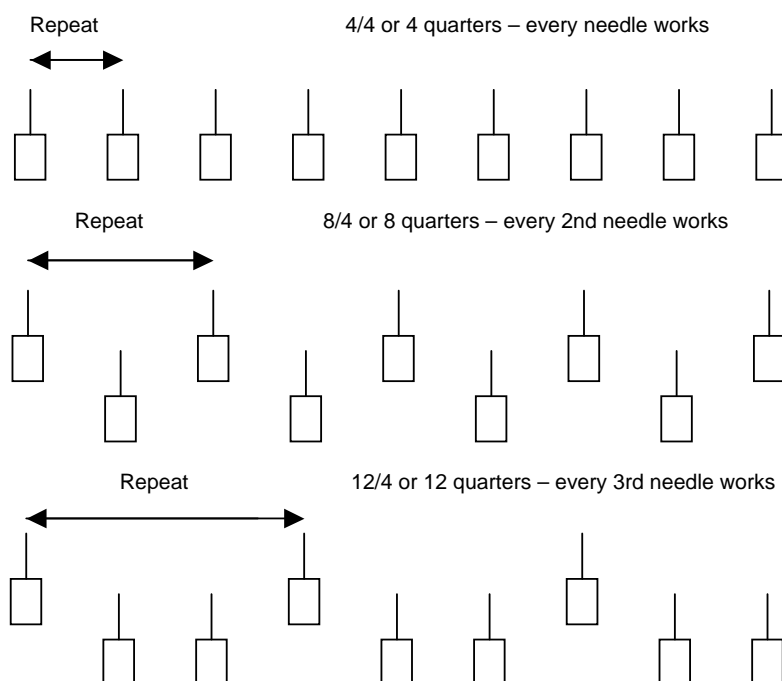
$$\text{Scale Factor} = (\text{Measured Repeat (X)} \div \text{Design Repeat}) \times 100\%$$

If the image needs to be enlarged by 10%, you will get 110% or a similar value; if it needs to be reduced by 5%, you will get 95% or similar.

- 6 If necessary, adjust the dimensions by percentage in **Object Properties General** dialog.

Working with design repeats

A Schiffli design can be repeated horizontally as many times as can fit across the frame. Repeats are measured in 'quarters' as shown in the diagram below.



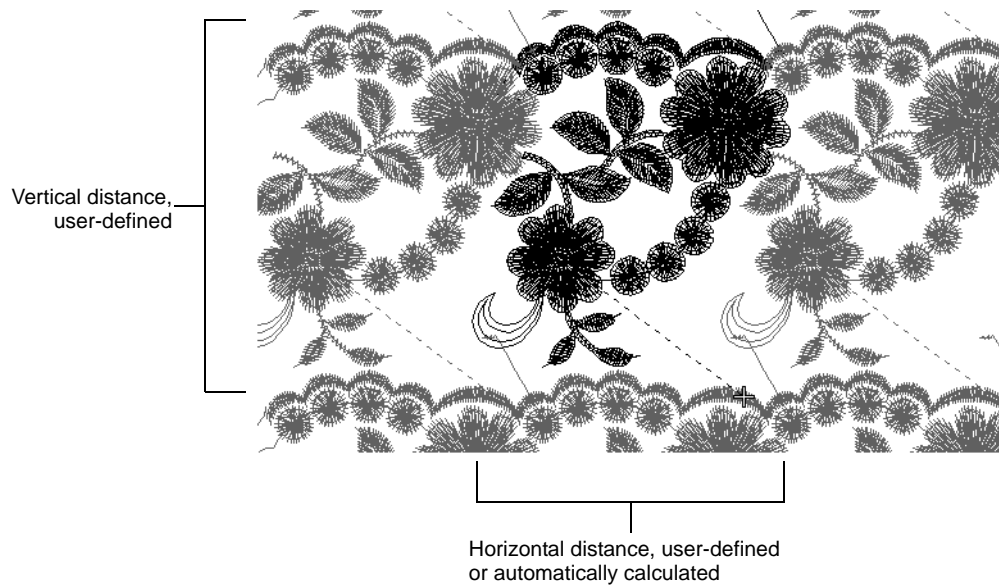
A design can be stitched by every needle (Repeat=4/4), every second needle (Repeat=8/4), or every third needle (Repeat=12/4), and so on. Repeat values increment in multiples of 4 up to a maximum of 96. The design repeat is characteristic to the design and in ES Schiffli is therefore part of the 'design properties'. The repeat value can be viewed in the **Information** dialog and also printed on the production worksheet. See [Printing a Schiffli production worksheet](#) for details.

The physical distance between two repeating needles is not essential to the Schiffli design. However, this value is provided to assist you in checking the accurate size of the artwork (image or enlargement drawing).

When creating new designs, ES Schiffli provides control over design repeats and caters for various machine types. You can view any number of full or part repeats to see how they interconnect. A **Print Repeats** option for the production worksheet is also available so you can see the design without having to wait for design samples.

Number of repeats

When digitizing or opening a design, you can view it with any number of repeats. The number can be a real number and larger than 1 – e.g. 1, 2, 3, etc.



The repeats are balanced around the original design which means that whole designs are displayed only for odd integer (1, 3, 5) numbers of repeats.

If the number of repeats is ...	Then ...
1.0	the original design only is displayed.
1.2	<ul style="list-style-type: none"> the original design is displayed, plus 0.1 of the design to either side of the original.
2.0	<ul style="list-style-type: none"> the original design is displayed, plus 0.5 of the design to either side of the original. <p>The repeat pattern looks like this:][]].</p>
2.9	<ul style="list-style-type: none"> the original design is displayed, plus 0.95 of the design to either side of the original.
3.0	<ul style="list-style-type: none"> the original design is displayed, plus a complete copy of the design to either side of the original. <p>The repeat pattern looks like this: [][][].</p>

Defining the design repeat

When working with Schiffli designs ensure that the:

- Design repeat is well defined
- Image/enlargement drawing is the right size, and
- Vertical/horizontal lines are correct.

EmbroideryStudio provides view and print functions to display the design in repeated form. It is only necessary to define design repeats so that the software can display and print/plot multiple repeats. In other words, you need only define the repeat value if you want to **view** the repeats.



Note You can save grid settings in the template. It is a good idea to set up your Schiffli templates with grids sized for Schiffli work. When checking the design repeat, the grid can be used as reference for adjustments. See the **Changing System Settings** chapter in the **EmbroideryStudio Onscreen Manual** for details.

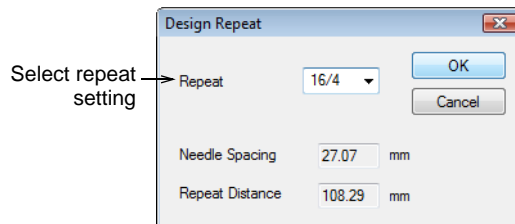
To define the design repeat

- 1 If you are using the Schiffli template, the machine type will already be set to Schiffli.

If you need to adjust the default settings for any reason, see [Creating custom machine formats](#).

- 2 Select **Special > Design Repeat**.

The **Design Repeat** dialog opens.



- 3 From the **Repeat** dropdown list, select the repeat setting you require.

A design can be stitched by every needle (Repeat=4/4), every second needle (Repeat=8/4), or every third needle (Repeat=12/4), and so on. Repeat values increment in multiples of 4 up to a maximum of 96.



Tip To check or adjust the repeat size, select **Machine > Machine Format Values > Advanced**. See [Setting exact needle spacing](#) for details.

- 4 Click **OK**.

The selected design repeat will be saved as the new default preference.



Tip The repeat is displayed in the **File > Information > Design Information** tab on the same line as the file version.

Viewing design repeats in EmbroideryStudio

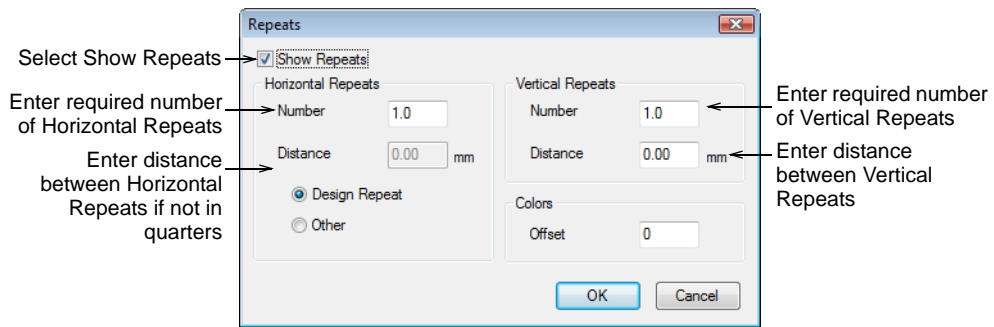


Use Show Repeats (Schiffli toolbar) to view Schiffli designs with any number of repeats. Right-click to adjust settings.

When digitizing or opening an existing image, you can view your design with any number of repeats.

To view design repeats in EmbroideryStudio

- 1 Press the keyboard shortcut **W** to access the **Repeats** dialog.



- 2 Select the **Show Repeats** checkbox to activate the feature.
- 3 Enter the required number of horizontal and vertical repeats in the **Number** fields. See [Number of repeats](#) for details.
- 4 Select from the available options:

Option	Purpose
Horizontal Repeats (Design Repeat)	If Design Repeat is selected, the physical distance of the repeat is automatically calculated. The repeat distance is typically a multiple factor of the needle distance – 4/4 - 27,07mm, 8/4 - 54.14, etc. Note: Make sure that you have already selected the design repeat. See To define the design repeat for details.
Horizontal Repeats (Other)	If you select Other, you need to type the distance setting in mm. This facility is provided for users who are doing continuous design work on Multihead systems.
Vertical Repeats	The Vertical Repeat setting is not pre-defined like the design repeat, so you need to specify the vertical repeat distance as well as number of repeats.
Colors	To help you distinguish on screen the original design from the repeat patterns, the facility exists to display the repeats in different colors. You can enter a Color Offset setting indicating where you want to start the first repeat color. Let's say you have a 4-color design using palette colors 1, 2, 3, 4. If you set Color Offset to 5, this means that the repeat colors will display as 5, 6, 7, 8.

- 5 Click **OK**.



Note Design repeats will not display while TrueView™ is activated.

Viewing design repeats using a digitizing tablet



To switch on repeats, click the Show Repeat icon on the Menu Chart with Button 1 of the puck.

When digitizing or opening an existing image, you can view your design with any number of repeats. You can control the display of repeats using your digitizing tablet.

To view design repeats using a digitizing tablet

- ◀ To switch on repeats, click the **Show Repeat** icon on the **Menu Chart** with Button 1 of the puck.

This sets **Show Repeats** on and displays the **Repeats** dialog. See [Viewing design repeats in EmbroideryStudio](#) for details.

- ◀ To switch off repeats, click the **Show Repeat** icon again with Button 1.
This sets **Show Repeats** off and redraws the design without repeats.

Working with pattern arrangements

Pattern arrangements are used by digitizers to save digitizing time. Lacework especially is made up of a few patterns which are repeated many times. Pattern arrangements mean that only the design elements to be repeated are digitized. **EmbroideryStudio** provides tools to define pattern arrangements and output to specific formats which support the feature.

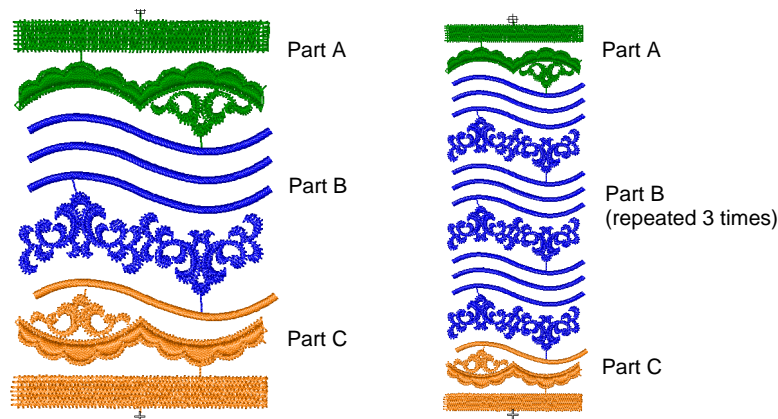
Designs can be saved to certain formats with design elements stored only once, together with repeat instructions – e.g. Hiraoka VEP, Wilcom EMB or ESS. Some Schiffli embroidery machines or controllers can read these formats directly. Designs can also be saved with the arrangements 'expanded' as pure stitch data – e.g. DAT file format. As the term suggests, these files are much larger than 'non-expanded' (original) design formats. See also [Saving pattern arrangements](#).



Tip When using pattern arrangements, it's a good idea to turn the cumulative stitch count on. This gives the cumulative stitch count for the whole design, not each part separately. To turn it on, select **View > Design Options > General > Cumulative Stitch Count On**.

Applying pattern arrangements to a new design

Pattern arrangements can be applied to new EMB designs or added to existing designs. Pattern arrangements in **EmbroideryStudio** split the design into color blocks which are then arranged into logical parts, Part A is usually one color block, Part B a second color block, and Part C a third color block. Normally, for both lacework and emblems, Color 1 is Part A, Color 2 is Part B, and so on, for each part of the design. However, it is possible to group several color blocks into one part if this is required for RCC designs.



For lacework, the number of rows is normally one for A and C, with multiple rows for B. For emblems, the number of rows is usually the same for each part.



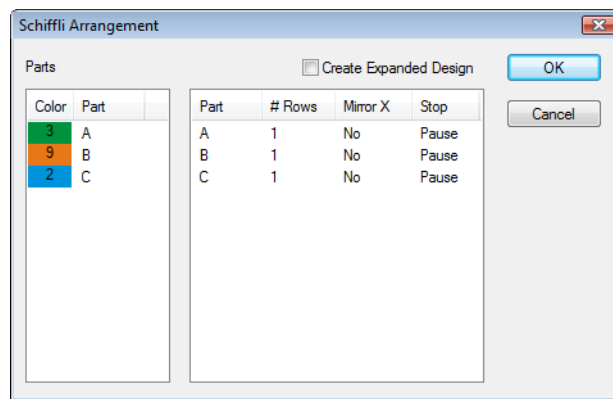
Caution Only set up the pattern arrangement **after** the design elements have been finalized. Otherwise the pattern arrangement can become 'out-of-sync' with its design.

If the arrangement is out-of-sync, ES Schiffli reverts to a default arrangement. This means that each color block is defined as a separate part with each repetition separated by a Pause function. The default arrangement displays the whole design in one color and has minimal effect on the design data.

To apply pattern arrangements to a new design

- 1 Digitize all parts of the new design as a single EMB file, applying a different color to each part.
- 2 Select **Special > Schiffli Arrangement**.

The **Schiffli Arrangement** dialog opens showing colors as they occur in the design.



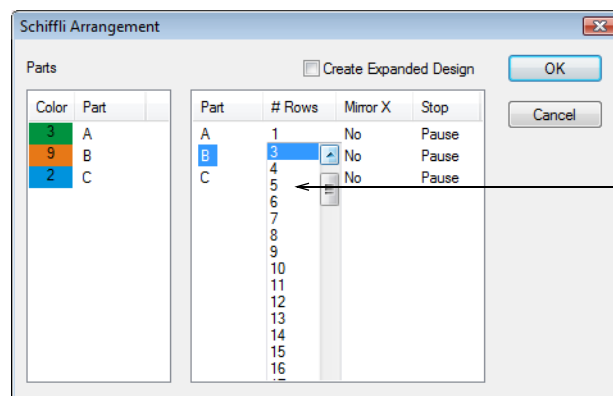
- 3 In the **Parts** panel, assign a color to each part.
 - ◀ **Color**: new thread number as required.
 - ◀ **Part**: new part numbers as required.

For RCC designs, you can allocate more than one color to a part.



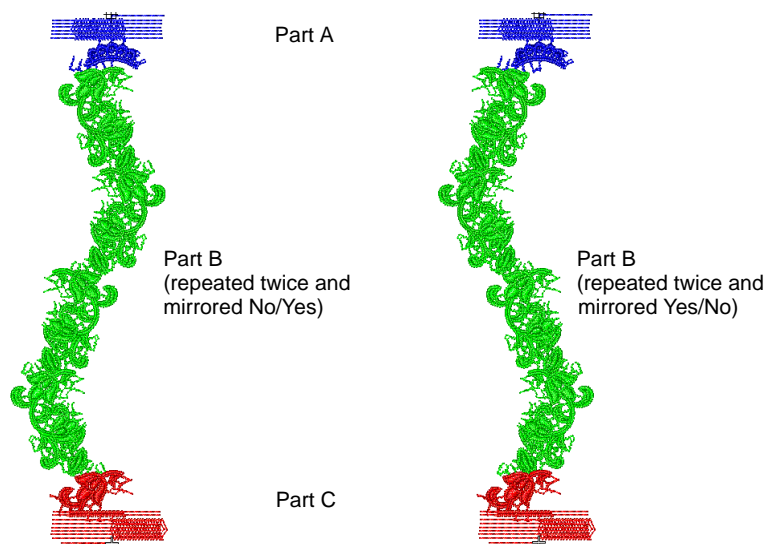
Tip A color block can only be in one part of the arrangement. To re-use it later, duplicate it as a separate color block.

- 4 In the **Arrangement Parameters** panel, **# Rows** column, select the number of times you want to stitch this part of the design.



Select number of rows for each part

- 5 In the **Arrangement Parameters** panel, **Mirror X** column, select how you want to mirror this part of the design.



Note Each arrangement part, or row within a part, is attached to the end point of the previous one. If a part's end point does not finish directly below its start point, the repeat patterns will shift over multiple rows (unless you mirror them alternately). See also [Aligning parts in stitch designs](#).

- 6 In the **Arrangement Parameters** panel, **Stop** column, select the required machine function for the last row of each part. For example:

Function	Purpose
Stop	The machine will stop when it finishes the last row.
Pause	The machine will stop conditionally when it finishes the last row. This means that the machine will stop only if the machine operator has enabled Stop on Pause.
No	The machine will automatically continue stitching between rows.

- 7 Select the **Create Expanded Design** checkbox if you are going to save the design as a machine format that does not read pattern arrangement files – e.g. DAT. See also [Viewing pattern arrangements in expanded files](#).
- 8 Save the design. See [Saving pattern arrangements](#) for details.

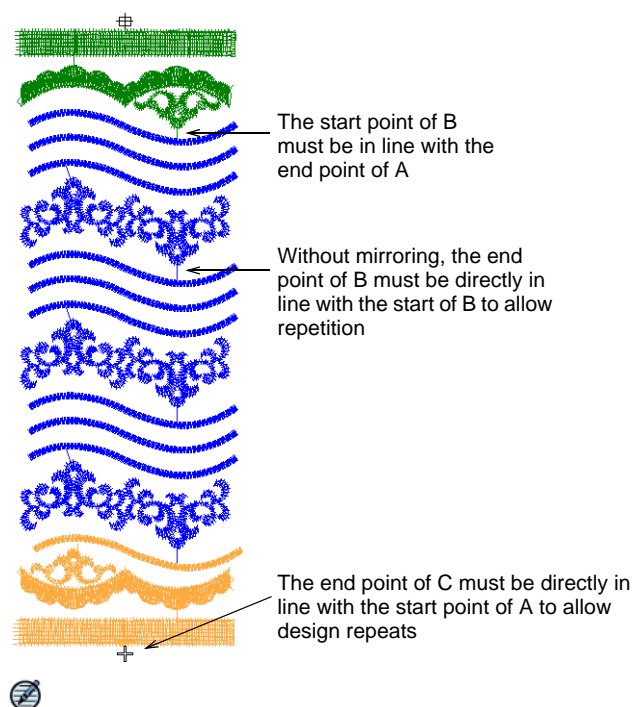


Tip You can also manually select the parts and save them as separate files.

Aligning parts in stitch designs

When creating the stitch file it is important that the start and end points for each part are correctly aligned. The parts must be carefully designed so the start and end points of each color match up correctly or the design registration will not be

correct. The first stitch in a row of an arrangement should start at the XY location of the last stitch of the previous row.



Note If you want to mirror Part B, the start point should be at the top-center and the end point should be at the bottom-center.

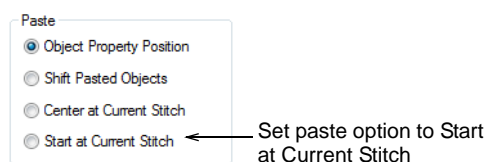
Combining split designs into a single file

If you open a design which has been split into separate files for each ABC part, you can combine it into one EMB file using pattern arrangements.

To combine split designs into a single file

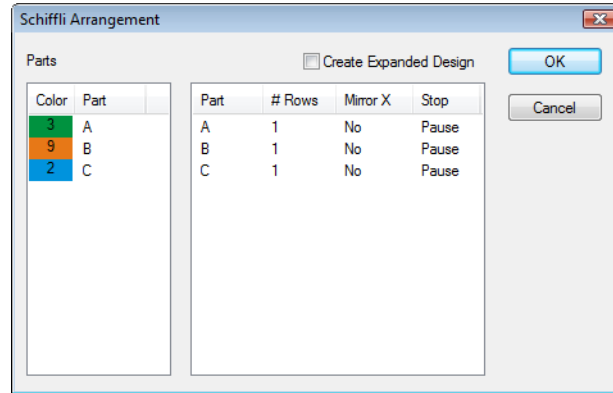
- 1 Select **View > Design Options**.

The **Options** dialog opens.



- 2 Select **Start at Current Stitch** in the **Paste** panel.
This means inserted components are pasted at the current stitch.
- 3 Open the design file you want to comprise Part A.
- 4 Select **Insert > Embroidery File > DOS Disk**.
The **Open** dialog opens.
- 5 Open the design file you want to comprise Part B.
The second design file will be inserted at the last stitch of Part A. Change the color as required.
- 6 Repeat for Part C.
- 7 Select **Special > Schiffli Arrangement**.

The **Schiffli Arrangement** dialog opens showing colors as they occur in the design.



- 8 Assign the parts of the combined design. See [Applying pattern arrangements to a new design](#) for details.
- 9 Save the combined design as an EMB file.

Saving pattern arrangements

Pattern arrangements can be saved as EMB, ESS or Hiraoka VEP file format. Save expanded designs independently as an EMB, ESS, DAT, SAS or other machine format file. See also [Supported Machine Functions, File and Disk Types](#).



Note Expanded designs can also be saved in an EMB template file with its own default values.

To save pattern arrangements

- 1 Open a design or designs with separate pattern arrangement files.
- 2 Assign the pattern arrangements to the design. See [Applying pattern arrangements to a new design](#) and [Combining split designs into a single file](#).
- 3 Select **File > Save As**.
 - ◀ Save non-expanded designs as EMB, ESS or VEP.
 - ◀ Save expanded files as EMB, DAT or SAS.



Note Save as ESS file to transfer the design to machine via WESS.

Viewing pattern arrangements in expanded files

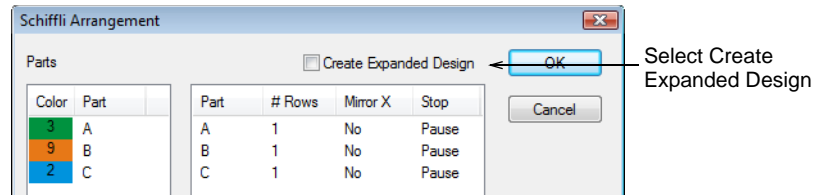
Normally the pattern arrangements in your design are not shown on screen. If you need to see them, create an expanded design. This displays the design in a separate window where all parts are shown. You can use this expanded design as a preview of the expanded arrangement and then delete it or save it as required. The design can also be viewed in design repeats or printed with pattern arrangements on. See also [Viewing pattern arrangements with repeats](#).



Note The arrangement parameters are not saved in the expanded design but are saved with the original design.

To view pattern arrangements in an expanded file

- 1 Open a design or designs with separate arrangement files.
- 2 Select **Special > Schiffli Arrangement**.
The **Schiffli Arrangement** dialog opens showing colors as they occur in the design.
- 3 Assign the pattern arrangements to the design. See [Applying pattern arrangements to a new design](#) for details.
- 4 Select the **Create Expanded Design** checkbox.

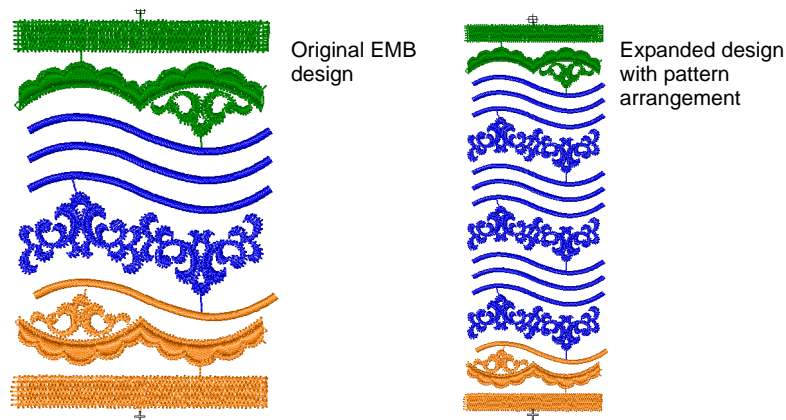


This design becomes the current window and is an expanded view of the original design. For each part, the stitches are copied to the new design as a single manual object with rows, mirroring and stops indicated.



Note If an arrangement is expanded, the color change/stop between rows is removed in EMB and ESS.

- 5 Save the original design as the master copy.
- 6 Save the expanded design as an EMB, ESL, DAT, SAS or other machine format file.



Viewing pattern arrangements with repeats



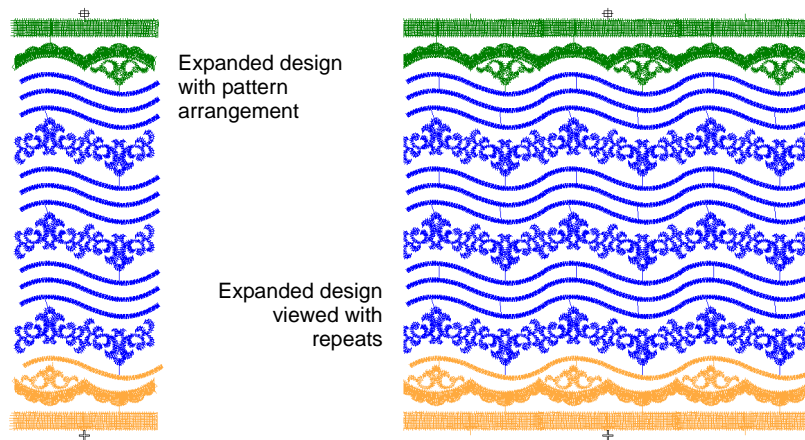
Click Show Repeats (Schiffli toolbar) to view design repeats. Right-click to adjust settings.

Designs with pattern arrangements can be viewed together with design repeats.

To view pattern arrangements with repeats

- 1 Open an expanded design.
- 2 Select **View > Design Repeat**.
The **Design Repeat** dialog opens.

- 3 Define the repeat options as required. See [Defining the design repeat](#) for details.
- 4 Click the **Show Repeats** icon.



Renaming thread code labels for printing



Use Color Palette Editor (Color Palette) to modify threads in existing charts.

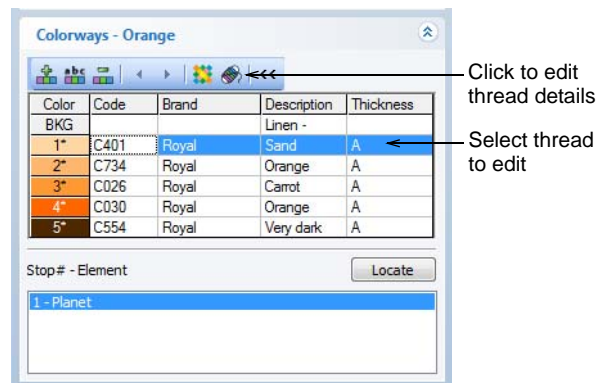


Use Edit Thread (Color Palette) to modify thread information about the palette color currently selected in the colorway list.

You can change the text labels of the thread colors to Parts A, B and C to reflect the pattern arrangements when printing. These labels appear on the production worksheet both in the stop sequence, and in Color Film printout which shows the different color blocks of the original design.

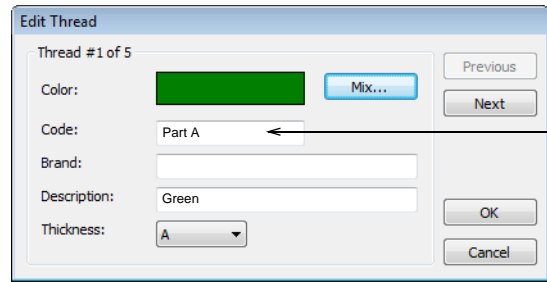
To rename thread code labels for printing

- 1 Click the **Color Palette Editor** icon.
The **Color Palette Editor** docker opens.



- 2 Select and double-click a code name.

The **Edit Thread** dialog opens.



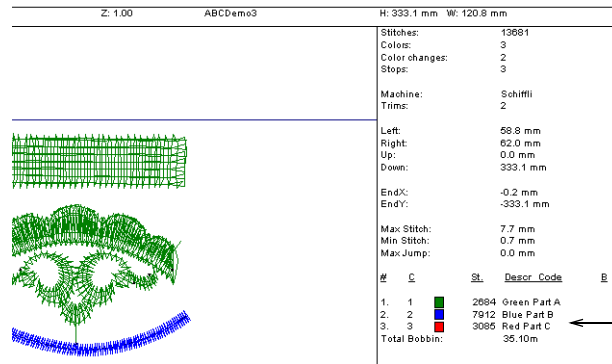
The **Edit Thread** dialog box is shown. It has a title bar "Edit Thread" and a subtitle "Thread #1 of 5". The "Color:" field is a green color swatch with a "Mix..." button. The "Code:" field is a text box containing "Part A" with a left-pointing arrow. The "Brand:" field is empty. The "Description:" field contains "Green". The "Thickness:" field is a dropdown menu showing "A". On the right side, there are buttons for "Previous", "Next", "OK", and "Cancel".

← Edit code name

3 Edit the **Code** field as required.

4 Click **OK**.

Thread codes display as Parts A, B and C.



The image shows a stitch pattern on the left and a table of thread codes on the right. The stitch pattern consists of three distinct sections: a top section with green horizontal lines, a middle section with green and blue interlocking loops, and a bottom section with blue horizontal lines. The table on the right provides technical specifications and a list of thread codes.

#	C	SL	Descr	Code	B
1.	1	2894	Green Part A		
2.	2	7912	Blue Part B		
3.	3	3085	Red Part C		
Total Bobbin: 35.10m					

← Parts A, B and C shown

Chapter 4

Editing Schiffli Designs

Schiffli designs created in **EmbroideryStudio** can be edited freely. You can insert or delete parts of the design and move or rotate objects as you can for Multihead designs. Logical functions preserve their correct positions. Offsets are also handled independently. For example, rotating an object with borer functions will not affect the frame offset. After encoding, it will still stay vertical. Of course you would need to consider if such rotation is feasible from the Schiffli design point of view as in most cases such a move would require a different stitching sequence as well. For details on object-based design creation and editing, refer to the **EmbroideryStudio** Onscreen Manual.

Like stitches, many logical machine functions are inserted automatically whenever you select commands or specify object properties. They are stored with the embroidery object in the native Wilcom **EMB** design file and updated whenever the object is modified. You can edit individual stitches as required. **EmbroideryStudio** also lets you manually insert machine functions and modify them. This flexibility allows you to adapt designs to almost any machine requirement. For details about stitch and machine function editing, refer also to the **EmbroideryStudio** Onscreen Manual.

This section deals with selecting and editing stitches, and converting selected stitches to objects. It also includes instructions for inserting, checking, editing and clearing manually-inserted functions.

Supported Schiffli machine functions

ES Schiffli makes a distinction between 'logical' and 'physical' machine functions. The logical machine function is what you, the digitizer, want to perform – for example, color change, or start/stop boring. This concept may be new to Schiffli designers who are used to working on a stitch-by-stitch basis.



Note Some functions may appear as both 'logical' and 'physical' depending on the particular machine. For example, 'Borer In/Out' may be an actual physical function on one machine but may need to be encoded as a number of physical functions on another.

Logical functions are saved as 'object properties' in the native Wilcom **EMB** design file. EMB files can be output in a wide variety of Schiffli formats. ES Schiffli automatically generates the required physical functions by interpreting the logical functions. When outputting the final machine code for Plauen or Saurer type machines, ES Schiffli makes sure that the physical functions occur on the right stitch and in the right phase (for Plauen), based on preset values (defaults). You can change these defaults to suit your particular needs when outputting the design. See **Outputting Schiffli design files** for details.



Note Users with sufficient experience can check the physical machine functions one-by-one in the final **stitch file** by using the ES Schiffli FIXPAT utility. This allows you to check the stitching sequence and insert any unsupported or

non-standard functions. See [Checking stitches and machine functions on Jacquard cards](#) for details.

Frequently used machine functions

Frequently used user-selectable functions supported by ES Schiffli include:

- ◀ Stepp/Blatt
- ◀ Begin Jump/End Jump
- ◀ Fast/Slow
- ◀ Borer In/Out
- ◀ Borer Depth
- ◀ Drop Sequin.

Stepp/Blatt functions



Use Stepp (Schiffli toolbar) to increase thread tension.



Use Blatt (Schiffli toolbar) to reduce thread tension.

Tension control depends on stitch length. It also depends on the machine, fabric, and even stitch direction, but generally the threshold value between Stepp and Blatt functions is around 2.3 – 2.6mm. Thus when you digitize stitches smaller than this threshold value, you need to be in normal tension mode (Stepp). If the stitch becomes longer than this, you need to switch to loose tension by inserting a Blatt function in order to avoid thread or needle breakage. Conversely, if you are digitizing in Blatt mode and stitches become smaller than the threshold value, you must insert a Stepp function to avoid stitch puckering or looping. In **EmbroideryStudio**, Stepp/Blatt functions can be displayed in two colors.

In addition to the Blatt function, some machines use Fadenleiter for even finer tension adjustment. ES Schiffli provides support for this. See [Machine-specific functions](#) for details.



Note SPES users should note that **EmbroideryStudio** does not currently insert the tension and speed changes automatically based on the stitch length.

Begin/End Jump function



Use Begin Jump (Schiffli toolbar) to insert a command which causes the active tool (needle or borer) to be pulled out.



Use End Jump (Schiffli toolbar) to insert a command which causes the active tool (needle or borer) to be pushed in, thereby penetrating the fabric.



Use Penetrations (Generate toolbar) to activate needle or borer penetrations.



Use Borers (Create Special Tools Flyout) in conjunction with Penetrations to activate borers.

ES Schiffli automatically handles needle or borer penetrations as part of 'object properties'. You control Begin and End Jumps by means of the **Penetrations** tool. This means that:

- ◀ for normal stitching, Penetrations must be active
- ◀ for boring, Penetrations and Borers must be active

◀ for jumps, Penetrations must be inactive.

Begin/End Jump functions instruct the current tool (needle or borer) to stop or start penetrating. If you need additional Begin/End Jump functions, you can insert them manually. Begin Jump applies both to stitching and boring and enables traveling to a point in the design without penetrations. Always remember to insert an End Jump function to instruct the machine to resume normal stitching.



Note Begin/End Jump functions were previously called Needle Out/In in ES Schiffli. However, depending on the selected penetrating device, they may be translated as either Needle Out/In or Borer Out/In physical functions. Schiffli machines do not have a **Jump Stitch** mechanism – the frame moves with neither borers nor needles active.

Fast/Slow functions



Use Fast (Schiffli toolbar) to insert a command to increase machine speed.



Use Slow (Schiffli toolbar) to insert a command to decrease machine speed.

In principle, Schiffli designs will be stitched in fast speed to achieve maximum production. ES Schiffli always sets the initial speed to 'fast'. You only need to insert Slow functions for particular stitch effects, stitching on delicate fabrics, or when using special devices such as sequins. Like Needle In/Out, ES Schiffli automatically inserts Slow/Fast speed functions in design locations required by the target machine (as specified in the conversion settings). Any difference in machine starting speeds is automatically handled on output. See [Outputting Schiffli design files](#) for details.

Borer In/Out functions



Use Borer In (Schiffli toolbar) to insert a command to cause the borer attachment to be lowered so that it penetrates the fabric.



Use Borer Out (Schiffli toolbar) to insert a command which causes the borer attachment to be raised.

Borer In/Out functions are available for embroidery machines equipped with a borer. They instruct the machine when to use the boring knife or tool instead of a needle. You can insert these functions using the Borers tool. It is common to use sequences of empty stitches with functions like fast and slow and borer depth separated from each other only by these empty stitches. After Borer Out, the Needle will return to the last stitch position before the Borer In.



Note ES Schiffli shows stitching, not frame movements, so **EmbroideryStudio** will not show borer offset. You can only edit/view the borer-offset compensation stitches in a separate editor such as FIXPAT. See [Editing stitches with FIXPAT](#) for details.

Borer Depth function



Use Borer Depth (Schiffli toolbar) to set the depth of the borer attachment which controls how large a hole the borer makes. Valid Borer Depths are 1 through 13 for Plauen and 0 to 12 for Saurer.

Borer depth is relevant only to designs digitized using ES Schiffli. The Borer Depth function is selected and defined as an absolute value. On the machine, the depth is changed by increments from the current position. The increments necessary to achieve the required borer depth are automatically calculated by ES Schiffli and distributed on stitches before the required point. See [Modifying borer depth](#) for details.

Drop Sequin function



Use Drop Sequin (Schiffli toolbar) to insert a command which causes a sequin to be dropped.

A **Drop Sequin** function is available for embroidery machines equipped with a sequin dispenser. This function instructs the machine to drop a sequin on the fabric for stitching. See also [Sequins and Boring](#) in the **EmbroideryStudio** Onscreen Manual.

When outputting Schiffli [stitch files](#), ES Schiffli provides the three most frequently used physical functions to activate the sequin device:

- ◀ Borer Depth (BR)
- ◀ Fadenleiter (TNS)
- ◀ Schnur(Cord) (SCH).

When reading Schiffli designs, if the sequin function is set to something other than **None**, all instances of the selected physical function are converted to the ES Schiffli **Drop Sequin** function. See also [Reading and writing files in ES Schiffli](#).

Other machine functions

Other user-selectable functions supported by ES Schiffli include:

- ◀ Stop
- ◀ Color Change
- ◀ Jump(M)
- ◀ Empty/Empty Jump
- ◀ Trim.

Stop function

The software automatically inserts a **Stop** code at the end of an object if accompanied by a color change. It is generally not explicitly inserted otherwise the Schiffli **Arrangement** feature will not work. However, if you want the embroidery machine to stop for any special reason during stitching, you can manually insert a **Stop** function in the stitching sequence. If you normally select **Stop** functions to change colors, refer to [Color Change function](#).



Tip Because a **Stop** function may be inserted for various reasons, you should record its purpose on the production worksheet to assist the machine operator.

Color Change function

Schiffli machines with automatic color changes have specific mechanisms and color change procedures which are different to Multihead machines. Color Change functions tell the Schiffli machine to move the frame under the next selected needle. They are automatically inserted when you select a new color from the color palette. You only need to insert manual color change functions if you cannot recolor using the standard method. Color change should be used for both manual re-threading of color change and machines with automatic (RCC) color change. See also [Working with RCC Designs](#).

Jump(M) function

Jump(M) functions cause frame movements without needle penetrations and are used to move smoothly from one part of a design to another. Insert Jump(M) functions manually in order to digitize individual jumps or create jump connectors. When digitizing with the **Manual** input method, you can create jumps manually by right-clicking as you digitize. See **Digitizing individual stitches** in the **EmbroideryStudio** Onscreen Manual for details.



Note There are also Begin Jump and End Jump functions as the closest **EmbroideryStudio** equivalents to the Schiffli Needles In and Needles Out functions. See [Begin/End Jump function](#) for details.

Empty Stitch/Jump function

Empty Stitch is a zero-length stitch which in Multihead designs is used together with, or as an alternative to, tie-in and tie-off stitches. In Schiffli designs, empty stitches are often used in boring to make multiple penetrations. The Empty Jump function instructs the machine to make a single zero-length stitch without needle penetration (jump). This may be used as a marker in the stitch file. The **Travel by Function** tool recognizes and stops on Empty Stitch/Jump functions. A dedicated **Empty Function** tool is available on the **Pointer** toolbar. See **Adding empty stitches and empty jumps** in the **EmbroideryStudio** Onscreen Manual for details.



Tip The Jump function can be inserted on an Empty Stitch as well as a normal stitch. As an alternative, multiple Empty Jumps can be inserted directly, without having to insert an Empty Stitch first.

Trim function

The ES Schiffli Trim function has two main uses – trimming threads on Schiffli machines equipped with trimmers, and for viewing TrueView™ samples of the final embroidery. In ES Schiffli, jump stitches are assumed to be present only for stitches that will be trimmed. To hide them in TrueView™ display, they must be encoded as Trims. By so doing, you obtain a realistic view of the design as it would appear after manual trimming. If the output format does not include a Trim code, the function is ignored. See also [Setting trim function encoding](#).



Note Saurer machines, some of which have trimmers, are supported indirectly via SHC (*.PAT). Any movements without stitching can be trimmed according to the user settings on the machine.

Machine-specific functions

ES Schiffli supports fine tension and speed changes, as well as special devices like Cord and Sequin for specific machines. These functions can be output to disk or tape, and are preserved when read into **EmbroideryStudio**. Machine-specific functions directly supported by ES Schiffli include:

- ✦ Fadenleiter Plus/Minus
- ✦ Thread Brake Plus/Minus
- ✦ Boring Tension Start/End
- ✦ Pause
- ✦ RPM Plus/Minus
- ✦ Stuepfel In/Out
- ✦ Cord In/Out
- ✦ Festoon In/Out.

For details of the machine types to which each function is relevant, see the table [Machine-specific functions](#).

Fadenleiter functions



Use Fadenleiter Plus (Schiffli toolbar) to instruct the machine to increase the Fadenleiter stroke one increment.



Use Fadenleiter Minus (Schiffli toolbar) to instruct the machine to decrease the Fadenleiter stroke one increment.

Fadenleiter Plus/Minus functions instruct the machine to increase or decrease the **Fadenleiter** stroke one increment. This means increasing or decreasing thread feed where sections become wider or narrower.

Thread Brake functions



Use Thread Brake Plus (Schiffli toolbar) to insert a command to increase the application of the thread brake.



Use Thread Brake Minus (Schiffli toolbar) to insert a command to decrease the application of the thread brake.

Thread Brake Plus/Minus functions instruct the machine when to increase or decrease tension one increment by Thread Brake.

Boring Tension functions

Start /End Boring Tension functions instruct servo thread machines to feed less thread for stitching in boring holes. For Hiraoka TNS Ein, it overrides/restores Stepp/Blatt tension.

Pause function

The Pause function is usually a conditional Stop on Empty. It is interpreted by the machine according to the machine operator preferences.

RPM functions



Use RPM Plus (Schiffli toolbar) to insert a command to increase the turning speed of the machine.



Use RPM Minus (Schiffli toolbar) to insert a command to decrease the turning speed of the machine.

RPM Plus/Minus functions instruct the machine to increase or decrease machine speed in increments from current or normal.

Stuepfel functions

Stuepfel In/Out functions instruct the machine when to switch to the **Stuepfel device** from the borer. Borer In engages both the borer and the Stuepfel.

Cord functions

Cord In/Out functions tell the machine to engage or disengage the cord device.

Festoon functions

Festoon In/Out functions instruct the machine to engage or disengage the festoon device.

Thread Roller functions

Thread Roller Plus/Minus functions instruct the machine when to increase or decrease tension one increment by Thread Roller Feed (2S-55 RCC). Currently this function is not output by ES Schiffli.

Indirectly supported functions

ES Schiffli indirectly supports Saurer Clutch In/Out (when used with Borers). An indirectly supported function means that, although you cannot select the function in **EmbroideryStudio**, the software automatically inserts it as part of a logical function.

Inserting machine functions

Machine functions can be inserted via commands or object properties. They can also be inserted manually via the **Schiffli** toolbar or **Insert Function** dialog or by means of shortcut keys. Machine functions are stored with their corresponding embroidery object and updated whenever the object is modified. A major difference between Multihead and Schiffli digitizing is that, in various parts of Schiffli objects, you need to manually insert Tension and sometimes Speed Change codes based on stitch length.



Caution Stitches or machine functions which are manually inserted into non-manual objects – e.g. Input A, Complex Fill, etc – need to be maintained manually. If an object's stitches are regenerated for any reason, stitch edits are lost. Machine functions may be moved to another point in the stitch sequence. With manual objects, this is not a problem – function and stitch edits are always preserved.

Because of the 'all-in-one' file structure of **EmbroideryStudio**, digitizing and editing can be combined at any time during the digitizing process. You can therefore choose to digitize without stopping to insert machine functions. When finishing a larger part or even the whole design, you can then quickly browse through and insert the necessary functions. All machine functions can be inserted the old way – i.e. digitize, insert function, digitize, insert function – but you will find that, compared to the recommended method, this is much slower.

Function states in ES Schiffli

To correctly insert or delete functions appropriate to the stitching effect, you need to be aware of the machine state at the insertion point. ES Schiffli only checks commonly used functions. For example, it does not check for possible user errors such as inserting multiple Slow functions one after the other, or **not** inserting the required number of Fadenleiter functions.



Note When outputting designs to specific Schiffli file formats, however, ES Schiffli performs some checks, for example, to prevent functions like Stepp/Blatt being output in Plauen format when the needles are out.

Inserting common functions via the toolbar



Use Clear Function (Schiffli toolbar) to remove all functions at the current stitch position.

Insert commonly used machine functions manually via the **Schiffli** toolbar or by means of shortcut keys. The tools can be used for stitch-by-stitch digitizing and for placing fine-tuning functions after digitizing. They are often more convenient than changing object properties when editing 'imported stitches' type designs with unrecognized manual objects. See also [Machine function selection method summary](#).

To insert common functions via the toolbar

- 1 Travel to the position in the design where you want to insert the machine function.



Tip Use the **Stitch List** to view stitch position coordinates and function information – e.g. whether the stitch is a **Jump**. It also shows the length of every stitch in the design.

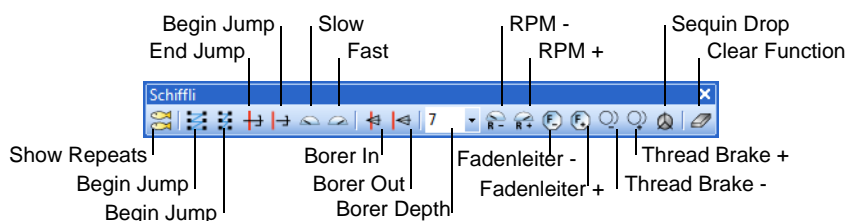
#	X	Y	L	Func
195	0.00	0.00	0.00	(empty)
196	0.00	0.00	0.00	(empty)
197	0.00	0.00	0.00	(empty)
198	0.00	0.00	0.00	Stop (empty)
199	0.00	0.00	0.00	(empty)
200	0.00	0.00	0.00	(empty)
201	0.00	0.00	0.00	(empty), jump
202	0.00	0.00	0.00	(empty), jump
203	0.00	0.00	0.00	(empty), jump
204	-1.000	1.74	2.43	
205	-1.000	1.74	2.43	
206	-1.000	1.74	2.43	

Additional empty jumps inserted before and after the selected function



Tip The **Stitch List** provides an alternative means for inserting machine functions manually. See [Inserting machine functions with Stitch List](#) for details.

- 2 Travel to the position in the design where you want to insert the machine function.



- 3 From the **Schiffli** toolbar, select the function you want to insert. See [Supported Schiffli machine functions](#) for details.
With some functions you can choose whether to insert on the current stitch or on an empty stitch.
- 4 To insert additional Empty Stitches or Jumps, use the **Empty Function** tool on the **Pointer** toolbar.
See [Adding empty stitches and empty jumps](#) in the **EmbroideryStudio** Onscreen Manual for details.
- 5 To clear a function, select it and click the **Clear Function** icon.

Inserting machine functions via the dialog

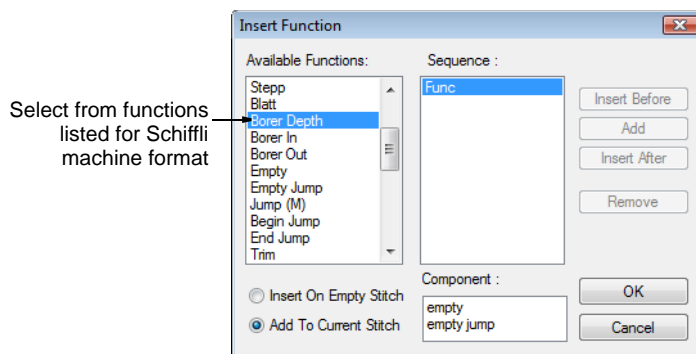
Insert machine functions manually via the **Insert Function** dialog. Depending on your machine's requirements, you will either add the function to the current stitch, or insert it on an empty stitch or empty jump. For some machines you will also need to add empty stitches or empty jumps on either side of some functions. See your machine manual for details.



Note For Schiffli work, you need to use the ES Schiffli template. This template sets the machine format to Schiffli and also turns off all the automatic connector settings. See [Setting up your Schiffli Machine](#) for details.

To insert machine functions via the dialog

- 1 Travel to the position in the design where you want to insert the machine function.
- 2 Select **Machine > Insert Function**.
The **Insert Function** dialog opens.





Tip It is faster to digitize individual jumps – Jump(M) – by right-clicking with the **Manual** input method selected. If you want the whole object to consist of jumps, deselect the **Penetrations** icon.

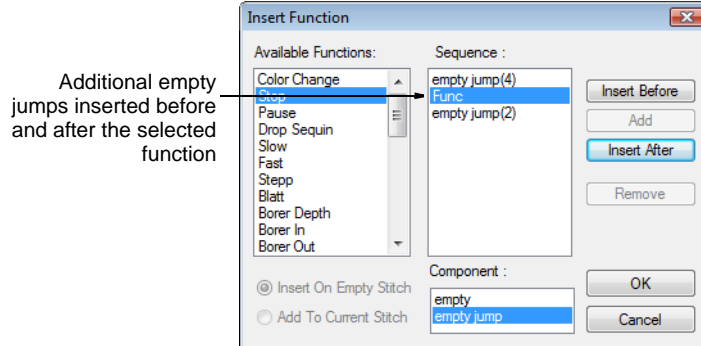
- 3 From the **Available Functions** list, select the function you want to insert.
With some functions you can choose whether to insert on the current stitch or on an empty stitch.
- 4 If available, choose the insertion method:

Function	Purpose
Insert on Empty Stitch	Inserts the selected function on an empty stitch.
Add to Current stitch	Inserts the selected function on the current stitch.

Depending on your machine, you may need to insert additional empty stitches or empty jumps before or after the selected function. For example, before a particular Stop function, you may want to insert a number of empty jumps. See your machine manual for details.

- 5 To insert additional empty stitches or empty jumps, select one or other in the **Component** field.
 - ◀ Select **Insert Before** if you want the empty stitch/jump to precede the selected function.
 - ◀ Select **Insert After** if you want the empty stitch/jump to follow the selected function.

To insert multiple empty stitches or jumps, click **Add**.



The selected function, together with any additional empty stitches or jumps, appears in the **Sequence** panel.

- 6 Click **OK**.

The selected function, together with any additional empty stitches or jumps, is added at the current needle position.

#	X	Y	L	Func
195	0.00	0.00	0.00	(empty)
196	0.00	0.00	0.00	(empty)
197	0.00	0.00	0.00	(empty)
198	0.00	0.00	0.00	Stop (empty)
199	0.00	0.00	0.00	(empty)
200	0.00	0.00	0.00	(empty)
201	0.00	0.00	0.00	(empty), jump
202	0.00	0.00	0.00	(empty), jump
203	0.00	0.00	0.00	(empty), jump
204	-1....	1.74	2.43	
205	-1....	1.74	2.43	
206	1....	1.74	2.43	

Additional empty jumps inserted before and after the selected function



Tip The Stitch List provides an alternative means for inserting machine functions manually. See [Inserting machine functions with Stitch List](#) for details.

Inserting machine functions with Stitch List



Use Stitch List (View toolbar) to insert machine functions directly into the stitching sequence.

You can use the Stitch List to access the **Insert Function** dialog. This provides a convenient means for inserting machine functions manually into the stitching sequence.

To insert machine functions with Stitch List






















- 1 Open the Stitch List.
- 2 Locate the position in the stitching sequence where you want to insert the machine function.
- 3 Right-click the stitch in the Stitch List and select **Insert Function** from the popup menu.
- 4 From the **Available Functions** list, select the function you want to insert.
See [Inserting machine functions via the dialog](#) for details.
- 5 Click **OK**.

The name of the inserted function appears in the Prompt line.

Machine function selection method summary







The table below summarizes the general functions that **ES Schiffli** supports together with the available selection methods.



Function	Hot Key	Toolbar	Menu	Tablet	Button
Stepp (normal tension)			Machine > Insert Function		1
Blatt (loose tension)			Machine > Insert Function		1
Jump (M)	Right-click in Manual mode		Machine > Insert Function		

Function	Hot Key	Toolbar	Menu	Tablet	Button
Borer In			Machine > Insert Function		1
Borer Out			Machine > Insert Function		4
Borer Depth			Machine > Insert Function		2
Stop			Machine > Insert Function		1
Begin Jump			Machine > Insert Function		4
End Jump			Machine > Insert Function		1
Fast			Machine > Insert Function		1
Slow			Machine > Insert Function		1
Empty Stitch			Machine > Insert Function		
Empty Jump			Machine > Insert Function		
Drop Sequin			Select Sequin, then right-click in Manual.	Drop Sequin	
Color Change			Machine > Insert Function		1
Trim (optional output)			Machine > Insert Function		

Machine-specific function selection method summary

Schiffli machine-specific functions have a direct mapping to the actual functions of the selected machine type, for example Fadenleiter. The table below summarizes the machine-specific functions that the **ES Schiffli** supports together with available selection methods.

Schiffli Function	Hot Key	Toolbar	Menu
Fadenleiter Plus			Machine > Insert Function
Fadenleiter Minus			Machine > Insert Function
Thread Brake Plus			Machine > Insert Function
Thread Brake Minus			Machine > Insert Function

Schiffli Function	Hot Key	Toolbar	Menu
Boring Tension Start/End	/ \		Machine > Insert Function
Pause			Machine > Insert Function
RPM Plus	:		Machine > Insert Function
RPM Minus	"		Machine > Insert Function
Stuepfel In/Out			Machine > Insert Function
Cord In/Out			Machine > Insert Function
Festoon In/Out			Machine > Insert Function

Modifying borer depth

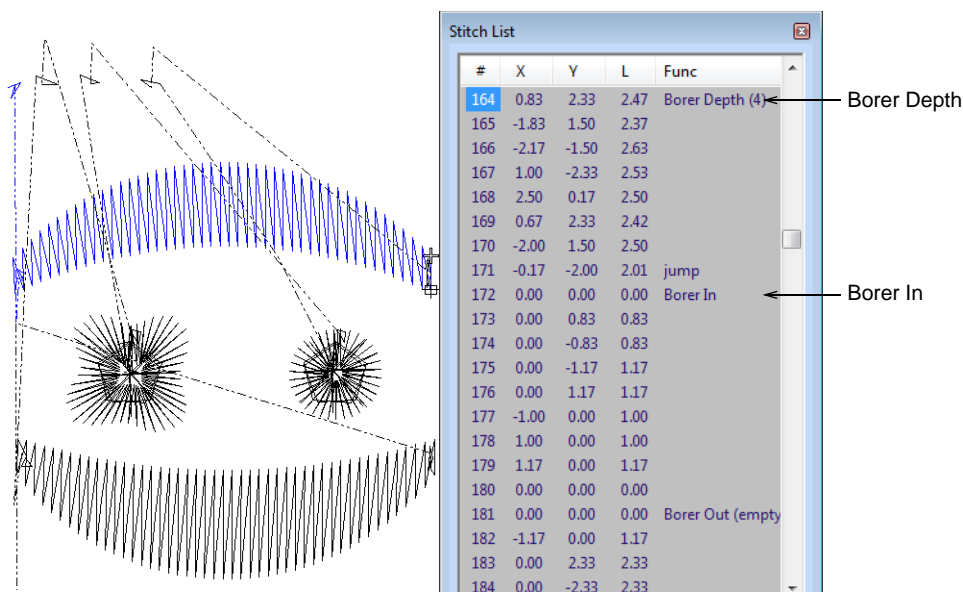
Borer depth is relevant only to designs digitized using ES Schiffli. The Borer Depth function is selected and defined as an absolute value. On the machine, the depth is changed by increments from the current position. The increments necessary to achieve the required borer depth are automatically calculated by ES Schiffli and distributed on stitches before the required point. Borer depth is specified slightly differently for Plauen (1-13) and Saurer (0-12). The default starting borer depth value is 6 for Saurer and 7 for Plauen machines. However, you can set the Schiffli borer depth numbering system as required. See [Setting borer depth numbering](#) for details.



Caution A zero value for Saurer cannot be entered. If you use this value, you will need to change the starting borer depth of the machine values.

Borer depth and Stitch List

The borer depth, like other functions, will appear in the Stitch List.



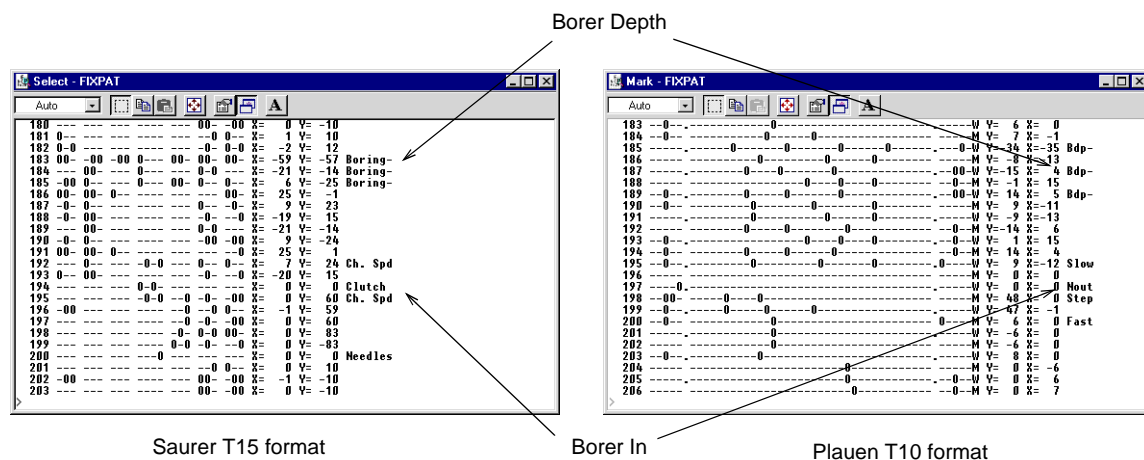
Logical vs physical borer depth

Remember, though, that what you see is the logical borer depth and not the physical Borer Minus and Borer Plus functions at the given stitch. These are

inserted by the program at final encoding. For example, Borer Depth (3) means that, as the previous Borer Depth was 6, ES Schiffli needs to insert three (3) 'Borer ...' functions in the stitch file. It is possible to use sequences of empty stitches with functions like borer depth, separated from each other only by these empty stitches. The logical functions in **EmbroideryStudio** are translated to the following physical functions in the Plauen (T10) and Saurer (T15) stitch files.

Logical Function	Physical Functions Plauen	Physical Functions Saurer
Borer In	<ul style="list-style-type: none"> • Slow • Needle Out • Frame Shift to move borer to the first borer hole • Borer In (Stepp) • Fast 	<ul style="list-style-type: none"> • Slow • Clutch • Fast • Frame shift to move borer to first borer hole • Borer/Needle Roller in
	<ul style="list-style-type: none"> • Slow • Borer Out (Stepp) • Frame shift to return to last stitch position • Needle In • Fast 	<ul style="list-style-type: none"> • Borer/Needle Roller Out • Slow • Frame shift to move back to last stitch position • Clutch • Fast

If you are concerned about the function sequence, you can check the software output in the Plauen or Saurer files using the FIXPAT utility. See [Editing stitches with FIXPAT](#) for details.



Tip Although **EmbroideryStudio** moves the borer depth codes further back in the stitching sequence, it is good practice to change borer depth a few stitches before or after Borer In/Out.

Adjusting borer depth

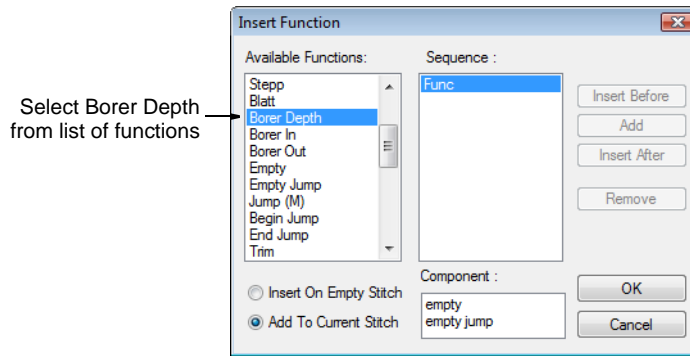
You can control borer depth by entering the specific depth value in **EmbroideryStudio**.

To adjust borer depth

- 1 Travel to the position in the design where you want to insert the machine function.

2 Select **Machine > Insert Function**.

The **Insert Function** dialog opens.

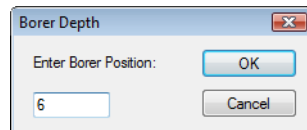


3 From the **Available Functions** list, select **Borer Depth**.

Choose whether to insert the function on the current stitch, or on an empty stitch. See [Inserting machine functions via the dialog](#) for details.

4 Click **OK**.

The **Borer Depth** dialog opens.



5 Enter the required absolute borer depth.

Absolute means the required borer depth, not a change of $\pm n$ increments. The value will be interpreted as 1-13 for Plauen and 0-12 for Saurer.

6 Click **OK**.



Tip Press the hot key **[;]** (semicolon) to open the **Borer Depth** dialog.

Adjusting borer depth with a digitizing tablet



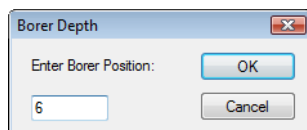
Click **Borer** icon on the Menu Chart with Button 2 to adjust borer depth.

You can control borer depth by entering the specific depth value with a digitizing tablet.

To adjust borer depth with a digitizing tablet

1 Click the **Borer** icon on the Menu Chart with Button 2.

The **Borer Depth** dialog opens.



2 Enter the required absolute borer depth and click **OK**.

Use the keyboard or menu chart keypad.



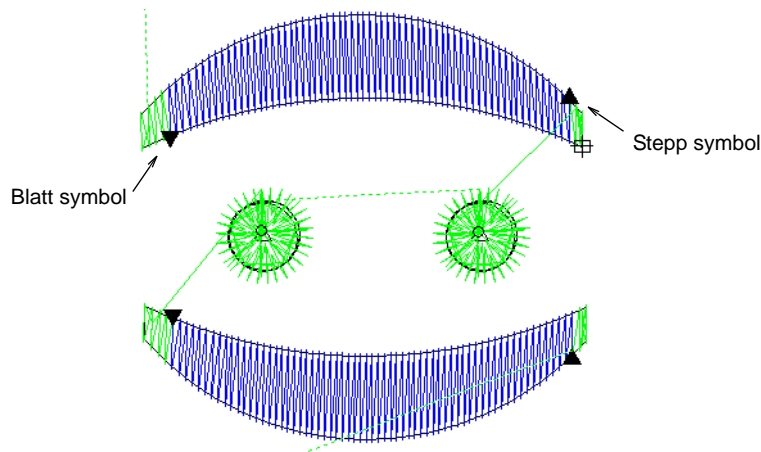
Note Different size borer symbols are displayed for different borer depths.

Displaying machine functions

The **View** menu includes a **View by Machine Functions** option. This option enables **Stepp/Blatt** and **Schiffli Needle In/Out**.

Displaying Stepp/Blatt functions

The old CED symbols are used in **EmbroideryStudio** for Stepp and Blatt functions so that they are easier to recognize. To distinguish them from the Trim symbol (a hollow triangle), the Stepp and Blatt triangles are solid black. In addition to function symbols, tension changes are highlighted by showing stitches in different colors.

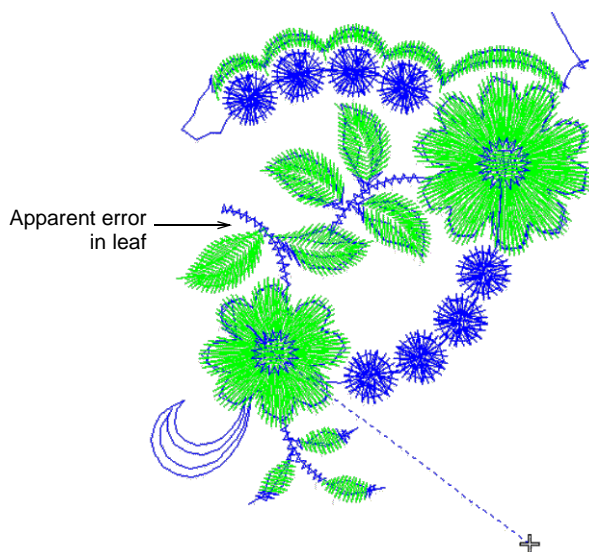


Each of these solutions has different advantages. The triangles can be printed on the worksheet, whereas the color coding of the stitches makes it easy to check and edit the design on the screen.

Checking for Stepp/Blatt digitizing errors

The Stepp/Blatt display helps you locate digitizing errors quickly. On standard machines, Stepp and Blatt are possible only with Penetrations On stitching, so

Penetrations Off stitches are shown as a dotted line. The sample design below, for example, appears to have an error in the leaf (left center).



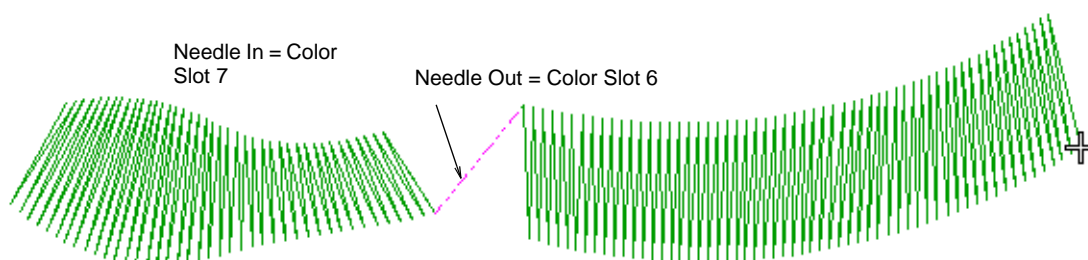
To check for Stepp/Blatt digitizing errors

- ◀ Press + to activate the Stepp/Blatt display.

To allow for fine tension display, Stepp (normal tension) is displayed in Color Slot 1 and Blatt (loose tension) in Color Slot 2.

Displaying Needle In/Out functions

Like Stepp and Blatt, the Schiffli Needle In/Out status is displayed in different colors, and uses a dashed line style.



Most Schiffli machines have no thread trimmers. So when needles are out, the thread is dragged across the fabric to the next penetration point.

Creating Schiffli split stitch effects

Schiffli designers (like Multihead ones) try to avoid long stitches. In Satin areas in particular, they use various 'split stitch' techniques and effects. Because Schiffli embroidery employs thicker yarn than Multihead, it is important that needle penetration points in the split are not too close together, not too visible, and not too close to the edge.

Stations software (SPES) includes several split stitch types specifically designed to address Schiffli style work. While the same stitch types are not explicitly defined in **EmbroideryStudio**, the examples below show you how to produce similar results. Using these techniques it is possible to satisfy most of the particular Schiffli style requirements.



Tip If you plan to reshape an object's boundaries, you may also want to reshape the **User Defined Split** lines. To allow this, you need to create the **User Defined Split** lines as drawing objects, separate from the embroidery object, then use **Make User Defined Split**. Then to edit them, select the drawing objects and re-shape them, and **Make User Defined Split** again.

Creating split stitch effects with Satin or Zigzag



Use Object Properties (View toolbar) to toggle the Object Properties dialog on/off. Use it to set properties for the current design.



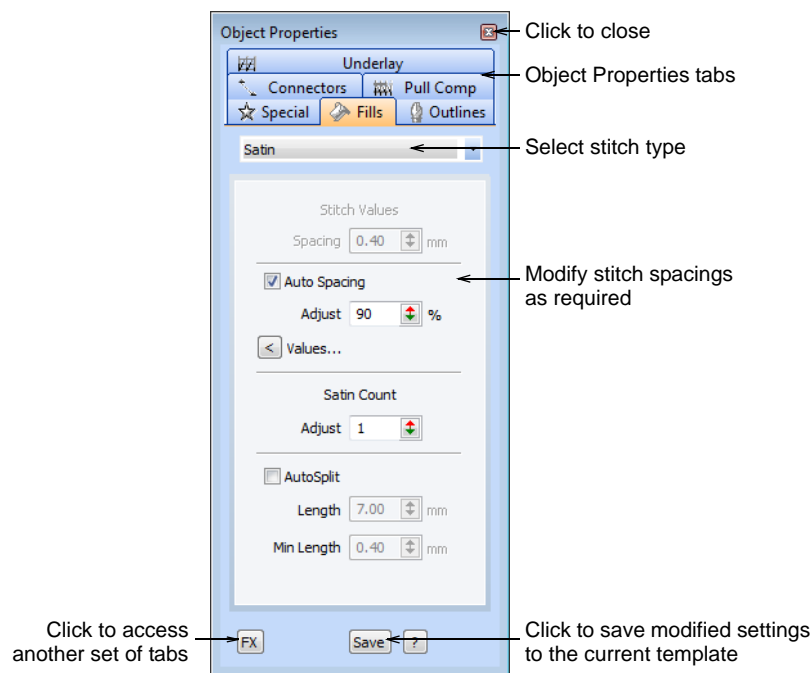
Use User Defined Split (Stitch Effects toolbar) to create your own split line effects. Right-click to adjust settings.

Certain Schiffli split stitch effects are possible using Satin and Zigzag stitch types.

To create split stitches with Satin or Zigzag

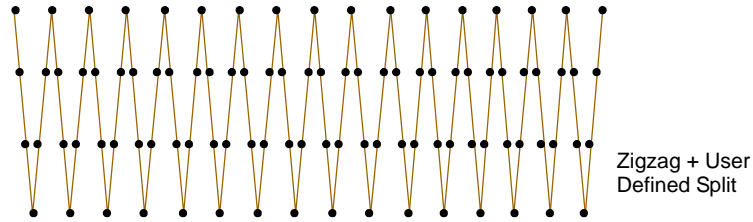
- 1 Click the **Object Properties** icon.

The **Object Properties** dialog opens.



- 2 Select **Satin** or **Zigzag** stitch type.
- 3 Select a stitch spacing of your choice and click **OK**.
- 4 Digitize the object you want.
- 5 Using the **User Defined Split** tool, digitize the exact split lines you want – one, two or multiple.

Refer to the **Textured Fills** chapter of the **EmbroideryStudio** Onscreen Manual for details.



- 6 To soften the split line effect, select the object and right-click the **User Defined Split** icon.

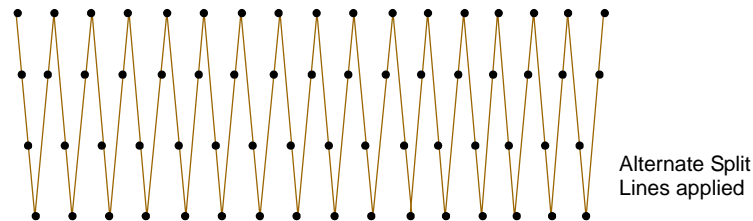
The **Object Properties > Decorative** dialog opens.



- 7 Select the **Split Alternate Stitch Lines** checkbox.

- 8 Press **Enter** or click **Apply**.

Split lines are softened.



Creating alternate Split Stitch and Geflecht Stitch effects



Use Object Properties (View toolbar) to toggle the Object Properties dialog on/off. Use it to set properties for the current design.



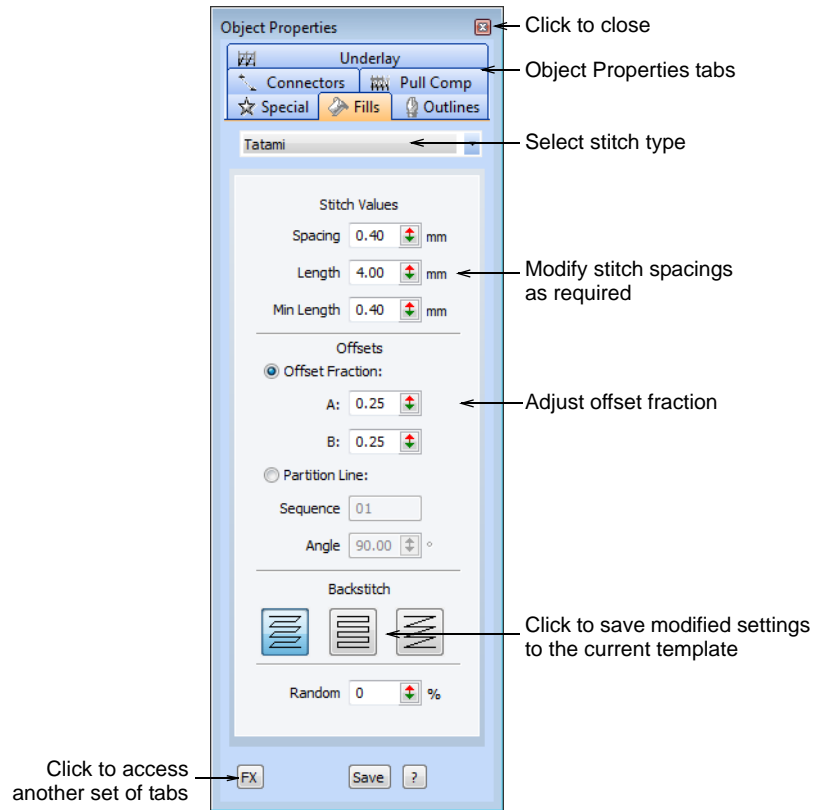
Use User Defined Split (Stitch Effects toolbar) to create your own split line effects. Right-click to adjust settings.

If you do not have the **Split Alternate Stitch Lines** option enabled, you can use Tatami and vary the parameters to achieve different alternate split stitch effects.

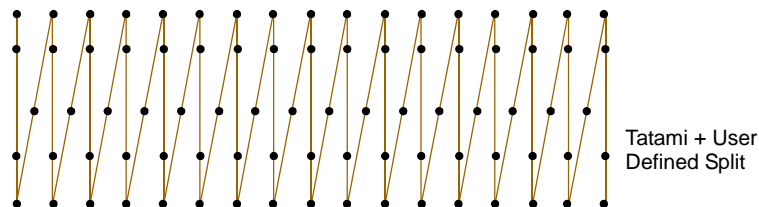
To create alternate split stitches with Tatami

- 1 Click the **Object Properties** icon.

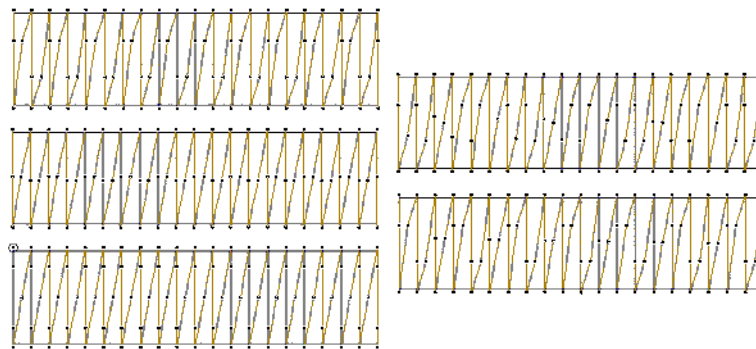
The **Object Properties** dialog opens.



- 2 Select **Tatami** stitch type.
- 3 Select a stitch spacing of your choice – e.g. 0.5.
- 4 Adjust the **Stitch Length** setting.
This needs to be a large value in the order of 10.0mm or so, depending on the width of the shape you are covering and the effect you want to achieve.
- 5 Adjust the **Minimum Stitch Length** setting.
This should be a larger value than normal to keep the needle penetrations away from the edge of the shape (e.g. 2.0 to 4.0mm).
- 6 Adjust the **Offset Fraction** (typically 0.5 for both A and B).
Try other values for other effects.
- 7 Using the **User Defined Split** tool, digitize the exact split lines you want – one, two or multiple.
Refer to the **Textured Fills** chapter of the **EmbroideryStudio** Onscreen Manual for details.



Variations of Double Split Alternate are shown below. Many more are possible.



Note These are only valid for shapes of relatively constant width.

Chapter 5

Reading and Outputting Designs in ES Schiffli

ES Schiffli makes a distinction between 'logical' and 'physical' machine functions. Logical functions are saved as 'object properties' in the native Wilcom **EMB** design file. This concept may be new to Schiffli designers who are used to working on a stitch-by-stitch basis.

EMB files can be output to a wide variety of Schiffli formats. When outputting the final machine code – e.g. for Plauen or Saurer type machines – ES Schiffli ensures that the physical functions occur on the right stitch and in the right phase (for Plauen), based on preset values (defaults). In other words, it generates the necessary physical functions by interpreting the logical functions. See also [Supported Schiffli file formats](#).



Note Users with sufficient experience can check the physical machine functions one-by-one in the final **stitch file**. By using the ES Schiffli FIXPAT utility, it is possible to check the stitching sequence and insert any unsupported functions. See [Checking stitches and machine functions on Jacquard cards](#) for details.

Reading and writing files in ES Schiffli

Schiffli designs in **EmbroideryStudio** can be opened, edited and saved in Wilcom **EMB** file format, as well as **ESS** and **ESL**, Wilcom's Schiffli **stitch file** formats. Designs can also be read and written in many other machine-specific formats. See [Supported Schiffli file formats](#) for details.



Note ESL is used for RCC designs only. ESS is the primary stitch file format for Wilcom-developed Schiffli servo control systems. When the ESS file is read directly by a Wilcom Electronic Servo System (WESS), high data resolution and stitch accuracy are possible.

Using ES Schiffli Disk Converter for certain formats

ES Schiffli requires certain default settings when reading Schiffli files or encoding designs to their final stitch file format. Most settings can be adjusted within **EmbroideryStudio**. If you need to use the ES Schiffli Disk Converter for certain formats, you can adjust default settings using the ES Schiffli DEFCED utility. See [Modifying Schiffli default settings](#) for details.



Note With the current version of ES Schiffli, the ES Schiffli Disk Converter is no longer used for saving T10, T15, DAT, or SAS files. These are all saved by **EmbroideryStudio**.

Stitch files

Stitch designs are generally not suited to scaling because stitches are not regenerated. However, **EmbroideryStudio** patented Stitch Processor technology can interpret object outlines, stitch types and spacing from stitch data with some success. In this way, you can re-constitute old tape format files and other stitch file format designs for modification in **EmbroideryStudio**. These 'recognized' designs can be scaled with stitches recalculated for the new outlines. Alternatively, object recognition can be applied to selected stitching after the design has been opened and edited.

Stitch processing generally is more effective for multihead stitch designs than Schiffli. With Schiffli designs, overall object recognition works best on emblem-style full-coverage stitching with minimal functions. Processing is normally used, however, on selected stitching, if at all. In short, it is better not to perform overall object recognition when opening Schiffli designs. This means deliberately turning it off prior to opening.



Tip Before proceeding, you are advised to read the [Processing Design Files](#) chapter in the **EmbroideryStudio** Onscreen Manual to become well acquainted with the handling of [stitch files](#) and [outline files](#) in **EmbroideryStudio**.

Recognition limitations

If a stitch type is not recognized accurately, the settings in the **Object Properties** dialog will not match the stitches. The stitches will remain the same as in the original design until you make changes and regenerate them. If you change the design, stitches will be regenerated according to the object properties. Designs converted from tape format files and expanded designs which have non-standard stitch types may require editing in **EmbroideryStudio** to ensure that the object outlines, stitch types, stitch density and colors are correct.



Note Stitch editing is affected by object recognition in two main ways: connector stitches cannot be edited except by moving the end points, and only manual stitch can preserve stitches edits after stitch generation from objects.

Opening Schiffli design files



Use Open (Standard toolbar) to open an existing design.

When you open Schiffli [stitch files](#), you can set decoding options to determine how to read the design. A set of **Standard** decoding options are the same for all formats. The **Conversion Details** decoding options are specific to the file type being opened – Plauen or Saurer. See also [ES Schiffli encoding and decoding settings](#).



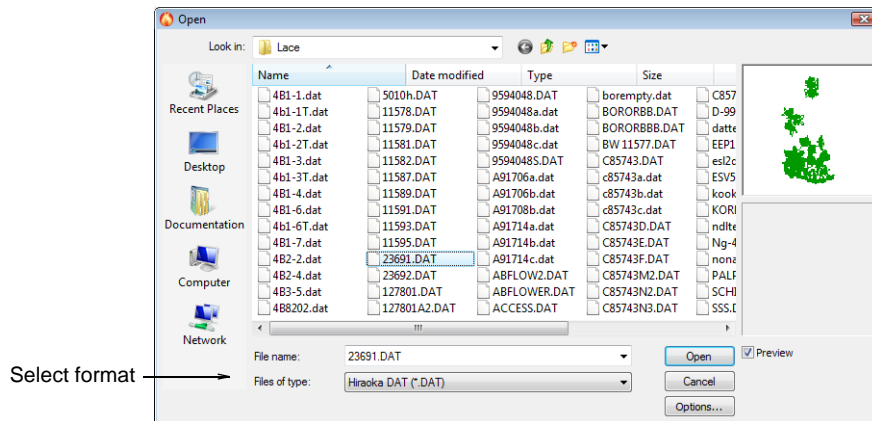
Note Opening RCC type designs in **EmbroideryStudio** is not covered here. See [Opening RCC and INC files](#) for details.



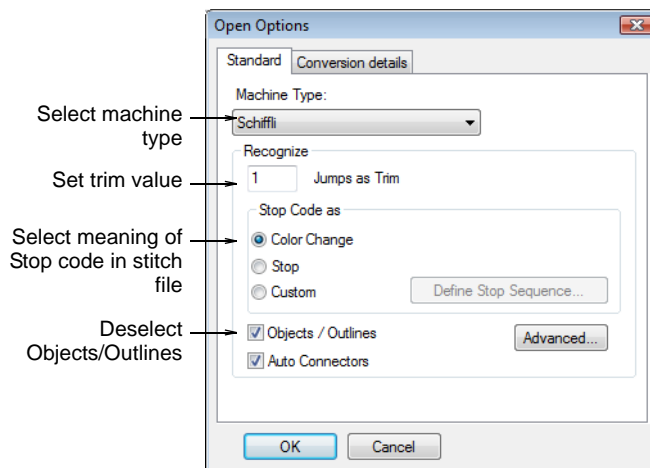
Tip Decoding options should reflect how the design was originally digitized, not how you want it now. Experiment with the settings to get the best results.

To open Schiffli design files

- 1 Open the file from your hard disk, or read it from tape or embroidery disk.



- 2 Select a Schiffli file format from the **Files of Type** list and select the file to open.
 - 3 Click **Options**.
- The **Open Options** dialog opens at the **Standard** tab.



- 4 Select Schiffli as the machine format from the **Machine Type** list if not already selected.

- 5 Enter the number of jumps to recognize as trims.

The specified number of consecutive jumps will be converted to a trim function.



Caution If this value is different from the original design, trim functions will be not be inserted correctly.

- 6 Use the **Stop Code** panel to define the meaning of stop codes in the original stitch file.

Function	Purpose
Color Change	Stop codes are interpreted as Next Color commands. The next color is selected from the default color palette.

Function	Purpose
Stops	Stop codes are interpreted as Explicit Stops. The machine stops stitching.
Custom	Lets you map thread colors to every stop code in the file. This means you can color code stitch file which do not contain needle addressing information before opening the file. See EmbroideryStudio Onscreen Manual for details.

7 Select or deselect the **Objects/Outlines** checkbox as required.

- ✦ Open **without** object/outline recognition for 'stitch editing' or 'block editing' of manual stitch objects. This is the default.
- ✦ Open **with** object/outline recognition for re-shaping, or stitch density or pull compensation adjustments of supported stitch types, particularly Satin and Run stitch. With this option, designs are more likely to be emblem than lace. If you select this option, the **Advanced** button becomes available. See **EmbroideryStudio Onscreen Manual** for details of object/outline recognition.

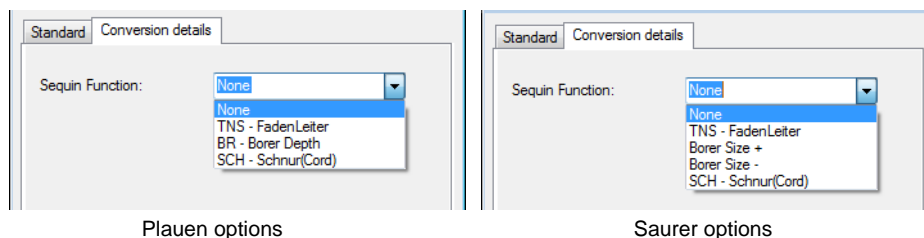


Tip For lace designs, Tatami recognition should be turned off in the advanced options. If only a few objects need to be reshaped, it may be better to recognize only selected stitches inside **EmbroideryStudio** after opening.

8 Select or deselect the **Automatic Connectors** checkbox as required.

- ✦ Deselect to open designs with connectors recognized as Manual objects. This avoids stitch editing problems caused by automatic connectors. This is recommended for lace designs.
- ✦ Select to open appropriate designs with automatic connectors **without** having to use object/outline recognition. This option is more applicable to emblem style designs than lace.

9 Select the **Conversion Details** tab for further machine-specific options.



10 Select the **Sequin Function** you require.

If the sequin function is set to something other than **None**, all instances of the selected physical function are converted to the ES Schiffli **Drop Sequin** function. See also **Other machine functions**.

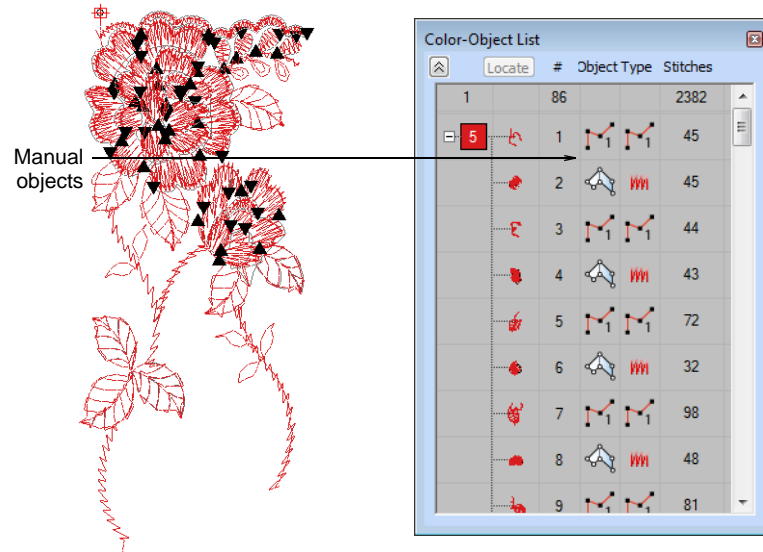


Tip In order to select the correct physical function, you have to know what function was used in the original design file to drive the sequin mechanism on the target machine. If you don't know, experiment with different settings until you get the right one.

11 Click **OK**.

12 Click **Open**.

If you use the default settings, the design opens as a collection of Manual objects with only general and connector properties.



Note ES Schiffli adds the missing information to the file but does not change the stitches. See also [Adjusting stitch density](#) in the **EmbroideryStudio** Onscreen Manual.

Outputting Schiffli design files

Your designs should always be saved in Wilcom **EMB** file format as this preserves all the design settings, including object properties. When you want to stitch it out, however, you need to output it to the appropriate **stitch file** as shown in the table. If a selected machine format does not support a particular function in the design – either automatically or manually inserted – it is simply ignored.

Machine	Output file format
Hiraoka	DAT
Plauen	T10
Saurer	T15
Saurer SLC	SAS
WESS	ESS
RCC	ESL



Note Outputting RCC type designs in **EmbroideryStudio** is not covered here. See [Outputting EMB files to RCC](#) for details.

Encoding options

When outputting **stitch files**, you need to adjust the encoding options for Schiffli format designs to stitch correctly on the target machine. Options vary with the selected file type – i.e. whether based on Plauen or Saurer formats. The default values are specific to the file type. See also [Customizing machine formats for specific designs](#).

The defaults are **not** suitable for all machines, particularly those with mechanical automats. In particular, the **Stitches for Auto Fast** field applies to Needles Out

or Jump stitches as well as needle or borer penetration stitches. If you want to automatically have jumps in a design performed at slow speed (together with small numbers of boring penetrations), you need to set the number of stitches to a value which is above the largest (expected) number of stitches for Schiffli design Jumps. In practical terms, this can be calculated as follows:

- ◄ Largest Jump Distance: 300mm
- ◄ Safe Jump Length: 6mm
- ◄ Number of Jump Stitches: 50

Thus, you need to set the **Stitches for Auto Fast** field to 50. If outputting to a Saurer machine, the **Auto Slow/Fast for Needles In/Out** option must also be selected. See the procedure below.



Note If you need to use the ES Schiffli Disk Converter for certain formats, you can adjust default settings using the ES Schiffli DEFCED utility. See [Modifying Schiffli default settings](#) for details.

Initializing machine starting status

ES Schiffli requires that when a new embroidery design is about to start stitching, the Schiffli machine will have a starting status and all the devices on the machine will be correspondingly set. ES Schiffli monitors and records any change in device status during the encoding process. Examples of starting statuses include:

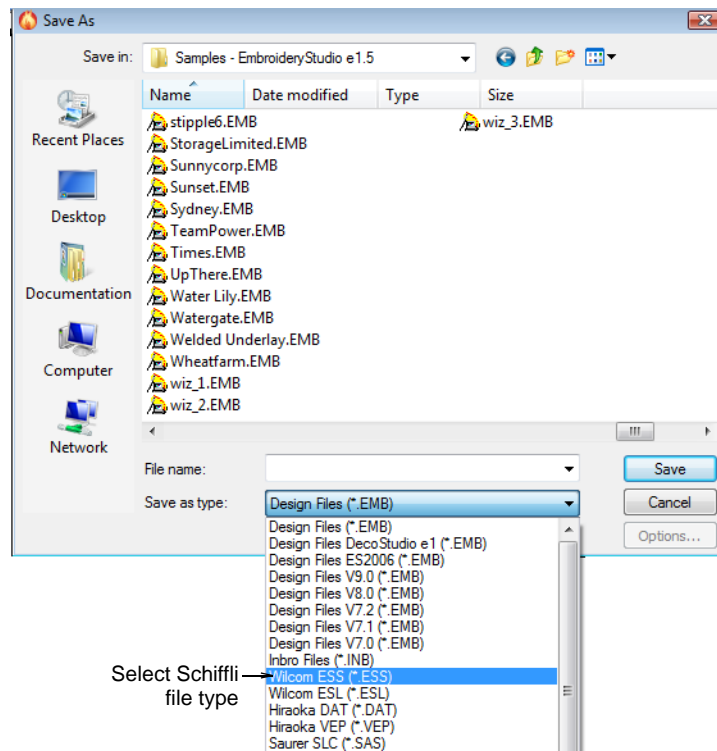
- ◄ Needles: Out
- ◄ Speed: Slow (or Fast for Saurer)
- ◄ Thread Tension: Stepp
- ◄ Borers: Out
- ◄ Borer Position: Middle (6 or 7, depending if Plauen or Saurer).

At the end of the design, ES Schiffli can restore the starting status of each device with the **Restore Function State Before Stop** setting. The setting is also necessary when parts of the design are repeated on the machine. For example, if the borer depth was left at +1 (8) at the Stop function that ends the B part of an ABC type design, then after each repeat of the B part, the borer depth would increment by 1 each time to 9, 10, etc. Furthermore, the controller of electro-mechanical Plauen Hiraoka machines requires that the DAT design state is restored at every Stop before the design is loaded for stitching. State restoration is optional for cases where designs are split into pieces and then punched onto several cards for mechanical machines.

To output Schiffli design files

- 1 Open the file from your hard disk, or read it from tape or embroidery disk and edit as required.
- 2 Select **File > Save As**.

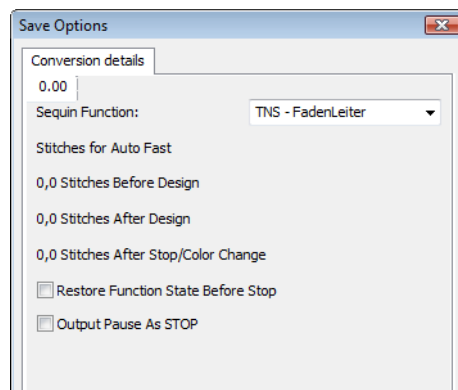
The **Save As** dialog opens.



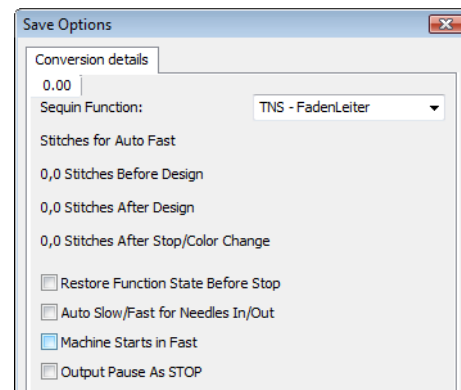
3 Select a Schiffli file type from the **Save as Type** list.

4 Click **Options**.

The **Save Options** dialog opens. The **Conversion Details** encoding options depend on the file type – Plauen or Saurer.



Plauen options



Saurer options

5 Select the **Sequin Function** you require if different from the default.

If the **Sequin Function** field is set to something other than **None**, all instances of the ES Schiffli **Drop Sequin** function are converted to that physical function. Otherwise, the function is ignored. See also **Other machine functions**.

6 Adjust stitch encoding as required:

Function	Purpose
Stitches for Auto Fast	This value determines the minimum number of consecutive stitches/borer penetrations/needle-out movements required before a speed change is possible. For example, if the value is 5 and there are 3 needle penetrations, they will all be done in slow speed. For Saurer designs, Auto Slow/Fast for Needles In/Out must also be enabled.
Empty Stitches Before Design	Usually non-zero for punched cards.
Empty Stitches After Design	Usually non-zero for punched cards.
Empty Stitches After Stop/Color Change	Usually non-zero for punched cards.



Tip Punched cards generally require a certain amount of blank space before and after the design in order to wind them onto the spool. 200 empty stitches translates to about 1 meter of card. You may also want to insert empty stitches after color changes for easy identification.

7 Select the **Restore Function State Before Stop** as required.

If enabled, all necessary functions are automatically inserted in the output file before the Stop code to return the machine to the same state it was at the start of the design.

8 Select **Auto Slow/Fast for Needles In/Out** as required.

This is only optional for Saurer designs. If enabled, a Slow function will be inserted before a needle change. The Fast function will be inserted according to the value set in the **Stitches for Auto Fast** field.

9 Select **Machine Starts in Fast** as required.

If enabled, ES Schiffli assumes that the machine is already running in fast speed at the design start. For Saurer format files, it is essential that this option be specified correctly or the speed change commands will be encoded back-to-front.

10 Select the **Output Pause as Stop** as required.

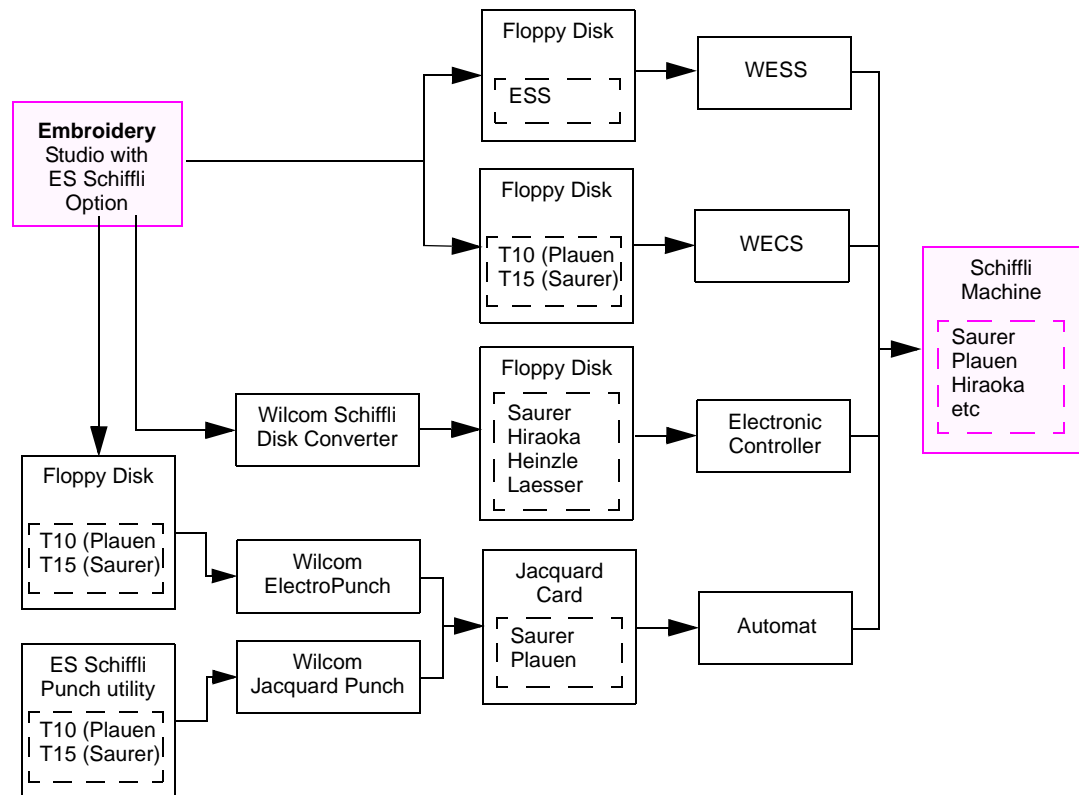
Encoding depends on the selected file type:

File Type	Description
T10	If enabled, Pause commands are output as normal Plauen Stop function, otherwise they are not output at all.
DAT	If enabled, Pause commands are output as DAT Stop function, otherwise they are output as DAT Pause function.
SAS	If enabled, Pause commands are output as a Stop(13), otherwise they are not output at all.
Other	If enabled, Pause commands are output as a generic Stop for T15 and others, otherwise they are not output at all.

11 Click **OK**.

Using Wilcom output devices and machine controllers

Once a design has been saved to the appropriate format, you can output it for stitching in a variety of ways as shown in the diagram below. See also [Format conversions summary](#).



Note The Wilcom Jacquard Punch and Wilcom ElectroPunch devices are no longer supported by Wilcom.

Using WESS to transfer designs to machine

WESS (Wilcom Electronic Servo System) replaces the Schiffli Automat and controls the frame movements directly by servo motors. It requires Wilcom **ESS**, Hiraoka DAT, Saurer SAS, T10 or T15 files on floppy disk as input and its method of operation is similar to WECS. See the Wilcom WESS Operator Manual for details.



Note ESS is the primary machine file format for Wilcom-developed Schiffli servo control systems. When the ESS file is read directly by WESS, high resolution and stitch accuracy is possible. If your machine uses a WESS controller, you need only output a single ESS file.

Using WECS to transfer designs to machine

WECS (Wilcom ElectroCard System) eliminates the need for Jacquard cards. WECS reads Wilcom **stitch files** T10 and T15 and runs the Schiffli Automat directly. You therefore only need to save the design as a stitch file to floppy disk. See the WECS Operator Manual for details.

Using ElectroPunch to punch a Schiffli card

Wilcom ElectroPunch takes T10 or T15 files as input. You need to copy these files to a floppy disk or directly via **File > Save As** to floppy disk. See the Wilcom ElectroCard/ElectroPunch User Manual for details.

Using ES Schiffli Punch utility to punch to Wilcom Jacquard Punch

The ES Schiffli Punch utility for Windows sends a T10 or T15 tape file from your PC to a Wilcom Jacquard Punch, the predecessor of the ElectroPunch. See [Punching stitch files to Wilcom Jacquard Punch](#) for details.

Outputting designs to production worksheet

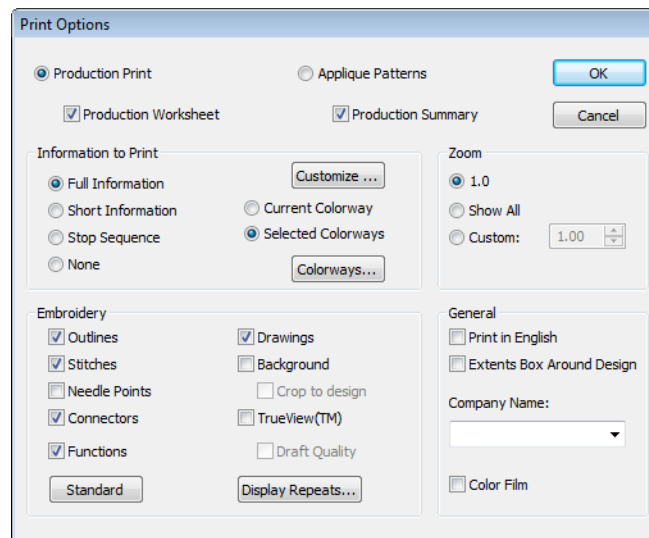
You may also want to output your design to a production worksheet. See [Printing a Schiffli production worksheet](#) for details.

Printing a Schiffli production worksheet

Printing a Schiffli production worksheet is similar to printing one for Multihead work. The only difference with Schiffli designs is that you can show several repeats in both horizontal and vertical directions. See also [Printing production worksheets with station information](#).

To print a Schiffli production worksheet

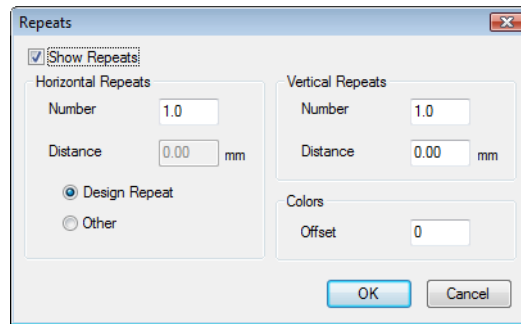
- 1 Select **File > Print** or press **Ctrl + P**.
The **Print** dialog opens.
- 2 Click **Options**.
The **Print Options** dialog opens.



The **Print Options** dialog differs for Schiffli only with the inclusion of a **Display Repeats** button.

- 3 Select to display pattern arrangements if required.
- 4 In the **Embroidery** panel, click **Display Repeats**.

The **Repeats** dialog opens.



- 5 Select the **Show Repeats** checkbox and select from the available options. See [Working with design repeats](#) for details.
- 6 Click **OK**.

Chapter 6

Working with RCC Designs

ES Schiffli resolves three crucial issues for Schiffli digitizers working with **RCC** type designs:

- ✦ Inserting commands in the right place for needle changes.
- ✦ Moving the frame sideways under the new active needles automatically.
- ✦ Displaying design colors where they will be on the fabric and not where they are relative to the frame – i.e. 1, 2, 3 etc, French inches apart.

ES Schiffli takes care of station changes and frame movements. Furthermore, for designs created in **EmbroideryStudio**, the position of each color is correct.

RCC is available on both Plauen and Saurer machines. Hiraoka, Saurer Pentamat and Laesser have the more advanced Individual Needle Control (INC). For both RCC and INC, a needle pattern is known as a 'station' – i.e. a pattern of needles, either regular as in RCC, or irregular as in INC.



Note INC type machines can handle the standard repeat stations used by RCC machines. ES Schiffli allows you to define RCC type stations only and it supports only Saurer Pentamat INC type designs.

RCC stations

The original Schiffli machines lacked automation in two areas:

- ✦ changing design repeats – i.e. changing the distance between the active needles, and
- ✦ changing thread colors – i.e. maintaining the distance but changing the active needles.

Technically both issues meant changing the active needle groups in some way. In the main, this has meant by hand. The key problems with changing manually are:

- ✦ downtime (loss of production) on the machine, and
- ✦ labour cost of doing the needle changes one-by-one.

Thus multicolored designs are expensive to produce because operators need to manually trim the threads and re-thread the needles. For this reason, many Schiffli designs still use a single color.

Schiffli automatic color change machine types

Over time two solutions were developed, first RCC then INC (Individual Needle Control).

RCC color change control

Repeat Color Change (RCC) is a mechanism available on some Plauen and Saurer type machines to push a group of needles – every needle, every 2nd, every 3rd, every 4th, etc – forward or backward. Each pattern is called a 'station'. Individual stations exist for each combination – 4/4, 8/4-1, 8/4-2,

12/4-1, 12/4-2, 12/4-3, etc. Non-Hiraoka RCC Schiffli machines are usually capable of accessing 10-12 different needle patterns by using a physical 'template' on the machine. An example explains this:

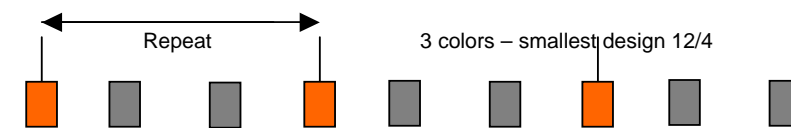
Station	Design repeat	Needles Working	Needles in Use
1	4/4	all	all
2	8/4-1	every second	1,3,5, etc
3	8/4-2	every second	2,4,6, etc
4	12/4-1	every third	1,4,7, etc
5	12/4-2	every third	2,5,8, etc
6	12/4-3	every third	3,6,9, etc
7	16/4-1	every fourth	1,5,9, etc
8	16/4-2	every fourth	2,6,10, etc
9	16/4-3	every fourth	3,7,11, etc
10	16/4-4	every fourth	4,8,12, etc

As the example shows, a station defines two things:

- ◀ the repeat pattern
- ◀ the active needle.

The limitation of RCC stations is that most solutions allow only a limited number (10-12) of combinations in one design. Replacing the whole RCC mechanism with another 10 combinations is also time-consuming and causes downtime. Some machines have fixed sets which cannot be replaced in any case. Therefore users are limited to a given set of design sizes and number of colors.

Color variation is given by the design width. For example, generally speaking a 12/4 design repeat can have three differently colored (threaded) needles as shown in the diagram.

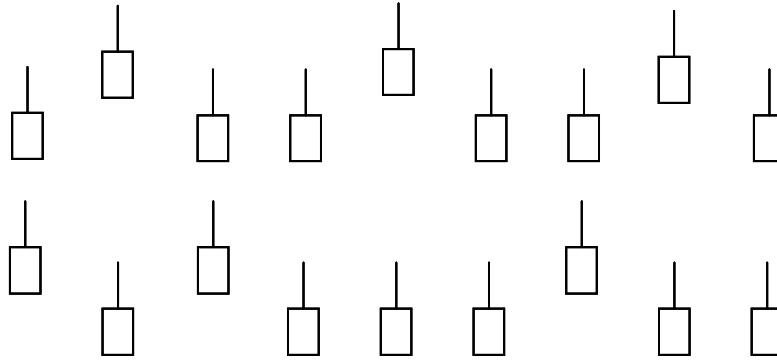


Tip There is a special Schiffli embroiderer's technique which involves 'borrowing' a color from the next design repeat in order to employ more colors. This technique is supported in **EmbroideryStudio**.

INC color change control

Individual Needle Control (INC) was a mechanism originally developed for Saurer Pentamat machines whereby each needle position across the whole machine could be activated or de-activated individually, either under program or manual control. Hiraoka and Laesser have developed their own implementations of individual needle control, sometimes called Single Needle Control (SNC). INC

type machines can handle user-defined stations with any number of needles each of which may be in or out.



Individual needle control in Pentamat machines was originally promoted as the ability to activate and de-activate multiple needle sets inside the one design – e.g. to make tablecloths and the like. But the real benefit of INC type machines has proved to be the ease with which you can change from one standard design repeat, e.g. 8/4, to another standard repeat, e.g. 12/4. This greatly increases the flexibility for factory production scheduling among machines. A second significant benefit of INC has been the ease it offers in creating RCC type multicolored designs.

In effect, RCC is a subset of INC. In fact, typical use of INC is similar to RCC. You select the repeat – e.g. 12/4 – and the active needle – e.g. #2. Non-typical use is in a non-cyclic pattern – e.g. select needles 1,3,7,30, etc. Unlike RCC type machines, however, INC is not limited to 10-12 templates. INC type machines can have pre-programmed RCC style stations from 4/4 up to 96/4. This means there is no limit to the number of design repeats in the same design.

RCC machine types

Currently there are effectively three types of machine in the field:

- ◀ purely mechanical machines requiring manual needle changes and re-threading
- ◀ mechanical machines with an RCC mechanism added
- ◀ electronic machines with Pentamat-style individual needle control.



Note Whether handling RCC or INC type designs, **EmbroideryStudio** assumes that the design repeat is the same for the whole design – i.e. the colors may change as 12/4 Needle 1, 12/4 Needle 3, etc, but the design repeat remains 12/4 in the whole design. In other words, it assumes that INC type designs will also conform to an RCC style.

Instructing the machine to change repeat/needles

The Schiffli machine function set is traditionally programmed into punched cards. These cards were designed a hundred years ago at which time the developers did not foresee RCC and INC. Therefore the code set did not contain any of these commands.

For mechanical machines reading Jacquards, manufacturers had two choices:

- ◀ Insert a Stop function in the design where they wanted to change needles. The operator then set the new combination/needle pattern manually.

- ◀ Borrow an existing command, such as the Cord function, and use it to control the needle changes.

For electronic controllers it was easy – introduce a new electronic format with extended capabilities.

Assigning color sequence to RCC and INC stations

With ES Schiffli you can nominate each Stop and Color Change and assign them to a station number. The program then works out the necessary codes to select the appropriate station number.

Encoding station numbers

RCC machines can only access each station in a cyclic manner, for example:

- ◀ from Station 1 go to Station 2, 3, 4, 5 to reach Station 6
- ◀ from Station 9 go to Station 10, 1, 2, 3 to reach Station 4.

ES Schiffli supports encoding of this functionality.



Note With RCC machines, usually only the needles change automatically while the Borer is installed in one design repeat only.

RCC templates

Different machine manufacturers make different templates. In this sense, a 'template' means a proprietary definition of station numbers and repeat patterns as shown by the table below.

Design repeat	Needle	Zangs (T11) Station	Comerio (T13) Station	Saurer RCC (T18) Station
4/4	1	0	1	5
8/4	1	1	2	6
8/4	2	2	3	7
12/4	1	3	4	8
12/4	2	4	5	9
12/4	3	5	6	10
16/4	1	6	7	1
16/4	2	7	8	2
16/4	3	8	9	3
16/4	4	9	10	4

Hiraoka supports design repeats 4/4 through 16/4 with addition of 24/4 and 48/4. Pentamat machines support any design repeat up to 96/4. ES Schiffli provides easy and validated selection of the design repeats available in the standard templates.



Note It is possible to make special user-defined templates for Schiffli machines. User-defined templates are currently not supported by ES Schiffli.

Digitizing RCC designs

Designing for **RCC** is not much different to normal Schiffli digitizing. However, you need to set the design repeat to the largest used in the design. To visualize which needle is stitching at a particular point in the design, you should use only as many colors as there are needles in the design repeat. To change the design repeat without changing needles – e.g. 8/4 ndl 1 to 16/4 ndl 1 – you should insert a Stop function. See also [Digitizing an RCC design in EmbroideryStudio](#).



Note If you are working with an older machine without thread trimming, you still need to consider the basic rules of tacking the thread before and after color changes.

Handling frame movements

When the Schiffli machine selects another needle, the frame does not move automatically under it. This can either be done manually during digitizing or left to be calculated by ES Schiffli itself. The software is capable of calculating the automatic frame movements in a similar way to Borer offset. For instance, to change from 12/4-1 to 12/4-2 means a horizontal frame movement by a positive 27.07mm. This is usually broken down into several Needles Out movements of around 7mm.

Displaying RCC patterns

From the digitizer's point of view, changing colors for RCC is the same as for Multihead machines. However, displaying RCC **stitch files** using the FIXPAT Show Design function will display a design shift on-screen. This is because the frame movement looks to the software like a jump movement to the right. The next color will thus be displayed 27.07mm to the right of the previous color. This is only a visual limitation. **EmbroideryStudio** will output the colors correctly on the production worksheet with a station label configured by the user.

Changing design repeats within the same design

In most Schiffli designs, the design borders are usually in 4/4, changing to 8/4, 12/4 or 16/4 for the main body of the design. Another border may then be made in 4/4, upside down. Explicit design repeat changes in the design are not supported in **EmbroideryStudio**. Currently the design can have only one design repeat value which is saved with the design. You can, however, output a Stop or a Color Change which you can then assign to any of the stations using the ES Schiffli Disk Converter. See [Converting EMB to RCC file format](#) for details.

Supported RCC/INC conversions

Converting EMB files to RCC/INC stitch files is a three-stage process:

- ✦ Output design in **EmbroideryStudio** to ESL file format.
- ✦ Convert ESL file to an intermediary code in Tnn format with the ES Schiffli Disk Converter.
- ✦ Convert the Tnn format to final code with the Converter.

See [Outputting EMB files to RCC](#) for details.

Converting RCC/INC stitch files to EMB format is a three-stage process:

- ✦ Convert the native RCC/INC file to a Tnn format with the Converter.
- ✦ Rename RCC or INC Tnn stitch files as T10 (Plauen) or T15 (Saurer) respectively.
- ✦ Open the design in **EmbroideryStudio**.

See [Opening RCC and INC files](#) for details.

Use the ES Schiffli Disk Converter to convert to the following formats. All formats, except for PAT, can be converted in both directions.

Machine	Disk Format	File Format	Convert From
Hiraoka	Hiraoka	DAT	T12
Zangs	Heinzle	EAS	T11*
Zangs	Saurer SLC	PLS †	T11
Hiraoka	Saurer SLC	PLS †	T12
Comerio	Saurer SLC	PLS †	T13
Plauen Pentamat	Saurer SLC	PLS †	T22
Saurer	Saurer SLC	SAS †	T18
Saurer Pentamat	Saurer SLC	SAS †	T20
Saurer Pentamat	Saurer NWD	NWD	T20
Saurer Pentamat	Saurer SHC	PAT	T20
* You must rename T11 to T10 before conversion. † When converting to Wilcom Tnn format, the corresponding Tnn format is automatically selected.			

Opening RCC and INC files

Schiffli [stitch files](#) made by other programs can be opened in **EmbroideryStudio** but with some limitations. When opening a stitch file, you can set decoding options to determine how to convert the design. Options vary with the type of stitch file you select.

Decoding limitations

While RCC and INC designs may be opened for editing, they need to be carefully checked before outputting again. Limitations include:

- ◀ When reading RCC/INC stitch files made by other programs, **EmbroideryStudio** does not recognize the frame movements as part of the color change. In both **EmbroideryStudio** and FIXPAT, designs (except for T12 Wilcom Plauen - RCC Hiraoka format) will be displayed with colors 'shifted' according to their needle position. These frame shifts need to be manually removed by selecting the color and moving it via object properties.
- ◀ Borer information may change incorrectly when stitches are moved. You should remove all sections with boring when editing and re-do them.



Tip Decoding options should reflect how the design was originally digitized, not how you want it now. Experiment with the settings to get the best results.

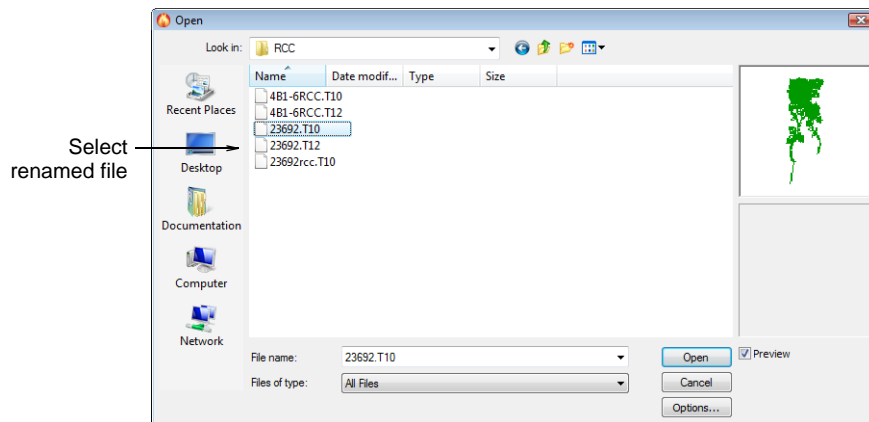
To open an RCC file in **EmbroideryStudio**

- 1 Rename RCC or INC Tnn stitch files as T10 (Plauen) or T15 (Saurer) respectively.
 - ◀ If you have a Wilcom Plauen format Tnn file – T11, T12, T13, T22 – rename it as T10.
 - ◀ If you have a Wilcom Saurer format Tnn file – T18, T20 – rename it as T15. See also [Supported Schiffli file formats](#).



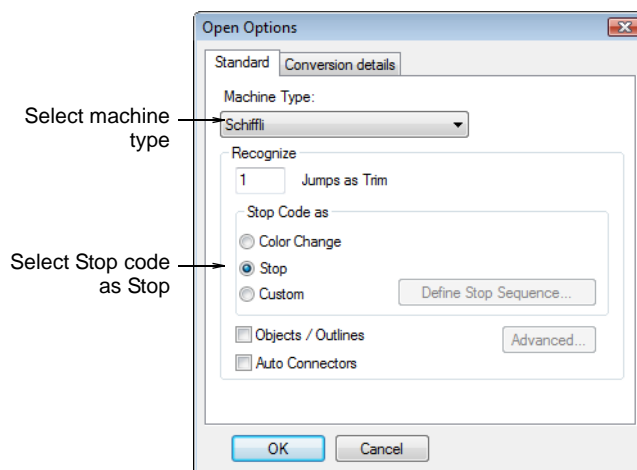
Tip If you have a native Plauen or Saurer format file – e.g. PLS, NWD – you first have to convert to Tnn format via the ES Schiffli Disk Converter. See [Converting designs with the Schiffli Disk Converter](#) for details.

2 Select File > Open.



3 Select the renamed file and click Options.

The **Open Options** dialog opens at the **Standard** tab.



4 Select Schiffli as the machine format from the Machine Type list if not already selected.

5 Accept the default setting for trim recognition.

6 Select Stop Code as Stop.

Stop codes are interpreted as **Explicit Stops**. The machine stops stitching.

7 Select or deselect the Objects/Outlines and Automatic Connectors checkboxes as required.

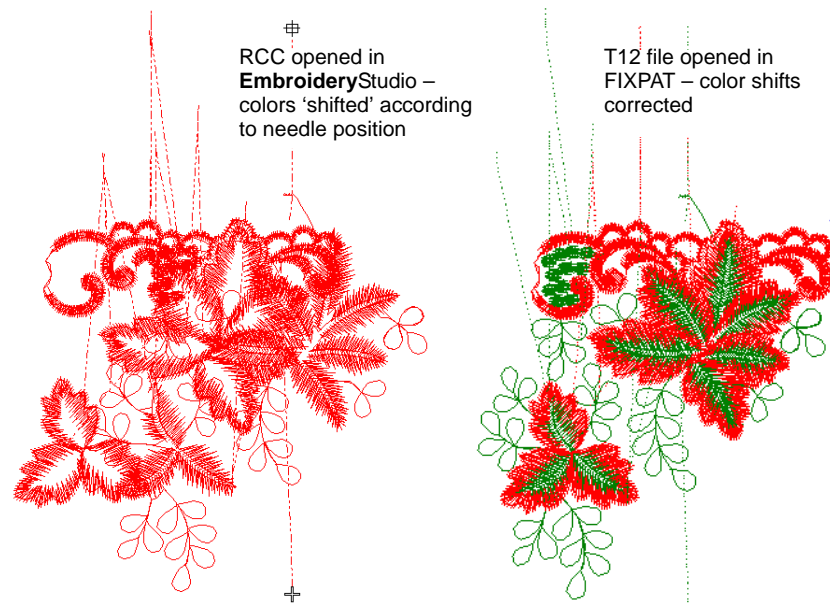
See [Opening Schiffli design files](#) for details.

8 Select the Conversion Details tab for further machine-specific options.

9 Make sure the Sequin Function is set to None.

10 Click OK then Open.

The design opens but frame movements are not recognized as part of the color change.



Tip FIXPAT can be used to view T12 (Wilcom Plauen - RCC Hiraoka) format with color shifts corrected. See [Displaying design repeats \(Plauen Hiraoka RCC\)](#) for details.

Outputting EMB files to RCC

EMB files can be converted to RCC [stitch files](#) by means of the ES Schiffli Disk Converter. The Converter allows you to:

- ◀ Select RCC or INC file formats as output
- ◀ Code for standard templates
- ◀ Select individual colors in the design to be converted to RCC or INC, and
- ◀ Assign a template number (tape code) and specific station number on the given template.

The ES Schiffli Disk Converter takes an ESL file, together with your additional input, and matches the Stop/Color Change logical functions to the user-defined RCC and INC repeat/needles definitions.

Encoding defaults

When outputting a design, the encoding process uses default values which can affect the resulting stitch file. You can use the DEFCED program to edit these settings. Important areas where DEFCED can be used include:

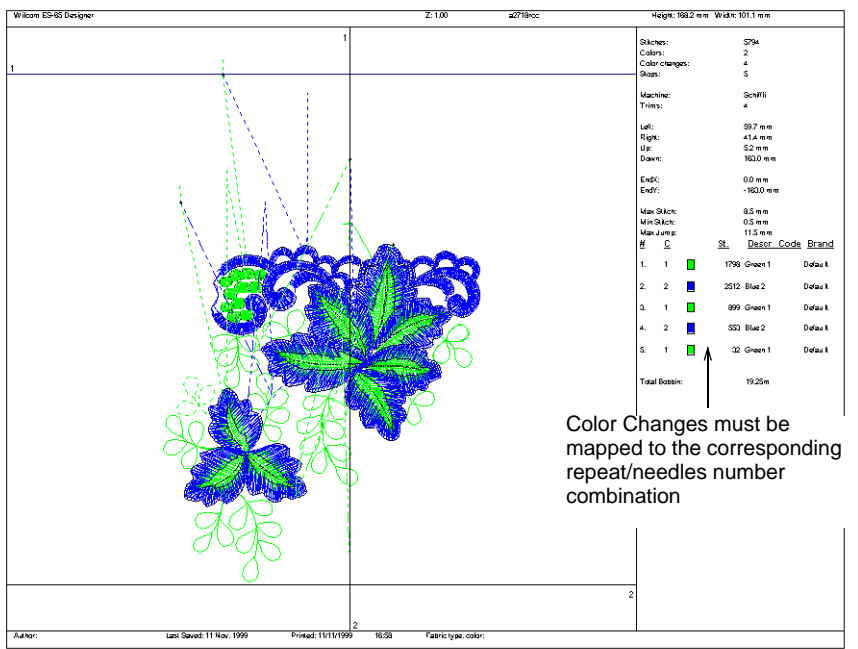
- ◀ Plauen RCC specific values (for Hiraoka, Zangs and Comerio)
- ◀ Saurer RCC/INC specific values.

See [Modifying Schiffli default settings](#) for details.


Mapping stitch blocks to repeat/needles numbers

In order for the ES Schiffli Disk Converter to match the Stop/Color Change logical functions of the [ESL](#) file to the user-defined RCC and INC repeat/needles definitions, you have to provide repeat/needles number input to the Converter. The **Define Color/Stop Sequence** dialog lets you create a Color Sequence

Table by mapping individual Color Change/Stop terminated stitch blocks in the ESL design to the corresponding repeat/needles number combination to be encoded for the particular RCC and INC format.



Converting EMB to RCC file format



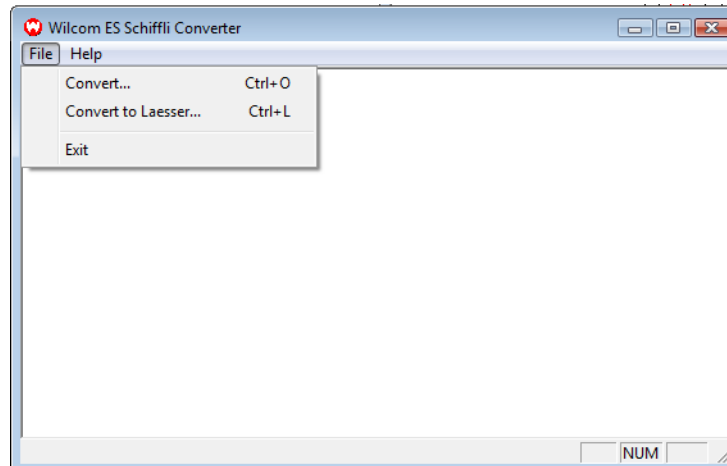
Use the Schiffli Disk Converter (Windows desktop) to convert an EMB file to RCC stitch file format.

The ES Schiffli Disk Converter program can be used to convert an EMB file to RCC stitch file format.

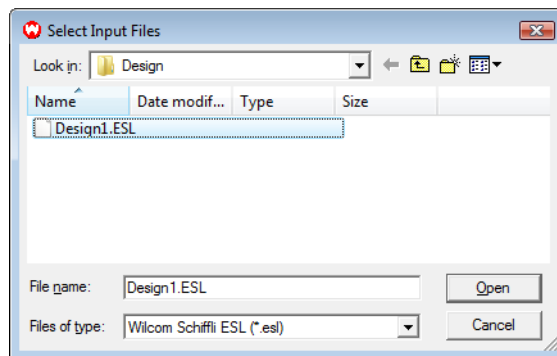
To convert EMB to RCC file format

- 1 From within **EmbroideryStudio**, use **File > Save As** to save your design in ESL format.
The ESL is a temporary file used to create the final RCC output.

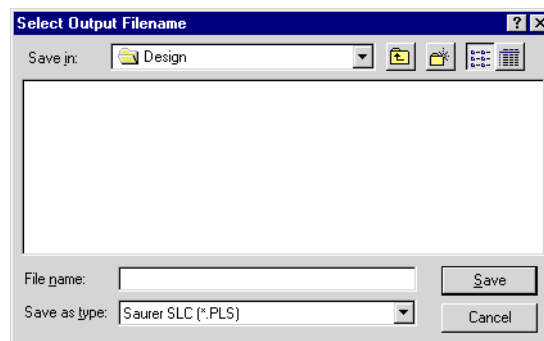
- 2 Double-click the **Schiffli Disk Converter** icon on the Windows Desktop.



- 3 Choose **Convert** from the **File** menu.
You are prompted to select the location of the 'input' file to convert.



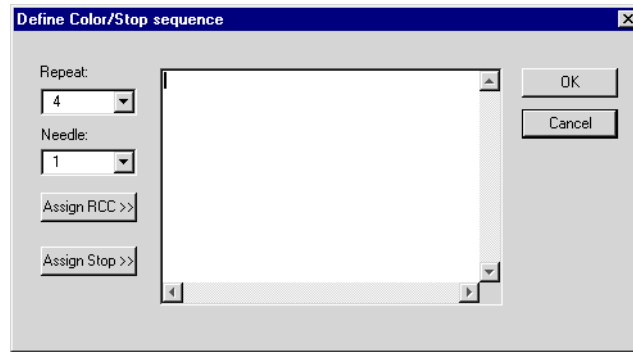
- 4 Choose ESL file type and select the file you want to convert.
You are then prompted to select the name, location and type of the output file.



Note When you first open this dialog, Windows may default to the **My Documents** folder. You have to select the **C:\design** folder or the one where you keep your Schiffli designs.

- 5 Select an RCC or INC file format as output.

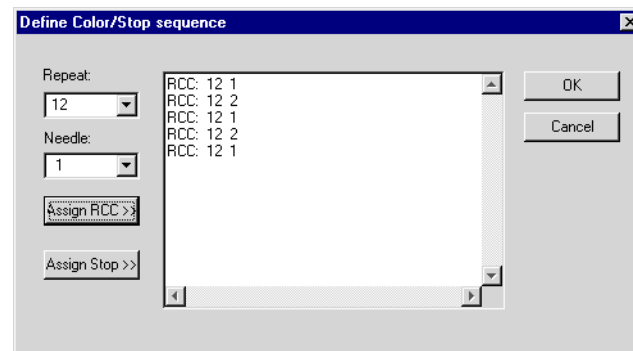
The **Define Color/Stop Sequence** dialog opens.



- 6 Map the individual Color Change/Stop terminated stitch blocks in the design to the corresponding repeat/needles number combination to be encoded for the particular RCC and INC format.



Note For this operation, you need to know the color changes in your design and the equivalent RCC stations.



The Color/Stop Sequence table is a list of repeat/needles combinations or Stops. It is up to you, using a production worksheet or multiple windows, to provide the input stitch block information. For example, to encode color 12/4, 1st needle, enter **12** in the **Repeat** field, **1** in the **Needle** field, and click **Assign RCC**.



Note A Rpt/Ndl combination must be the first entry in the table as the conversion process uses it as the reference needle for frame shifts.

- 7 Click **OK**.

The ESL input file is converted to the RCC or INC file format you have chosen as output. You can check the output file using the FIXPAT utility. See [Checking stitches and machine functions on Jacquard cards](#) for details.

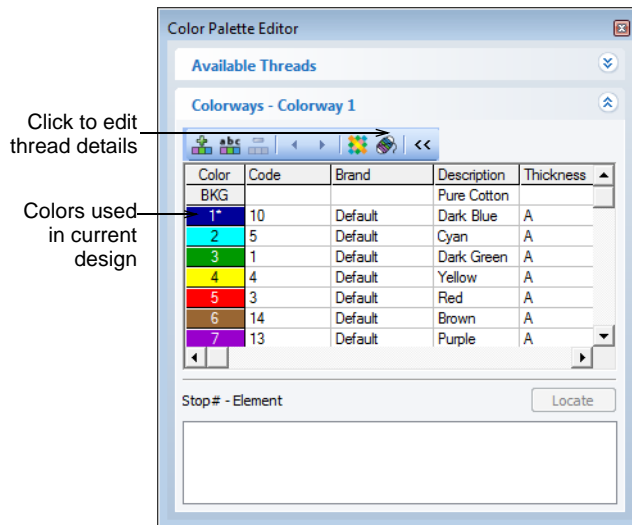
Printing production worksheets with station information

There is no specific field for RCC information. However, you can utilize the **Code** field in the **Edit Thread** dialog to record and print the station information.

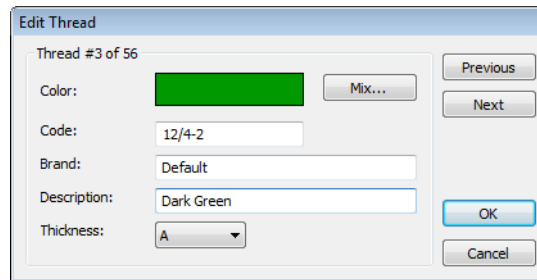
To print a production worksheet with station information

- 1 Click the **Color Palette Editor** icon.

The **Color Palette Editor** dialog opens.



- 2 Select a thread and click **Edit Thread**.
The **Edit Thread** dialog opens.



- 3 In the **Code** field, type the station information you require.
For example, you might enter **Station 5**. Alternatively, **12/4-2** may be more flexible as it is independent of the particular embroidery machine setup. This information is stored with the design. By using this field, the thread information – brand and color code of thread – can also be printed and preserved in the EMB file.

Digitizing an RCC design in EmbroideryStudio

The following shows a worked example for digitizing an RCC design in **EmbroideryStudio**.



Note In **EmbroideryStudio** you have to select a new color on the palette for every color change.

To digitize an RCC design in EmbroideryStudio

- 1 Set up the color chart so that you have the correct thread type and colors on the color palette.
If the thread is not supported, make sure you set the correct colors.
- 2 Click the starting color – e.g. Col1 – digitize your objects.

- 3 Before the next color change, tack the thread safely above the design – usually two manual stitches – to avoid over stitching the hanging thread of the unused color.

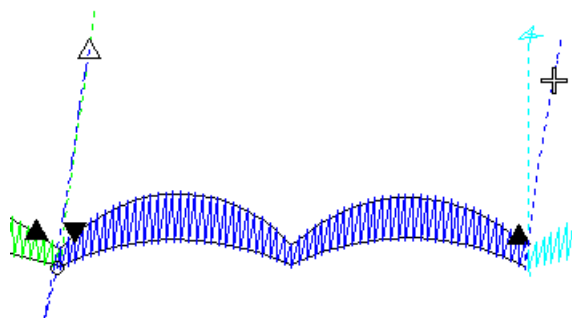
The following sample uses **Show Repeat On (8/4)** repeat.



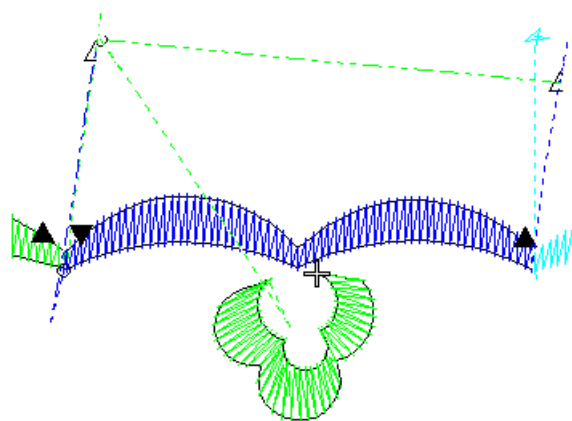
- 4 Select the second color – e.g. Col2.

This may be anywhere on the palette, but for clarity it is better to choose the second color.

- 5 Digitize your objects in this color and tack in the end.



- 6 Select the third color, or return to the first color as required, and digitize your objects.

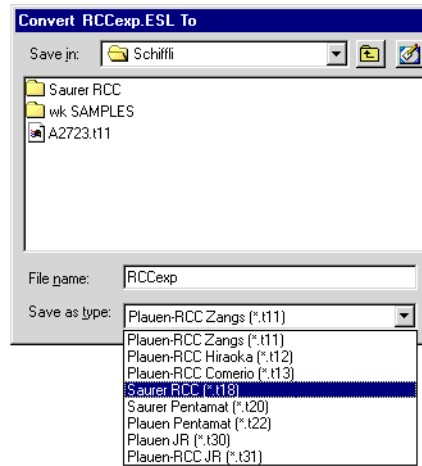


- 7 When finished, check the design and save as ESL.

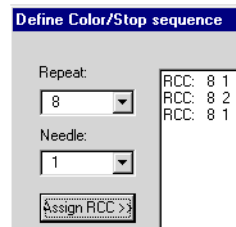
- 8 Open the ES Schiffli Disk Converter.

- 9 Select **File > Convert** and select the ESL file.

10 Convert the design to Saurer RCC.



The sample design has two colors but three color blocks – 8/4 first needle, then 8/4 second needle, and back to the first needle.



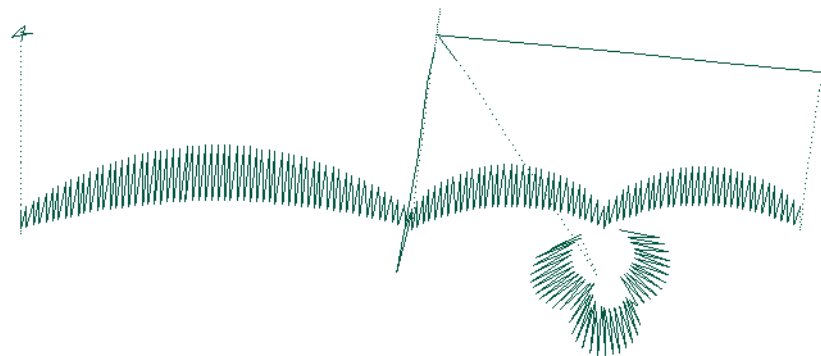
11 Save the T18 file.

This is a Wilcom Saurer RCC tape format which can then be converted to Saurer disk format.

12 If you want to check the RCC file, view it in FIXPAT.

The easiest way to open the file is to drag and drop it from Windows Explorer onto the FIXPAT icon on your Desktop.

13 View the design by pressing [S].



Note FIXPAT has a limitation – it cannot show the RCC design in different colors.

14 To convert to SAS, open the T18 file and convert to Saurer SLC (SAS) file format.

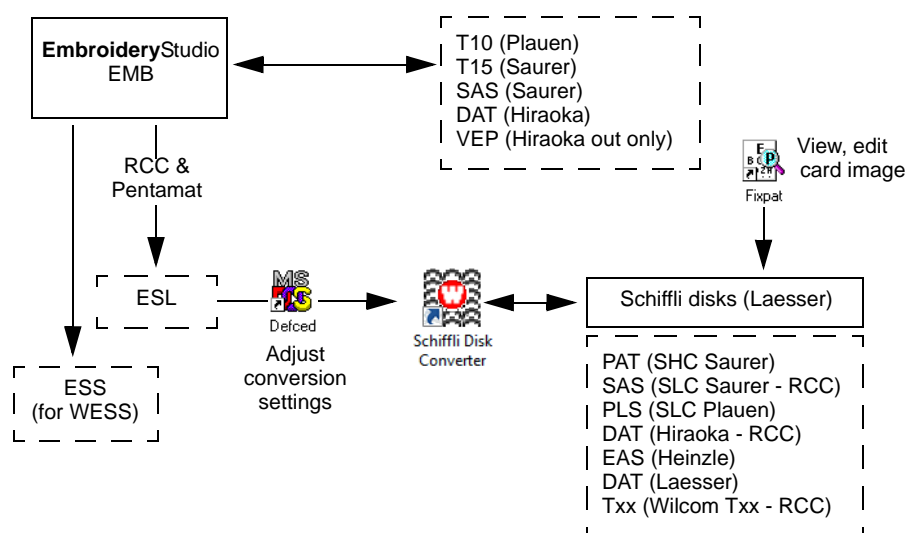
Appendix A

ES Schiffli Utility Programs

ES Schiffli e2.0 provides a number of external utility programs which can be used to modify, convert, or punch designs, especially those in older tape formats. Specifically these utilities are used to:

- ◀ Check stitches and machine functions on Jacquard cards:
The ES Schiffli FIXPAT (Fix Pattern) utility is used for safety-checking designs and can be useful as a fast editor for known problem patterns as well as direct function editing. The program also provides search capabilities to find and change machine functions or insert new ones.
- ◀ Convert designs to new Schiffli machines formats:
The ES Schiffli Disk Converter is used to convert older designs to and from the formats required for newer Schiffli machines. Some formats, notably RCC, cannot be directly converted in **EmbroideryStudio**, but can be converted using the ES Schiffli Disk Converter.
- ◀ Modify Schiffli default values:
Occasionally you may need to customize the Schiffli default settings according to your own requirements, notably when converting to RCC format using the ES Schiffli Disk Converter. The default settings are stored on your local hard drive and you can use the ES Schiffli DEFCEd utility to change them.
- ◀ Punch stitch files to Wilcom Jacquard Punch:
The ES Schiffli Punch utility for Windows sends a **stitch file** from your PC to a Wilcom Jacquard Punch (the predecessor of the ElectroPunch).

How the Schiffli utilities work



Checking stitches and machine functions on Jacquard cards

Experienced Schiffli digitizers can read the Plauen or Saurer type Jacquard cards and even make modifications to the card. The ES Schiffli FIXPAT utility which

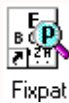
comes with ES Schiffli provides the same functionality. It is a conventional Schiffli editing program which displays the **stitch file** in the Jacquard card format as the punched holes would appear. Some stitches, such as borer-offset compensation stitches, can only be edited or viewed in FIXPAT. Use FIXPAT to edit designs such as those with extensions T10 to T39. See **Supported Schiffli file formats** for details.



Note Most RCC and INC (Individual Needle Control) designs are shown 'shifted' on screen.

In ES Schiffli only the stitches and borer cuts are displayed, not the frame movements. Thus boring is always generic with the borer offset added outside ES Schiffli. You can only edit/view the borer-offset compensation stitches in FIXPAT.

Editing stitches with FIXPAT



Use FIXPAT (Windows desktop) to check and edit known problem patterns.

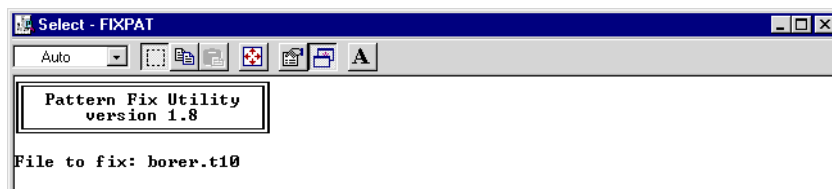
You can use the ES Schiffli FIXPAT utility as a fast editor for known problem patterns in Schiffli **stitch files**.



Caution The loading of Schiffli stitch files is mainly for checking of **EmbroideryStudio**-created designs, not for editing designs created on other systems.

To edit stitches with FIXPAT

- 1 Double-click the **FIXPAT** icon on the Windows desktop.



FIXPAT prompts you for the file name of the file you want to edit. This must be 8 characters or less.



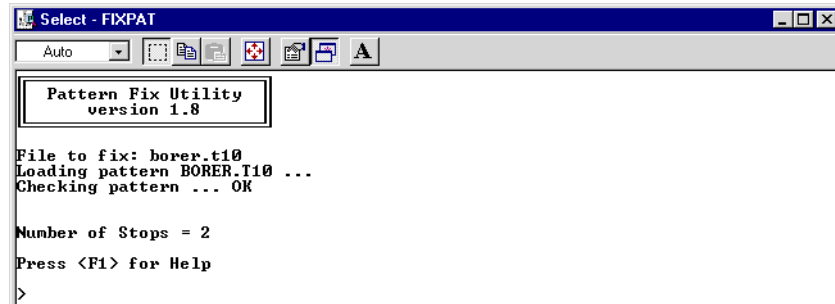
Note The program assumes that the file is located in the **C:\design** folder.

- 2 Type the name of the design together with the file extension.



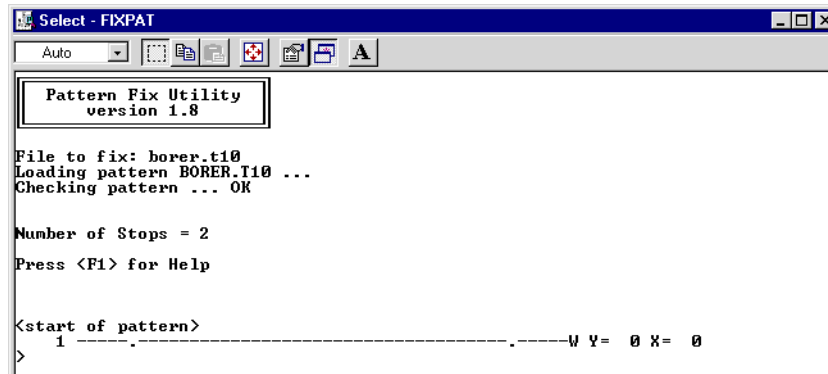
Tip An alternative way to load the file into FIXPAT is to use Windows drag and drop functionality by 'dragging' the file from Explorer and 'dropping' it onto the FIXPAT desktop icon.

If the loaded pattern has no illegal data, the following message will be displayed.



If the program finds any bad pattern data, you will be prompted to clear it.

3 Press

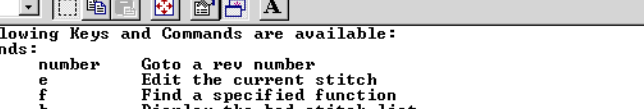


The pattern is now displayed as on a Schiffli card. For each stitch, the display shows:

- ◀ the stitch (or rev) number
- ◀ the hole pattern for that stitch
- ◀ an M/W phase indicator (Plauen)
- ◀ the X,Y coordinates of the stitch
- ◀ any function on the stitch (two can be shown for Plauen).

If the sequence of stitches on the card display is broken, a blank line is displayed between the stitches to indicate that they are not consecutive. Bad data on a stitch is highlighted.

- 4 Press **F1** to bring up the complete command listing.



The screenshot shows the 'Mark - FIXPAT' application window. The title bar includes the application name and standard window controls. The menu bar contains 'Auto' and several icons. The main text area is divided into two sections: 'Commands' and 'Keys'. The 'Commands' section lists 11 commands with their descriptions. The 'Keys' section lists 12 key shortcuts with their descriptions. The window is styled with a classic Windows 3.11 aesthetic.

Commands:	
number	Goto a rev number
e	Edit the current stitch
f	Find a specified function
b	Display the bad stitch list
r	Repair pattern
p	Display the pattern name
s number	Show stitches, number=number of repeats
n	Thread/Frame display toggle

Keys:	
<Enter>	Display current rev
<I>	Display next rev
<J>	Display previous rev
<PgDn>	Display next page
<PgUp>	Display previous page
<Home>	Goto start of pattern
<End>	Goto end of pattern
<+>	Search forwards for next function
<->	Search backwards for next function
<Shift +>	Search forwards for next STOP
<Shift ->	Search backwards for next STOP
<Alt X>	Exit and Save
<Alt Q>	Quit

All options listed under **Commands** must be followed by . The options under **Keys** are invoked by pressing the required key.

- 5 To go to a particular stitch in the pattern, type the rev number at the prompt and press .

```
>100      <Alt Q>   Quit  
100 ---0- ---0- ---0- ---0- ---0- ---M Y= 34 X= 3  
>
```

- 6** To edit the current stitch, type **E** at the prompt and press .

```
Editing:
23 --0--.------0-----0-----0-----0-----.-0-W Y= 32 X= 65
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
```



Note If the stitch contains bad data you will be prompted to fix it. Type **Y** at the prompt and press to fix any bad stitches.

- 7** To change **X**, for example, press **(X)** and you will be prompted to enter a new value.

```
Editing:
100--0-0-----0-----0-----0-----0-----M Y= 34 X= 3
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
New X:
```

- 8** Enter the new **X** data – e.g. 10 – and press Enter ↵

The display will reflect the changed value.

```
Editing:
100--0-----0-----0-----0-----0-----0-----M Y= 34 X= 3
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
New X: 10

Editing:
100--0-----0-----0-----0-----0-----0-----M Y= 34 X= 10
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
```

- 9** If you change your mind, press **Esc** to abort the edit.

```
Editing:
100--0-----0-----0-----0-----0---M Y= 34 X= 10
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
Edit Aborted
>
```



Note Changing **Y** data is similar to changing **X** data. You can continue to change the **X**, **Y** data in any order in the same way described.

Inserting and deleting functions on a stitch

As well as stitch editing, You can use FIXPAT for direct function editing. See also [To edit stitches with FIXPAT](#).

To insert and delete functions on a stitch

- 1 While in edit mode, press **I**.

```
Editing:
23 --0--0-----0-----0-----0-----0-----0--W Y= 32 X= 65
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
Inserting function:
1> Nout
2> Slow
3> Bdp-
4> Tns-
5> Cin
6> StfI
7> Blat
8> STOP
<Esc> to escape
Enter the Number:
```

A function list is displayed and the program waits for your selection. You can escape from changing the function data by pressing **[Esc]** at any time.

- 2 Type the item number of the function you want to insert and press **[Enter]**.

```
Enter the Number: 2
Editing:
23 --0--0-----0-----0-----0-----0-----0--W Y= 32 X= 65 Slow
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
```

The display will reflect the change.

- 3 To delete a function, press **[D]** and the function list will display.

```
Editing:
23 --0--0-----0-----0-----0-----0-----0--W Y= 32 X= 65 Slow
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
Deleting function:
1> Nout
2> Slow
3> Bdp-
4> Tns-
5> Cin
6> StfI
7> Blat
8> STOP
<Esc> to escape
Enter the Number:
```

- 4 Type the item number of the function you want to delete and press **[Enter]**.

```
Enter the Number: 2
Editing:
23 --0--0-----0-----0-----0-----0-----0--W Y= 32 X= 65
<Esc>=abort,<F10>=accept,<X>=change X,<Y>=change Y,<I>=insert fn,<D>=delete fn
```

The display will reflect the change.



Note You can continue to change the function data in any order in the same way described.

- 5 When the new data is correct, press **[F10]** to accept the changes and return to the prompt.

Pressing **[Esc]** will abort any changes.

Finding functions

You can use FIXPAT to find specified machine functions. See also [To edit stitches with FIXPAT](#).

To find a function

- 1 Type **F** at the prompt and press Enter↵.

```
>f
Functions:
 1> Nout/Nin
 2> Slow/Fast
 3> Bdp-/Bdp+
 4> Tns-/Tns+
 5> Cin/Cout
 6> Stf1/Stf0
 7> Blat/Step
 8> STOP
<Enter> repeat last search
<Esc> to escape
Enter the Number:
```

The search starts from the current rev and proceeds to the end of the pattern.



Tip To search the whole pattern, use the Home key to go to the start of the pattern before using the **F** command.

- 2 Type the number of the function you are looking for and press Enter↵.

```
Enter the Number: 2
32 -----0-----0-----0-----0-0--M Y=-24 X= 2 Fast
>
```

If the function is found, the rev will be displayed. Otherwise the message 'Function not found' will appear.

- 3 To repeat a search, type **F** at the prompt and press Enter↵.

Checking for bad stitches

If bad data was found and repaired when loading the pattern, you can list the rev numbers that were updated. See also [To edit stitches with FIXPAT](#).

To check for bad stitches

- 1 Type **B** at the prompt and press Enter↵.

```
>b
Bad Stitch List:
      No errors found
>
```

The table summarizes the error conditions you may encounter and the actions the software will take to rectify them.

File type	Error	Condition	Action
Saurer (T15)	Nop function	Four hole function present	function replaced with blank
	Series X1	Three hole in X1 series	three holes replaced with blank
	Series X2	Three hole in X2 series	three holes replaced with blank
	Series X3	Three hole in X3 series	three holes replaced with blank

File type	Error	Condition	Action
	Series Y1	Three hole in Y1 series	three holes replaced with blank
	Series Y2	Three hole in Y2 series	three holes replaced with blank
	Series Y3	Three hole in Y3 series	three holes replaced with blank
Plauen (T10, T12)	Illegal X	Illegal BCD X data in stitch file	X data cleared
	Illegal Y	Illegal BCD Y data in stitch file	Y data cleared

Repairing stitch patterns

Bad data may be cleared manually with the **Repair Pattern** command. See also [To edit stitches with FIXPAT](#).

To repair stitch patterns

- 1 Type **R** at the prompt and press .

```
>R
Checking pattern ... OK
>
```

- 2 If bad data is present, you will be prompted to clear it. Type **Y** at the prompt and press .
- 3 If you want to leave it so that it may be examined later in detail, type **N** at the prompt and press .

The message 'Bad data present' will appear.

Displaying pattern names

The name of the pattern you have loaded can be displayed with the **Display Pattern Name** command. See also [To edit stitches with FIXPAT](#).

To display the pattern name

- 1 Type **P** at the prompt and press .

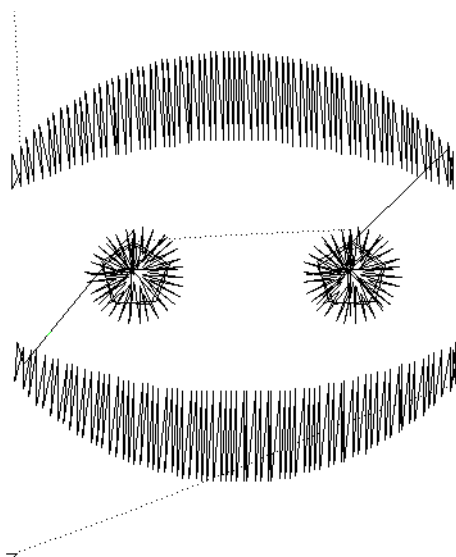
```
>P
Pattern: BORER.T10
>
```

Showing stitches

You can use FIXPAT to repair faulty stitch patterns. The **Show Stitches** command displays the pattern and lets you locate shift errors. See also [To edit stitches with FIXPAT](#).

To show stitches

- 1 Type **S** at the prompt and press .



Displaying design repeats (not Plauen Hiraoka RCC)

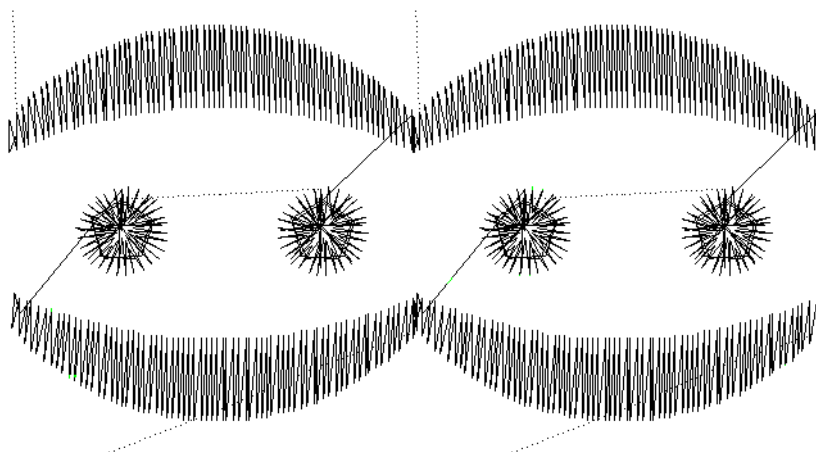
You can use FIXPAT to display multiple repeats. This procedure works for all except Plauen Hiraoka RCC formats. See also [To edit stitches with FIXPAT](#).

To display design repeats (not Plauen Hiraoka RCC)

- 1 To display more than one repeat of a pattern, type a number after the **S** command and press .
- The number entered becomes the default number of repeats.



- 2 If the design repeats itself, for example, every second needle, enter the repeat as **8** and press .





Tip The number in the square brackets [4/4] is the last value that was entered for the repeat. To re-use the last value entered, press without typing a number.

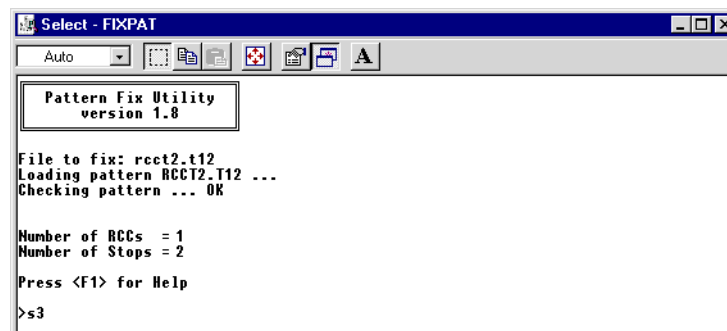
Displaying design repeats (Plauen Hiraoka RCC)

You can use FIXPAT to display multiple repeats. This procedure works for Plauen Hiraoka RCC formats. See also [To edit stitches with FIXPAT](#).

To display design repeats (Plauen Hiraoka RCC)

- 1 To display more than one repeat of a pattern, type a number after the **S** command and press .

The number entered becomes the default number of repeats.



For Hiraoka RCC coding, at each Stop, the program assumes a change of repeat – e.g. from 4/4 to 12/4. The program will ask for the repeat and the start needle for each change of repeat. It will only ask for this information once unless the number of horizontal repeats is changed. Changes of needle within a repeat – e.g. from 12/4 needle 1 to 12/4 needle 2 – are automatically defined in the design at each RCC+ function and do not require any operator input.

- 2 The **Start Design in Repeat** defaults to the last setting – e.g. 4/4. Press to accept.

```
>s3
3 Changes of Repeat in the design
  Start design in Repeat [ 4/4]:
```

On a 4/4 Repeat, the Start needle defaults to 1.

- 3 Enter the **Change to Repeat** at the prompt – e.g. 8/4 – and press .

```
>s3
3 Changes of Repeat in the design
  Start design in Repeat [ 4/4]:
    Start needle: 1
  Repeat change 2 at stitch 159
    Change to repeat [ 4/4]: 8/4
```

- 4 Enter the **Start** needle for the second repeat – e.g. 1 – and press .

```
  Repeat change 2 at stitch 159
    Change to repeat [ 4/4]: 8/4
      Start needle [ 1]: 1
```

You will be prompted for the total number of repeat changes. When you have entered all the required data, press and the design will display showing multiple repeats.

Displaying threads or frame movements

Either thread paths or frame movements can be shown on the graphic display when showing stitches. You can set the mode at any time before you enter **S**. See also [Editing stitches with FIXPAT](#).

When you choose 'Display Frame Movements', the stitch display will show the path of the active needles over the material including movements with 'Needles Out'. This is the default display. When you choose 'Display Threads Only', the stitch display will show the thread paths. This allows the path of the threads to be checked so that hanging threads are not sewn over.

To display threads or frame movements

- 1 To change the display mode, type **N** at the prompt and press .

```
<start of pattern>
1 --- --- --- X= 0 Y= 0
>n
Display Threads Only
>
```

- 2 This is a toggle command and you can change modes by entering **N** again.

```
<start of pattern>
1 --- --- --- X= 0 Y= 0
>n
Display Threads Only
>n
Display Frame Movements
>
```

Exiting FIXPAT

Use the command line to exit FIXPAT.

To exit FIXPAT

- 1 To exit the program, press + .

```
23 --0--.-----0-----0-----0-----0---.0-0--W Y= 32 X= 65 Slow
Save the pattern to disk (y/n)? [y]
```

- 2 To exit the program without saving changes, press .
- 3 To exit the program while saving changes, press .

```
Save the pattern to disk (y/n)? [y] y
Pattern Name <<Enter> to overwrite original> :
```

- ◀ If you want to replace the original pattern with the new, press .
- ◀ If you want to create a new pattern based on the original, enter a new name. This will preserve the original pattern file in your designs folder and create a new pattern with the new file name.
- ◀ If you want to quit and ignore changes, press + .

Converting designs with the Schiffli Disk Converter

Most Schiffli format designs can be saved directly from Wilcom **EMB** file format to Schiffli machine file formats in **EmbroideryStudio**. Schiffli machine files are converted directly, and do not need to pass through an intermediate file format like T10 or T15 which are not able to store all known functions.

Some formats, notably RCC, cannot be directly converted in **EmbroideryStudio**, but can be converted using the ES Schiffli Disk Converter. This utility contains:

- ✦ Support for multiple file selection – you can convert multiple **stitch files** from floppy disk.
- ✦ Preservation of input file names – input file names can be carried over to the output file names.

The ES Schiffli Disk Converter can be used to convert between the following formats:

Machine	Disk Format	File Format	Convert From
Plauen	Heinzle	EAS	T10 *
Saurer	Heinzle	EAS	T15 *
Saurer Pentamat	Saurer SHC	PAT	T15
Laesser	Laesser	DAT	T15
* These file types can be converted in both directions			



Note The ES Schiffli Disk Converter also provides conversion for RCC and Pentamat codes. See **Working with RCC Designs** for details.

Converting stitch files to Schiffli disk formats



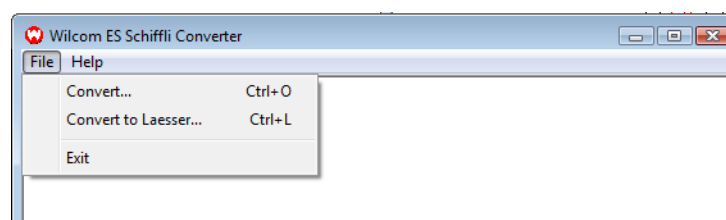
Use the Schiffli Disk Converter (Windows desktop) to convert multiple stitch files to floppy disk format.

The ES Schiffli Disk Converter can be used to convert one or more **stitch files** to another format.

To convert a stitch file to a Schiffli disk format

- 1 Double-click **Schiffli Disk Converter**.

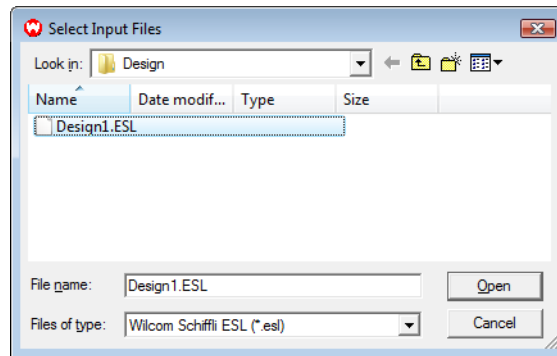
The **Wilcom ES Schiffli Converter** window opens.



The file menu gives you two options: **Convert** and **Convert to Laesser**.

- 2 Select **File > Convert** or **Convert to Laesser**.

The **Select Input Filename** dialog opens.



- 3 Select the file you want to convert.

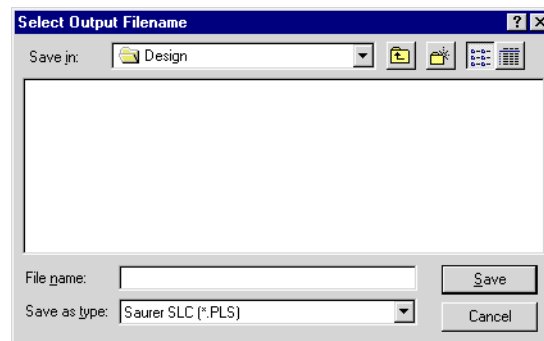
Select multiple files of the same format for batch conversion using the **Shift** or **Ctrl** keys.



Note Only **ESL** to RCC tape codes and **Laesser (DAT) – Output only** do **not** support multiple file selection and conversion.

- 4 Click **Open**.

The **Select Output Filename** dialog opens.



The file name/s selected in the **Select Input Filename** dialog appear in the **File Name** field.



Note Three letter format extension is omitted.

- 5 Select the format you want to convert to from the **Files of Type** dropdown list.
- 6 Select a folder to save in, then click **Save**.



Note When using the Laesser conversion, the following constraints apply:

- ✦ The conversion only works for Wilcom T15 to Laesser.
- ✦ The conversion is done using a program supplied by Laesser. This program only writes to floppy disk.
- ✦ The program writes a file called 'Stick_01.dat'. It does not check if there is an existing file of the same name.
- ✦ The program does not support multiple file selection.

Modifying Schiffli default settings

Occasionally you may need to customize the Schiffli default settings according to your own requirements, notably when converting to RCC format using the ES Schiffli Disk Converter. The default settings are stored on your local hard drive and you can use the ES Schiffli DEFCED utility to change them permanently. It is also possible to save different versions of the default values to be loaded as required. The values you need to know are listed here.

Format of defaults

Refer to the table below for an explanation of the format of defaults.

Item #	Description	Range of Values	Unit of Value	Current Defaults
186	SAURER BORING: Use overshoot before BORER IN ?	0 = no 1 = yes		= 1.00
187	SAURER BORING: borer overshoot in X direction		(6X mm)	= 0.00
190	SAURER STUEPFEL: overshoot in X direction		(6X mm)	= 0.00

Changing default conversion settings



Use DEFCED (Windows desktop) to adjust default settings used by the ES Schiffli Disk Converter.

Default settings are preset values which help to support the specific requirements of various Schiffli machines and the Schiffli operation itself. For example, you can define the number of leading holes on the Jacquard card. To change the default values, you need to change the stored values in the table of defaults by means of the ES Schiffli DEFCED utility. The program runs in a DOS Window.



Note EmbroideryStudio does not itself require default settings. They are only required when **ESL** designs are output to their final **stitch file** format by the ES Schiffli Disk Converter.

The settings you need to know are listed below. The ES Schiffli DEFCED utility also contains values which are not used by the ES Schiffli Disk Converter. While you can change them, they will have no effect. See **Default Schiffli settings by category** for details.

To change default conversion settings

- 1 Double-click the **DEFCED** icon on the Windows desktop.

For example, we may want to manually control the overshoot after movements with Needles Out (Jumps). (Normally the program would do this automatically.) To do so, we need to change the **Jump Overshoot** default to zero.

- 2 Type the number of the main menu item – in this case, **6** for **Enter category mode** – and press **Enter**.

```

Select - DEFCD
8 x 12
+ [2J+ [0;0H
DEFCD MAIN MENU V2.1

Exit                                     <0>
List all values by category              <1>
List all values by option number         <2>
Change all values by category            <3>
Change all values by option number       <4>
Change a value by option number          <5>
Enter category mode                      <6>
Save Defaults to Backup file             <7>
Load Backup file                         <8>
Your choice: 6

```

- 3 Type the number of the sub-menu item – in this case, **5** for **Tape Coding** – and press **Enter**.

```

Your choice: 6
+ [2J+ [0;0H
TERMINAL CHARACTERISTICS                 < 1>
GENERAL PATTERN CHARACTERISTICS          < 2>
LETTERING                                < 3>
MENU                                     < 4>
TAPE CODING                             < 5>
PLOT OPTIONS                            < 6>
DECODE OPTIONS                          < 7>
SCREEN DISPLAY OPTIONS                   < 8>
MELCO CONDENSED OUTPUT OPTIONS          < 9>
'0' or RETURN to exit
Your choice: 5

```

- 4 Type the number of the next sub-menu item – in this case, **3** for **Schiffli** – and press **Enter**.

```

Your choice: 5
+ [2J+ [0;0H
GENERAL                                  < 1>
MULTI HEAD                             < 2>
SCHIFFLI                                < 3>
'0' or RETURN to exit
Your choice: 3

```

- 5 Again type the number of the next sub-menu item – in this case, **3** for **Jump Overshoot** – and press **Enter**.

```

Your choice: 3
+ [2J+ [0;0H
EMPTY REUS IN CARD                       < 1>
STARTING BORER DEPTH                     < 2>
JUMP OVERSHOOT                           < 3>
SCHIFFLI TENSION                         < 4>
SCHIFFLI SPEED                           < 5>
VARIABLE XY PULL COMPENSATION             < 6>
PLAUE-SPECIFIC                           < 7>
PLAUE-RCC SPECIFIC                        < 8>
PLAUE JR SPECIFIC                         < 9>
PLAUE PENTAMAT                           <10>
SAURER-SPECIFIC                           <11>
SAURER-RCC/PENTAMAT SPECIFIC              <12>
SAURER AUTO TENSION                      <13>
SAURER AUTO RPM                          <14>
'0' or RETURN to exit
Your choice: 3


```

- 6 The next screen provides you with a variety of modifiable settings. Again type the number of the item you require – in this case, **80** for **Automatic Overshoot** – and press **Enter**.

```

Your choice: 3
+ [2J+ [0;0H
AUTOMATIC OVERSHOOT                      0.0=NO, 1.0=YES = 1.00 [080]
PROGRAMMED X OVERSHOOT <ie. non-automatic> 1X mm = 0.00 [081]
PROGRAMMED Y OVERSHOOT <ie. non-automatic> 1X mm = 0.00 [082]
Enter option number to change option
'A' to change all
'0' or RETURN to exit
Your choice: 80


```


- 7 The Automatic Overshoot option provides you with two alternatives: 'no' and 'yes'. Again type the number of the option you require – in this case, **0** for **No** – and press .

```

                                Your choice: 00
000 AUTOMATIC OVERSHOOT                0.0=NO, 1.0=YES      =    1.00 = 0


```

- 8 Having made your selection, you are prompted to press  to continue. This takes you back to the previous menu level.

```

                                Your choice: 00
000 AUTOMATIC OVERSHOOT                0.0=NO, 1.0=YES      =    1.00 = 0
Press <ENTER> to continue

```

- 9 Press  repeatedly to return to the main menu.




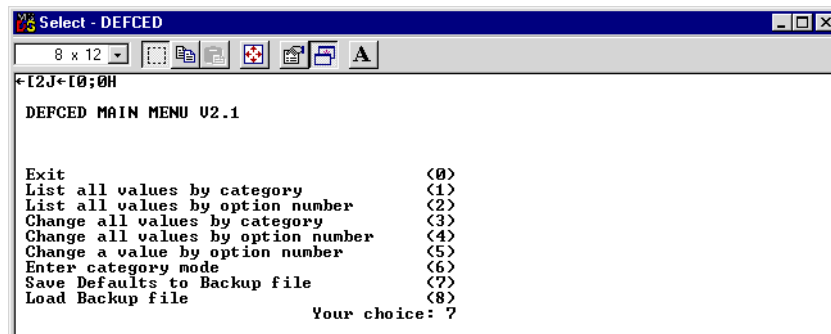
Note If you choose not to save the changes to a backup file (Option 7 of the main menu), the default settings will be permanently overwritten with the new settings. See [Saving default settings](#) for details.

Saving default settings

Any changes you make to the default settings will permanently overwrite any previous settings. To preserve existing settings you need to save them to a backup file. You may wish to save a number of different default settings to be loaded as required.

To save default settings

- 1 At the main menu, type **7** and press .



```

Select - DEFCEd
8 x 12
DEFCEd MAIN MENU V2.1

Exit                                <0>
List all values by category          <1>
List all values by option number     <2>
Change all values by category        <3>
Change all values by option number   <4>
Change a value by option number      <5>
Enter category mode                  <6>
Save Defaults to Backup file          <7>
Load Backup file                     <8>
                                Your choice: 7

```

- 2 At the prompt, enter the file name for the default settings and press .

```

                                Your choice: 7
Output file name :  Myset

```

The default settings are saved to the nominated file and you are returned to the main menu.



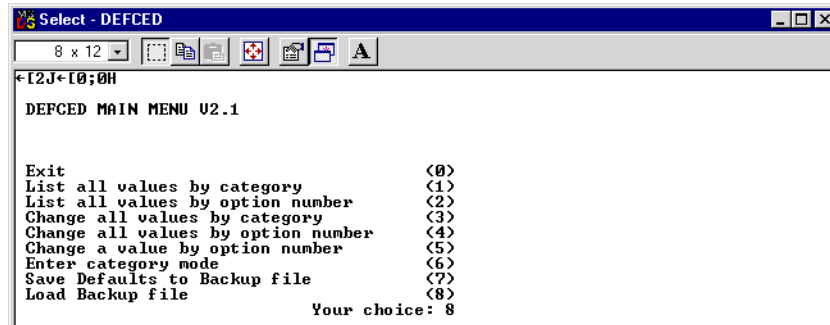
Note Use no more than 8 characters (no spaces) for the backup file name. Keep a record of the default settings and the name of the file they were saved to. The file is stored in the C:\ESWin\bin directory.

Loading default settings

If at some stage you want to reinstate the default settings, you need to load the settings from the backup file you created.

To load default settings

- 1 At the main menu, type **8** and press **Enter**.

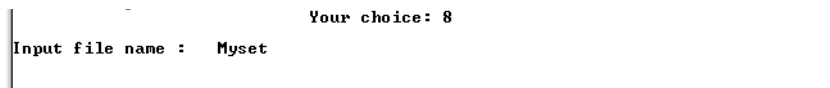


```
Select - DEFCEC
8 x 12
DEFCEC MAIN MENU U2.1

Exit <0>
List all values by category <1>
List all values by option number <2>
Change all values by category <3>
Change all values by option number <4>
Change a value by option number <5>
Enter category mode <6>
Save Defaults to Backup file <7>
Load Backup file <8>

Your choice: 8
```

- 2 At the prompt, enter the file name you used to save the default settings and press **Enter**.



```

Your choice: 8
Input file name : Myset
```

The defaults settings are loaded and you are returned to the main menu.

Default Schiffli settings by category

The settings that can be changed by DEFCEC fall into three categories – general Schiffli, Plauen-specific, and Saurer-specific.

```
***SCHIFFLI
**EMPTY REVS IN CARD
045 SCHIFFLI EMPTY REVS BEFORE STITCH DATA 1 REV = 4 BYTE = 20.00
046 SCHIFFLI EMPTY REVS AFTER STITCH DATA 1 REV = 4 BYTE = 20.00
048 SCHIFFLI BLANK CARD AFTER COLOR CHANGE. NO. OF REVS. = 8.00

**STARTING BORER DEPTH
195 SCHIFFLI BORING: borer depth at start of pattern = 6.00

**SCHIFFLI SPEED
090 SCHIFFLI AUTO FAST after NEEDLE OUT: 0=No change 1-4=Fast = 0.00
194 SCHIFFLI Machine Speed at Start of Pattern 0=Slow 1=Fast = 0.00

**PLAUEN-SPECIFIC
021 PLAUEN MAX STITCH 1X MM = 16.50
022 PLAUEN MIN STITCH 1X MM = 0.10
304 PLAUEN BORING: Number of points for Auto FAST (5.0 = Five) = 5.00

**PLAUEN-RCC SPECIFIC
271 ZAN-RCC Number of revs to divide a 4/4 frame shift 4.0 = 4 = 4.00
312 ZAN-RCC Start and end at station 0 (4/4) 1=YES 0=NO = 1.00
313 ZAN-RCC Return to start station at pattern end 1=YES 0=NO = 1.00
314 ZAN-HIR Zangs & Hiraoka RCC compatible tapecode 1=YES 0=NO = 0.00
272 HIR-RCC Number of revs to divide a 4/4 frame shift 4.0 = 4 = 4.00
273 HIR-RCC Number of revs after execution hole (min.) 8.0 = 8 = 8.00
274 HIR-RCC Return to start station at pattern end 1=YES 0=NO = 1.00
275 COM-RCC Number of revs to divide a 4/4 frame shift 4.0 = 4 = 6.00
276 COM-RCC Number of empty revs before execution hole 2.0 = 2 = 2.00
277 COM-RCC Number of revs after execution hole (min.) 8.0 = 8 = 4.00
278 COM-RCC Default machine type is 1.0=CCD1 2.0=CCD2 = 1.00
279 COM-RCC Output memorization holes for CCD1 0.0=NO 1.0=YES = 0.00
280 COM-RCC Start station is the first selected 1.0=YES 0.0=NO = 0.00
281 COM-RCC Return to start station at pattern end 1=YES 0=NO = 1.00

**PLAUEN PENTAMAT
307 PLAUEN PENTAMAT Max stitch 1X MM = 16.50
308 PLAUEN PENTAMAT Min stitch 1X MM = 0.10
309 Maximum number of programmable Pentamat stations (40 or 99) = 40.00
310 Pentamat: Number of delay revs at station change 12.0=12 = 8.00
```

```

**SAURER-SPECIFIC
024 SAURER MIN STITCH          1X MM          = 0.10
023 SAURER MAX STITCH          1X MM          = 17.10
042 SAURER automatic change to SLOW enabled 0.0=NO 1.0=YES      = 1.00
049 SAURER BLANK CARD AFTER NEEDLES OUT. NO. OF REVS.          = 0.00
186 SAURER BORING: Use overshoot before BORER IN ? 0.=no 1.=yes = 1.00
187 SAURER BORING: borer overshoot in X direction (6X mm)      = 0.00
188 SAURER BORING: borer overshoot in Y direction (6X mm)      = 50.00

**SAURER-RCC/PENTAMAT SPECIFIC
293 SAU-RCC Number of revs to divide a 4/4 frame shift 4.0 = 4  = 4.00
294 SAU-RCC Number of revs per station increment 4.0=4 6.0=6    = 4.00
295 SAU-RCC Return to start station at pattern end 0=NO 1=YES   = 0.00
322 SAU-RCC: Default machine type is 1.0=RCC 2.0=RCC/PENTAMAT   = 0.00
309 Maximum number of programmable Pentamat stations (40 or 99) = 40.00
310 Pentamat: Number of delay revs at station change 12.0=12    = 8.00

```

Punching stitch files to Wilcom Jacquard Punch



Use Schiffli Punch (Windows desktop) to send a stitch file from your PC to a Wilcom Jacquard Punch. Right-click to change the COM port.

The ES Schiffli Punch utility for Windows sends a **stitch file** from your PC to a Wilcom Jacquard Punch (the predecessor of the ElectroPunch).



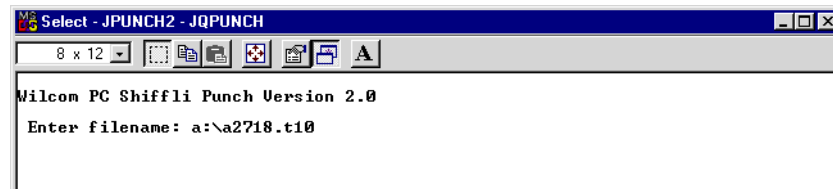
Note The punch is slow and so can be run in a minimized (background) window if it is to be used on a digitizing PC.

Sending stitch files to a Jacquard Punch

Any Schiffli Tnn type file can be sent to a Jacquard Punch.

To send stitch files to a Jacquard Punch

- 1 Double-click the **Schiffli Punch** icon on the Windows desktop.



Schiffli Punch prompts you for the name of the file you want to punch. This must be a valid DOS 8.3 file name.

- 2 Type the full path and design name together with the file extension, and press **Enter**.

The program will first attempt to synchronize the punch and then send the design to the selected COM port (default = COM2). A message will show the pattern number being punched and indicate when the operation is completed.

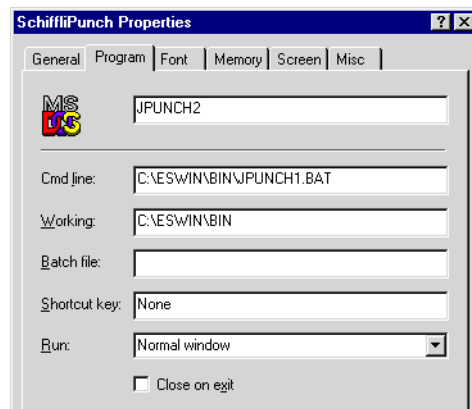
An error message – ‘unable to synchronize Punch’ – will tell you if your PC is unable to communicate with punch device. Check the COM port.

Changing the COM port of the Schiffli Punch

The punch uses a communications protocol using small packets containing one stitch at a time. The COMs settings are preset for you. Only COM1 or COM2 are supported (default = COM2). Baud rate is usually 4800 with no handshaking.

To change COM port

- 1 Right-click the **Schiffli Punch** icon on the Windows desktop.



- 2 In the **Properties** dialog, select the **Program** tab.
- 3 Edit the command line:
 - ◀ PUNCH1.BAT sends the file to COM1.
 - ◀ PUNCH2.BAT sends the file to COM2.
- 4 Click **OK** and run the program from the Windows desktop.

Appendix B

Supported Machine Functions, File and Disk Types

This section provides details of the machine, file and disk types supported by ES Schiffli. Tables show how various features are converted when the file type is changed. Use this section when converting designs to different formats, or digitizing for a specific format other than EMB.

Supported Schiffli machine functions

Schiffli machines are typically used to manufacture lace and emblems. They have particular machine functions which only apply to Schiffli designs.

ES Schiffli makes a distinction between 'logical' and 'physical' machine functions. Both logical and physical machine functions are encoded in the native Wilcom **EMB** file. EMB does not preserve 'non-supported' machine functions. EMB files can be output in a wide variety of Schiffli formats. See [Supported Schiffli file formats](#) for details.



Note Some functions appear as both 'logical' and 'physical' functions, depending on the particular machine. For example, 'Fast/Slow' may be an actual physical function on one machine, but may need to be decoded into a number of component functions on another.

General Schiffli machine functions

ES Schiffli supports the following user-selectable logical functions:

Logical Function	Description
Stepp/Blatt	Instructs the machine when to use normal (Stepp) or loose (Blatt) tension.
Jump (M)	Cause frame movements without needle penetrations – used to move smoothly from one part of a design to another.
Borers In/Out	Instructs the machine when to use the boring knife or tool instead of a needle.
Borer Depth	Instructs the machine to use either Plauen or Saurer numbering system governing borer depth.
Stop	Instructs the machine to stop.
Begin/End Jump	Instructs the machine whether or not to use needle/borer penetrations.
Fast/Slow	Instructs the machine to stitch fast or slow.
Empty/Empty Jump	Empty function instructs the machine to stitch with needle penetrations. Empty Jump function instructs the machine to stitch without needle penetrations (jump).
Drop Sequin	Instructs the machine when to drop a sequin on the fabric for stitching.

Logical Function	Description
Color Change	Instructs the machine to use the next thread color in the design.
Trim	Instructs the machine to trim threads. (Only relevant to newer Schiffli machines with trimmers.)

For detailed descriptions of the supported logical functions in ES Schiffli, see [Supported Schiffli machine functions](#) for details.

Machine-specific functions

ES Schiffli supports fine tension and speed changes, as well as special devices like Cord and Sequin for specific machines. These functions can be output to disk or tape, and are preserved when read into **EmbroideryStudio**. Machine-specific functions directly supported by ES Schiffli include:

Logical function	Saurer	Plauen	Hiraoka / WESS
Fadenleiter Plus/Minus	●	●	
Thread Brake Plus/Minus	●†		●
Boring Tension Start/End			●
Pause			●
RPM Plus/Minus	●		●‡
Stuepfel In/Out	●	●	
Cord In/Out	●	●	
Festoon In/Out	●	●	
† Previously known as Emery Roller ‡ Also known as Speed Data			

Indirectly supported functions

ES Schiffli indirectly supports Saurer Clutch In/Out (when used in Borer). An indirectly supported function means that, although you cannot select the function in **EmbroideryStudio**, the software automatically inserts it as part of a logical function.

Supported Schiffli file formats

Schiffli designs in **EmbroideryStudio** can be opened, edited and saved in Wilcom **EMB** file format, as well as **ESS** and **ESL**, Wilcom's Schiffli **stitch file** formats. Designs can also be read and written in many other machine-specific formats.



Note ESL is used for RCC designs only. ESS is the primary machine file format for Wilcom-developed Schiffli servo control systems. When the ESS file is read directly by a Wilcom Servo Control system (WESS), high data resolution and stitch accuracy is possible.

There are Schiffli file formats to suit specific Schiffli machines. Machine functions may differ between various machines. ES Schiffli supports the following Schiffli

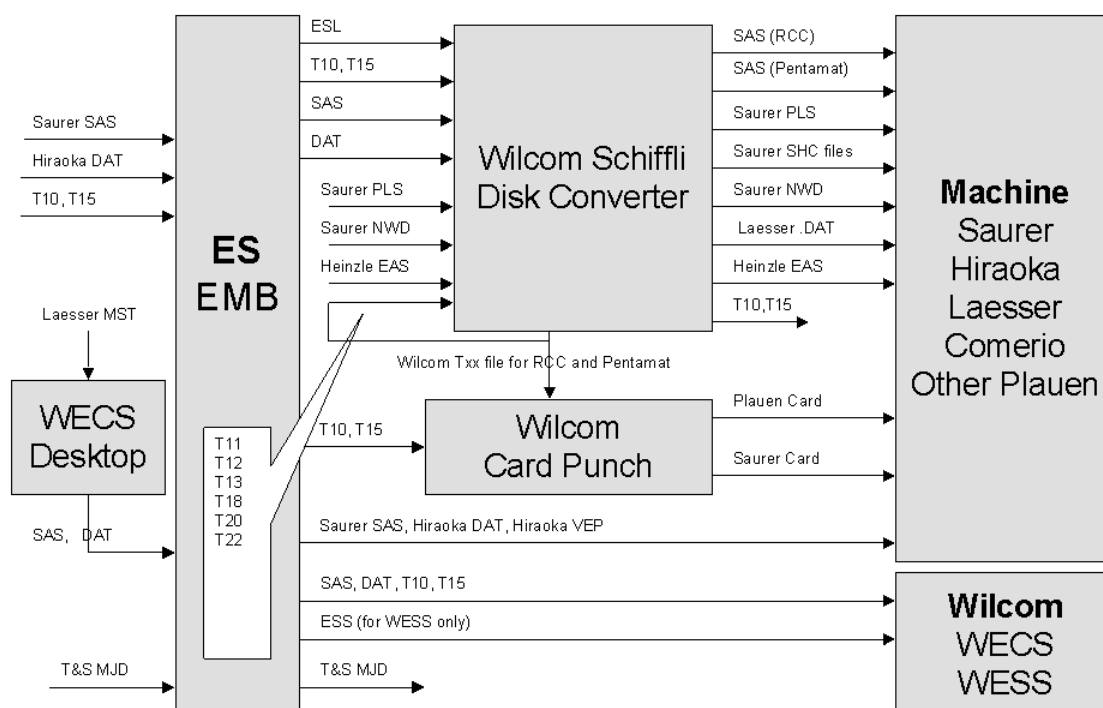
file formats either directly through **EmbroideryStudio**, or indirectly through the ES Schiffli Disk Converter.

File Type	Manufacturer	ES Read	ES Write	SDC Read	SDC Write
DAT	Hiraoka	●	●		●
DAT	Laesser				●
EAS	Heinzle			●	●
EMB	Wilcom	●	●		
ESL	Wilcom Schiffli (RCC)	●	●		
ESS	Wilcom Schiffli	●	●		
INP	Stations (some loss of stitch types and functions)	●			
MJD	Time & Space (standard non-RCC)	●	●		
NWD	Saurer			●	●
PAT	Saurer SHC (native Saurer)				●
PLS	Saurer SLC (Plauen data)	●	●		●
SAS	Saurer SLC (standard)	●	●	●	●
SAS	Saurer SLC RCC			●	●
SAS	Saurer SLC Pentamat			●	●
T10	Wilcom Plauen	●	●	●	●
T11	Wilcom Plauen RCC Zangs			●	●
T12	Wilcom Plauen - RCC Hiraoka			●	●
T13	Wilcom Plauen - RCC Comerio			●	●
T15	Wilcom Saurer	●	●	●	●
T18	Wilcom Saurer RCC			●	
T20	Wilcom Saurer Pentamat	●	●	●	
T22	Wilcom Plauen Pentamat			●	
VEP	Hiraoka		●		



Note All Schiffli disks are DOS/Windows readable and do not require special hardware.

Format conversions summary



Reading Schiffli designs

- ✦ Hiraoka DAT and Saurer SLC can be read directly into ES Schiffli and have full editing capabilities.
- ✦ T10 and T15 **stitch files** can be read with or without object recognition.
- ✦ INP type files may be read but with some loss of stitch types and functions.

Recognition limitations

If a stitch type is not recognized accurately, the values in the **Object Properties** dialog will not match the stitches. The stitches will remain the same as in the original design until you make changes and regenerate them. If you change the design, stitches will be regenerated according to the object properties. Designs converted from stitch format files and expanded designs which have non-standard stitch types may require editing in **EmbroideryStudio** to ensure that the object outlines, stitch types, stitch density and colors are correct.



Tip For lace designs, Tatami recognition should be turned off in the advanced options. If only a few objects need to be reshaped, it may be better to recognize only selected stitches inside **EmbroideryStudio** after opening.

Other limitations

- ✦ Functions such as Stuepfel, which were not supported in the V6.0 Schiffli machine, will be lost on writing to ESL.
- ✦ Old Stations files are not supported in ES Schiffli. These include PEN, PNN, RCC, T16, T19, T21.
- ✦ VEP files store the names of Hiraoka DAT files which must be eight characters or less. To avoid error when saving designs in VEP format, choose a file name of seven characters or less.

ES Schiffli encoding and decoding settings

When you open or save Schiffli files, you can set decoding or encoding options to determine how to handle the design. Options vary with the selected file type – i.e. whether based on Plauen or Saurer formats.

Plauen formats

Plauen formats include DAT and Wilcom Plauen T10. They share the same Plauen-specific encoding and decoding options and values.

Tab	Options	Settings
Standard	Recognize Jumps as Trim	1
	Recognize Stop Code as	Color Change Stop Custom
	Recognize Object/Outlines	Yes/No
	Recognize Auto Connectors	Yes/No
Conversion Details	Sequin function	None TNS - Fadenleiter BR - Borer Depth SCH - Schnur(Cord)
	# stitches for Auto Fast	5
	# empty stitches before stitch data	0
	# empty stitches after stitch data	0
	# Empty stitches after Stop or Color Change	0
	Restore function state before Stop	Yes/No
	Output Pause as Stop	Yes/No

Saurer formats

Saurer formats include SAS and Wilcom Saurer T15. They share the same Saurer-specific encoding and decoding options and values.

Tab	Options	Settings
Standard	Recognize Jumps as Trim	1
	Recognize Stop Code as	Color Change Stop Custom
	Recognize Object/Outlines	Yes/No
	Recognize Auto Connectors	Yes/No

Tab	Options	Settings
Conversion Details	Sequin function	None TNS - FadenLeiter Borer Size +/- SCH - Schnur(Cord)
	# stitches for Auto Fast	5
	# empty stitches before stitch data	0
	# empty stitches after stitch data	0
	# Empty stitches after Stop or Color Change	0
	Restore function state before Stop	Yes/No
	Auto Slow/Fast for Needles In/Out	Yes/No
	Machine starts in Fast	Yes/No
	Output Pause as Stop	Yes/No

Supported Schiffli disk formats

Save your Schiffli designs to a Schiffli formatted disk. Schiffli machines with Floppy Disk Readers can then read the design. ES Schiffli supports the following Schiffli disk formats:

Format	Density	Read	Write
Saurer SLC – SAS (Saurer)	DS/HD	●	●
Saurer SLC – PLS (Plauen)	DS/HD	●	●
Saurer SHC – PAT	DS/HD	●	●
Saurer NWD – NWD	DS/HD	●	●
Laesser (DAT)	DS/HD		●
Hiraoka (DAT)	DS/HD	●	●
Heinzle EAS	DS/HD	●	●

Glossary

Active window: The active window is one to which the next command or action will apply. If a window is 'active', its title bar changes color to differentiate it visually from other open windows.

Allover: Continuous embroidery which covers all of the goods from selvage to selvage.

Anti-aliasing: A software technique similar to dithering which is used to soften hard outlines where color blocks intersect. It produces smoother outlines by 'blurring' the pixels where colors join.

Auto Center: Auto Center automatically centers the start and end points of a design.

Automatic color change: Ability of multi-needle embroidery machine to follow a command to change to a specified needle with a different thread color.

Automatic pull compensation: Embroidery stitches pull the fabric inwards where the needle penetrates. This can cause the fabric to pucker, and gaps to appear in the embroidery. Automatic pull compensation counters this effect by 'overstitching' outlines of filled shapes on the sides where the needle penetrates. This means the design can be optimized for different fabrics. See also [Pull compensation](#).

Back appliqué: A fabric piece used behind a design where the front fabric will be cut away to reveal the fabric beneath it.

Backing: See [Stabilizer](#).

Backup: The copying of files onto floppy disk or other storage media in order to duplicate and secure data. Usually two copies are made and kept separately.

Blending: See [Color Blending](#).

Bobbin: Spool or reel that holds the bobbin thread, which helps form stitches on the underside of the fabric.

Bobbin embroidery: Designs worked with the fabric hooped facedown and the specialty thread or ribbon wound onto the bobbin. Most effective for simple designs such as leaves and vines, or special effects with threads too heavy to be threaded through the needle.

Bonding: Permanently joining two fabrics together with a bonding agent. Heat sealing.

Cascade: A way of arranging open windows on the desktop so that they overlap each other, with the title bar of each window remaining visible.

Checkbox: A small square box that appears in a dialog box and that can be selected or cleared. When selected, a tick or a cross appears. A checkbox represents an option that you can set.

Click: Press and release the left mouse button. See also [Right-click](#).

Click-and-drag: Click to select, hold down the left mouse button, move the cursor and release.

Clipboard: A temporary storage area in PC memory for what was last cut or copied. Images on the clipboard can be pasted into designs any number of times.

Close button: Used to close a window or an application. In MS Windows, it appears as a small box with an 'X' in it at the top-right of the title bar.

Color depth: Color depth, also called 'pixel depth', refers to the amount of color information available to each pixel in an image. An image with a color depth of 1-bit can display only two colors. As the color depth increases, more colors are available – 16 Colors (4 bit), 256 Colors (8 bit), High Color (16 bit), True Color (24 bit).

Color palette: The color palette contains a selection of thread colors tailored for each design. This color scheme, or 'colorway', represents the actual thread colors in which a design will be stitched. See also [Thread chart](#).

Color Reduction: See [Image Preparation](#).

Column: Narrow, long, curving shape.

COM port: A standard serial port used as a connection point for peripherals. Other ports may be present if the appropriate internal option cards have been installed. The computer must be informed which port is being used by which peripheral – e.g. COM1, COM2, etc.

Command: An instruction issued to the software in order to carry out an action. It may be as simple as 'paste an object' or as complex as 'regenerate stitches'. It is usually activated via a menu item, toolbar icon, or command button in a dialog.

Command button: A button in a dialog which executes or cancels the selected action. Two common command buttons are Cancel and OK.

Condensed file: See [Outline file](#).

Configuration: The size and type of computer hardware. Can also be used to mean the options provided with your software.

Confirmation message: A message displayed by the software asking you if you are sure you want to proceed – e.g. when you want to delete a design.

Connector stitches: Connector stitches link objects in a design. They can be run stitches or jumps. You can use automatic settings to generate connectors, trims and tie-offs, or add them manually.

Connectors: Hardware devices to connect cables to ports. If the connection is male, the port is female, and vice versa. The wiring configuration of each device is determined by its function.

Copy: To place a copy of a selection onto the clipboard. See also [Duplicate](#).

Copyright: A right granted by the government or by international agreement giving the owner the

exclusive privilege to publish and sell artistic work during the life of the creator plus 50 years.

Crest: An embroidered motif like an emblem, an insignia or a Coat of Arms.

Custom designs: Designs created by digitizing artwork or manipulating existing patterns.

Cut: An editing function. To remove a selection from a design. The cut selection is stored in memory (on the 'clipboard') and can be pasted into the same or different design.

Cut appliqué: See [Back appliqué](#).

Cutter: See [Appliqué cutter](#).

Default object properties: Default or starting property settings are the ones stored with the design template. These are automatically applied to any newly created objects in the design. See also [Object properties](#).

Default values: Pre-defined settings which determine object properties such as stitch spacing, as well as certain system settings. These are stored in the design template. They remain 'current' unless you override them with new settings. See also [Current property settings](#) and [Default property settings](#).

Defects: See [Stitching defects](#).

Density: See [Stitch density](#) or [Thread density](#).

Design: A 'design' is a file in the native embroidery format – e.g. EMB, JAN, ART – of embroidery digitizing software. The design source may be a stitch format design. The design contains stitching information such as fabric type in addition to stitched shapes.

Design card: Disk containing computerized embroidery designs read by the embroidery machine's computer.

Design file: See [File](#).

Design object: See [Objects](#).

Design properties: Designs themselves have properties, some of which can be modified, others not. The most important design property is its source – Native Design, Imported Outlines, Processed Stitches, or Imported Stitches. Other properties include the software version number,

stitch count, and so on. Colorways too are properties of the whole design.

Design segment: See [Segments](#).

Design sequence: See [Stitching sequence](#).

Design source: While embroidery files are broadly classified as 'outline' (condensed) or 'stitch' (expanded), **EmbroideryStudio** internally tags files as belonging to one of four types—Native Design, Imported Outlines, Processed Stitches, or Imported Stitches. See also [Design properties](#).

Design template: See [Template](#).

Design window: The design window is where designs are displayed for viewing and modification.

Desktop: MS Windows terminology for the screen background on which program icons are displayed.

Destination folder: The folder (directory) where you intend to copy or move one or more files.

Detail: An outline, a border, a pickout run, or a small area of the design you want to be stitched out last when using Smart Design.

Diagonal backstitch: The backward rows are diagonal, directly connecting the forward rows. Diagonal backstitch is suitable for turning shapes, and gives good results with Jagged Edge. See also [Backstitch](#).

Dialog: An on-screen box that either requests or provides information. Many dialogs present options to choose among before a command is carried out. Some dialogs present warnings or explain why a command cannot be completed.

Digitizer: Usually refers to the person punching or digitizing the design. Digitizer can also refer to the digitizing tablet used by the digitizer. See also [Digitizing tablet](#).

Digitizing: Process of encoding a design. Artwork is converted into a series of 'embroidery objects' to be read and manipulated by a specialist CAD/CAM application. Before outputting to embroidery machine, it is converted into 'stitch data'. See also [Punching](#).

Digitizing tool: Digitizing tools, sometimes referred to as 'input methods', are similar to drawing tools

except that the end result is an embroidery object rather than a vector object. Different digitizing tools are suited to creating different shapes or design elements.

Disk: See [Floppy disk](#).

Disk drive: Computers usually have three types of disk drive: a hard disk (or fixed disk) which usually supports the mass storage of information and applications, a floppy disk drive, and a CD ROM drive.

Display: A screen used to display the output of a computer. Also known as the monitor.

Dongle: A security hardware device required to run protected software. Some are attached to a parallel port, others to a USB port.

Double-click: Click the left mouse button twice without moving the mouse. Double-clicking carries out actions such as opening a program from an icon.

Drag: An operation of the mouse. Holding the (left) mouse button while moving the mouse. Typically used for moving something on the screen.

Drawing object: See [Vector object](#).

Dropdown list : A single-line dialog box control that opens to display a list of choices.

Duplicate: When an object is duplicated, it is not copied to the clipboard. This leaves the clipboard free for you to cut or copy other objects.

Editing: Changing aspects of a design via a computerized editing program. Most programs allow you to scale designs up or down, edit stitch-by-stitch or block-by-block, merge lettering with the design, move aspects of the design around, combine designs and insert or edit machine commands.

Emblem: Embroidered design with a finished edge, applied to a garment after stitching, commonly an insignia of identification. Also known as a 'crest' or 'patch'.

Embroidery object: See [Object](#).

Embroidery thread: See [Thread](#).

Entry point: The entry point is the point where the thread enters the embroidery object. This should coincide

with the exit point of the preceding object.

Exit: To leave a current window or application.

Exit point: The exit point is the point where thread leaves the embroidery object. This should coincide with the entry point of the next object.

EXP: Stitch or 'expanded' file format native to Melco machines.

Expanded file format: See [Stitch file](#).

Extension: See [File extension](#).

Fabric: Fabrics have many properties, the main one being elasticity or 'fabric stretch'. Surface texture, if present, is another property that requires different underlay types. The system can automatically compensate for the pull-push effect of different fabrics. Push, warping, and shearing are reduced by suitable underlay for the stitch type and fabric.

Fabric stretch: Embroidery stitches pull the fabric inwards where the needle penetrates. This can cause the fabric to pucker, and gaps to appear in the embroidery. Use automatic pull compensation to counter this effect by 'overstitching' outlines of filled shapes.

Facing: See [Topping](#).

Factory settings: These are the initial system settings as installed. They are a standard known setting that you can return to. Some customers want to create custom settings tailored to the exact fabric they are using most frequently. The 'My Fabric' settings are those retained in the design and can be saved to the template file.

File: A named collection of specifically related information stored on a disk. Designs that have been saved are stored as files.

File extension: The dot and three letters at the end of a filename such as '.BMP'. The extension identifies the file as a certain type, readable by certain applications.

Filename: The name of a file, including the extension, e.g. Cat.BMP.

Fill stitch: Series of running stitches commonly used to cover large areas. Different fill patterns can be created by altering the angle, length and repeat

sequence of the stitches. Also known as Geflect stitch.

Finishing: Processes done after embroidery is completed. Includes trimming loose threads, cutting or tearing away excess backing, removing facing or topping, cleaning any stains, pressing or steaming to remove wrinkles or hoop marks and packaging for sale or shipment.

Flagging: Up and down motion of fabric under action of the needle, so named because of its resemblance to a waving flag. Often caused by improper framing of goods. Flagging may result in poor registration, unsatisfactory stitch formation and birdnesting.

Floppy disk: A flexible disk permanently sealed in a square plastic jacket – e.g. HD/DD 3.5" floppy disk. Used for information storage 'off-line' for security and/or infrequently used data. Also used for transferring punched embroidery design (stitch file) data from computer to embroidery machine.

Folder: A collection of files and sub-folders that are stored together on a disk. Part of structure for organizing files on a disk.

Fringe: Threads that are cut and hang loosely from the edge of a design.

Grid: Grid lines provide visual cues to help you accurately place a design. When you start the software for the first time, grid lines appear by default.

Hard disk: A device for mass information storage. Usually the disk is fixed inside the system unit, and a second hard disk can be added. When you store information on the hard disk it will remain there until you delete it. As it has a finite capacity, file management is required.

Hardware: Computer componentry, including monitor, keyboard, digitizing tablet, printer, scanner, sewing machine, etc.

Heirloom embroidery: Embroidered goods designed to be passed down from generation to generation.

I-beam: One shape taken by the PC pointer, it indicates that text can be input at the point selected. The shape is like the capital letter 'I'.

Input method: See [Digitizing tool](#).

Jump: A frame or hoop movement without a needle penetration, commonly used to get from one point in a design to another.

Lacework: Lacework involves the use of threads to produce overall embroidery of full-length fabrics. Most often used to embellish women's apparel and home fashions. Such work typically uses boring. It is the most widely used application for Schiffli machines.

Line art: A drawing with only two colors – usually black and white.

List box: A single-line dialog that opens to display a list of choices.

Lock stitch: Commonly referred to as a lock-down or tack-down stitch, a lock stitch is formed by three or four consecutive stitches of at least a 10-point movement. It should be used at the end of all columns, fills and at the end of any element in your design where jump stitches will follow, such as color changes or the end of a design. May be stitched in a triangle, star or in a straight line. Lock stitch is also the name of the type of stitch formed by the hook and needle of home sewing machines, as well as computerized embroidery machines.

Logo: Name, symbol or trademark of a company or organization. Short for logotype.

Looping: Loops on the surface of embroidery generally caused by poor top tension or tension problems. Typically occurs when polyester top thread has been improperly tensioned.

Max/Min stitch length: The minimum and maximum stitch lengths allowable in a design determine the outside limits as measured between needle penetration points. They are governed by the minimum and maximum frame movements that the machine can make.

Maximize button: For Windows, the small box in the center of the group of three at the right of the title bar. Click the Maximize button to enlarge a window to its maximum size.

Memory: The place in the computer's system unit that stores information while you are working with it. If you exit without saving information in memory, it will be lost.

Menu bar: The menu bar contains dropdown menus of commands. Some of the same commands are available on the toolbar.

Menu chart: The menu chart provided with the software lets you select commands directly from the digitizing tablet using the puck. You need to 'register' it before use.

Minimize button: For Windows, the small box to the left of the group of three at the right of the title bar. Click the Minimize button to reduce a window to its minimum size.

Modeless dialog: Dialogs which stay on the screen and are available for use at any time but permit other user activities. In contrast, 'modal' dialogs require the user to respond before continuing the program.

Monitor: The screen on which punching or stitching progress can be followed, stitch by stitch.

Monogram: Embroidered design composed of one or more letters, usually the initials of a name.

Mouse: A device, equipped with control buttons and designed to roll about on the table next to the keyboard. As the mouse moves, its circuits relay signals that move a pointer on the screen.

Nap: A fuzzy or downy surface of fabric covering either one side or both, produced by brushing loosely twisted yarns.

Native file format: A design saved in the original format of the application you are working with is said to be the 'native' file format. It can also refer to the stitch file format required by a specific embroidery machine. When saved to another format, it is known as a non-native format.

Needle: Small, slender piece of steel with a hole for thread and a point for piercing fabric. A machine needle differs from a handwork needle; the machine needle's eye is found at its pointed end. Machine embroidery needles come with sharp points for piercing heavy, tightly woven fabric; ball points which glide between fibers of knit; and variety of specialty points, such as wedge points, which are used for leather.

Needle points: You can view needle points in a design to check density or, for instance, to select stitches for editing.

NORMAL template: Default template. See also [Template](#).

Object: In embroidery design terms, an object is an individual 'element' of a design. An object has many properties, such as its size, color, sequence in the design, stitch type and values, including the rules for stitching. See also [Vector image](#), [Vector object](#).

Object outline: See [Outline file](#).

Object properties: All embroidery objects in **EmbroideryStudio** contain defining settings or 'values'. The values stored with an object become its 'properties'. All objects have certain properties in common such as size and position. There are other, more specific properties of objects which depend on the object type.

Object recognition: See [Outline recognition](#).

Object type: An object has a type, shape, thread type and color, stitching settings and a position in the stitching order. The object type may or may not determine the intended final appearance of the stitching.

Outline file: Outline or 'condensed' files are high-level formats which contain object outlines, object properties and stitch data. When you open an outline file in **EmbroideryStudio**, corresponding stitch types, input methods and effects are applied. Outline files can be scaled, transformed and reshaped without affecting stitch density or quality. See also [Stitch file](#).

Outline stitch: Stitch such as Run or Satin used to outline an embroidery object.

Overview window: Use the Overview window to view a thumbnail of the design. The window is updated whenever you make a change, and can be used to zoom in or pan across the design window.

Pan: Use Pan to view parts of a design which are not currently visible in the design window.

Parallel port: A connection on a computer, usually LPT1, where you plug in the cable for a parallel printer and/or a dongle. Parallel ports are used to connect some embroidery machines. They are named LPT1, LPT2, etc. When you set up a parallel machine

connection, select the parallel port and the required protocol, and complete the machine setup procedure.

PCX: PC Paintbrush bitmap image format.

Pattern outline: See [Motif Run](#).

Pencil rub: Low-cost way of producing an embroidery design sample. Consists literally of a piece of tracing paper placed over a stitchout and rubbed lightly with a pencil to produce an impression of the embroidery.

Peripheral: Any device connected to a computer which is to some degree controlled by the computer – e.g. an embroidery machine or printer.

Pointer: A part of the screen display, the pointer can take various shapes. It is moved by moving the mouse and can be used to point to anything on the screen to make selections and indicate points for input. It also indicates when the computer is working and no input is possible.

Point: Unit of measurement, with 10 points equal to 1 mm.

Port: A connection on a computer where you plug in the cable that carries data to another device. Ports which are used to attach peripherals have names like COM1 or LPT1 so that you can specify where the peripherals are attached.

Position: The Position indicator shows position of the design (X, Y) in the design window.

Program: A computer program or 'application' is generally used for a particular kind of work, such as word processing or database management.

Properties: See [Object properties](#).

Protocol: The communications protocol depends on the connection type between the computer and the embroidery machine. This will be one of: standard serial, parallel, serial to parallel converted (DCi), or interface card.

Puckering: Result of the fabric being gathered by the stitches. Many possible causes include incorrect density, loose hooping, lack of backing, incorrect tension or dull needle.

Pull compensation: Digitizing technique that takes into account the

distortion of a design that will occur because of the interaction of thread with fabric. 'Push and pull' will cause a circle digitized perfectly round to sew with the sides pushed out, resulting in an egg shape. Generally, it is necessary to extend horizontal elements and reduce vertical elements. See also [Automatic pull compensation](#).

Push-Pull: When any stitch is sewn into fabric, the tension in the thread between needle penetrations can build up and result in a 'push-pull' effect. This can cause distortions in your sewn designs, poor stitch registration and even the bunching of the fabric. The degree of distortion can be affected by the following factors: stitch density, fabric type, underlay, backing type, thread type and garment orientation. See also [Stitch-Pull](#).

RAM: Random Access Memory, computer chip maintaining memory.

Read: To open a design which has been written on a design card or to an embroidery machine.

Redraw: The screen display is refreshed. This is useful when parts of the display have become obscured in the course of editing. See also [Slow Redraw](#).

Refresh: See [Redraw](#).

Resequence: You can change the position of a selected object by cutting it, then pasting it somewhere else in the stitching sequence, or by using the Resequence command. You can also resequence objects by color or using the Color-Object List.

Resizing: See [Scaling](#).

Resolution: Resolution determines the number of dots per inch (dpi) used to create an image. The higher the value, the clearer the image, but the more storage space required. A resolution of 75 dpi generally produces good results.

Right-click: To press and release the right mouse button. See also [Click](#).

Rotation handles: When you select an object, selection handles display at its extremities. If you click the object again, rotation and skew handles appear around the object. Rotation handles appear at the corners of the object and an anchor point displays at the object's center. Skew handles are diamond-shaped and appear at the

center-top and bottom of the object. See also [Selection handles](#).

Run stitch: Run stitch (also called Walk stitch) places a single row of stitches along a digitized line. The needle penetrations are placed in consecutive order. Run is generally used for stitching outlines and connector stitches. Run stitch length can be set to automatically vary in order to follow tight curves.

Satin stitch: Type of fill stitch. Formed by closely arranged zigzag stitches, it can be stitched at any angle and with varying lengths. The thread is laid across a shape with a zigzag sewing action where two stitches form a column. Hence it is only suitable for small or narrow shapes. As the stitches are almost parallel, Satin provides good coverage. It is often used for lettering, outlining, and details. Because there are generally no needle penetrations breaking up the fill, Satin stitch creates a glossy effect.

Save: To store (design) information in a file. Each time you save a design, you replace the previous version using the filename. You should save your design frequently.

Scaling: Ability to enlarge or reduce a design in size. In stitch or 'expanded' format, most scaling is limited to $\pm 5\%$ because the stitch count remains constant despite final design size. In outline or 'condensed' formats, scale changes may be more dramatic because stitch count and density are recalculated.

Schiffli machine: Commercial embroidery machine that utilizes the combination of needle and shuttle to form a stitch. Massive in size. Some schiffli machines – also known as looms – weigh 10 tons and have up to 1024 needles. Most Schiffli machines do not have automatic thread trim or automatic color change. Excellent for emblem production, the creation of lace, embroidery production on oversized items and production orders of very large quantities.

Screen calibration: You need to calibrate your monitor so that designs at 1:1 scale appear at real size. Do this when you first install

EmbroideryStudio, whenever you change your monitor, or adjust your monitor's horizontal or vertical controls.

Screen resolution: See [Pixels](#).

Scroll bar: The bar at the bottom and right edge of a window whose contents are not entirely visible. Each scroll bar contains a small box, called a scroll box, and two scroll arrows to allow different types of scrolling.

Security Device: See [Dongle](#).

Select: To highlight an object or group of objects for the purpose of editing. Only selected items can be edited.

Selection handles: Eight small squares that appear symmetrically at the corners and edges of a selected object. Use them to position and resize objects. See also [Rotation handles](#).

Sequence: See [Stitching Sequence](#).

Serial port: A connection point on a computer where you plug a serial communications device such as a modem. PC serial COM ports are male connectors, and can be either 9-pin or 25-pin. They are named COM1, COM2, COM3, etc. The number of available ports limits the number of devices you can connect. If additional ports are required, you can add them. Multi-port serial cards can also be used.

Serial Port Setup: Here you can adjust Baud, Data Bits, Stop Bits, Parity values. These settings must be identical to those of the embroidery machine. The type of handshaking must match the type of cable you are using.

Short stitch: Digitizing technique that places shorter stitches in curves and corners to avoid an unnecessarily bulky build-up or stitches.

Shortcut key: A key stroke or a series of keystrokes you can use to perform a task instead of using the mouse. For example, Ctrl+C actions the Copy command.

Sizing handles: See [Selection handles](#).

Skew handles: See [Rotation handles](#).

Slow Redraw: Use to redraw your design slowly. Slow Redraw lets you view the stitching and color sequence of a design in slow motion.

Software: Programs, such as MS Windows and ES Schiffli e2.0, which run your computer.

Specialty threads: Threads designed for effects such as shine, glitter,

iridescence or thickness. The threads often are made from synthetic materials including rayon, mercerized cotton, metallics and textured nylon.

Stabilizer: Also known as 'backing', stabilizers are woven or non-woven materials used underneath the item or fabric being embroidered to provide support and stability. It can be hooped with the item or placed between the machine throat plate and hooped garment. Available in various weights and types such as cut-away, tear-away and wash-away (soluble). The more stitches your design has, the more backing you will need. Professional embroiderers use tear-away stabilizers for woven fabrics and cut-away stabilizers for knits. See also [Topping](#).

Status bar: Provides information about the whole design: number of stitches, position of the design (X, Y), number of colors (C), number of stops (S), etc.

Stitch: A stitch is one needle penetration; also used to refer to the thread laid down from one needle penetration to the next.

Stitch angle: The stitch angle is the angle the overall stitching follows within a shape. The shape may have a fixed stitch angle – e.g. 45° to the horizontal – or multiple stitch angles.

Stitch bunching: Standard stitch spacing is calculated at the outside edge of a shape. With sharp curves, spacing which provides adequate coverage on the outside edge may cause bunching along the inside edge. This may cause thread breakage when stitching out.

Stitch count: Stitch count refers to the number of stitches in a design. In **EmbroideryStudio** one stitch is considered one machine revolution. See also [Design properties](#).

Stitch density: The number of stitches per given area (or stitch lines per distance in a fill).

Stitch editing: Digitizing feature that allows one or more stitches in a pattern to be deleted or altered.

Stitch file: Stitch or 'expanded' designs are low-level formats for direct use by embroidery machines. They contain only stitch coordinates and machine functions. Stitch designs are generally not suited to scaling because

stitches are not regenerated during rescaling. See also [Outline file](#).

Stitch length: The distance between two needle penetration points. For maximum stitch length, the length is measured according to the X and Y co-ordinates, whichever is greater. Run stitch length can be set to automatically vary in order to follow tight curves. See also [Max/Min stitch length](#).

Stitch-Pull: When any stitch is sewn into fabric the tension in the thread between needle penetrations can build up and result in Stitch-Pull. Stitch-Pull can cause distortions in your sewn designs, poor stitch registration and even the bunching up of fabric. The amount of Stitch-Pull that results in your design can be affected by the following factors: Stitch Density, Fabric Type, Underlay, Backing Type, Thread Type and Garment Orientation. See also [Push-Pull](#).

Stitch type: Three basic stitch types are available with lockstitch machines – Run, Satin and Tatami (Weave). ES Schiffl e2.0 provides many variants of these.

Stitch spacing: Spacing between two consecutive needle penetrations on the same side of a column. The smaller the value, the greater the stitch density. For more open stitching, use larger values.

Stitching defects: Stitching defects may appear in the form of gaps between filled areas, fabric show-through and thread breaks. These are often caused by incorrect stitching settings – e.g. setting pull compensation too small for the fabric stretchiness.

Stitching sequence: The embroidery objects in a design form a stitching sequence. Initially, objects are stitched in the order in which they were created. You can change the position of a selected object by cutting it, then pasting it somewhere else in the sequence, or by using the Resequence command. You can also resequence objects by color or with the Color-Object List.

Tatami stitch: Series of run stitches, commonly used to cover large, irregular shapes. Stitches are laid in rows traversing back and forth across the shape. These can be parallel or slightly turning. Different fill patterns can be created by varying the stitch length, angle or sequence. Also known as Weave stitch.

Template: Special files used to store styles and default property settings. Use templates when digitizing frequently-used design types to save time re-adjusting the current property settings.

Tension: Tautness of thread when forming stitches. Top thread tension, as well as bobbin thread tension, need to be correctly set. Proper thread tension is achieved when about one third of the thread showing on the underside of the fabric on a column stitch is bobbin thread.

Thread: Fine cord or natural or synthetic material made from two or more filaments twisted together and used for stitching. Machine embroidery threads come in rayon (high sheen), cotton (duller finish), polyester (strong and colorfast), metallics (synthetic core wrapped with metal foil or thin slivers of metal foil) and acrylic (sheen similar to rayon).

Thread chart: Thread charts are lists of pre-defined thread colors. They may be based on commercially available thread charts, or charts you define yourself. You can copy colors between different thread charts to create your own charts from existing colors. See also [Color palette](#).

Thread code: Code is the identification number of a thread color in a brand.

Thread density: Different thread density systems are used by different thread manufacturers. Density A is normal embroidery thread (density 120/2, or 40). Density B is thicker, Density C is finer, and Density D is very fine.

Thread thickness: See [Thread density](#).

Thread type: Embroidery thread varies in thickness. Types are A, B, C and D. Stitch density should be set according to the thread type. See also [Thread thickness](#).

Tie-ins: Tie-in stitches are inserted at the start of objects to prevent stitches from unraveling. They are inserted inside the shape on the second stitch. You generally use them when the previous connector is trimmed.

Tie-offs: Tie-offs are generally placed before trims to prevent stitches from unraveling. You can adjust connector settings to automatically add tie-offs

under certain conditions, or add them manually. You can also include trim functions so machines with trimmers cut the thread automatically.

Title bar: The horizontal bar located at the top of a window and containing the title of the window. On many windows, the title bar also contains the Control menu box and Maximize and Minimize buttons.

Toolbar: Toolbars provide quick and easy access to **EmbroideryStudio** commands. Click a toolbar button to activate a command or, where applicable, right-click to view and adjust its settings.

Topping: Material hooped or placed on top of fabrics that have definable nap or surface texture, such as corduroy and terry cloth, prior to embroidery. The topping compacts the wale or nap and holds the stitches above it. It includes a variety of substances, such as plastic wrap, water-soluble plastic 'foil' and open-weave fabric that has been chemically treated to disintegrate with the application of heat. Also known as 'facing'. See also [Stabilizer](#).

Trapunto: Trapunto is a general term for very open fill stitching, often used as a background or for filling large shapes. In **EmbroideryStudio**, Trapunto effect forces travel runs to the edges of objects so they do not show through open or loose stitching.

Travel run: Travel runs are typically used to connect segments of complex shapes. They can also connect adjacent objects. Because runs are not trimmed, they may be visible in the final embroidery. For this reason, they are less commonly used as connectors between objects than jumps. If objects are adjacent and connectors will be hidden, they can be used.

Traveling: You generally check a design's stitching sequence by 'traveling' through it by stitches, segments, functions or objects.

Trims functions: If you are using a machine with an automatic trimmer, the trim code causes the thread to be cut after a tie-off. In the software, trims are represented by a triangle with a small circle at the point where stitching starts again. The trimmed connector appears as a dotted line. You can adjust connector settings to automatically add trims, or add them yourself.

Trimmers: Devices built into an embroidery machine to automatically trim or cut remaining thread when the design jumps from one area to another or performs a color change.

Trimming: Action of cutting loose thread, removing backing, etc, from the final embroidered product.

TrueType Font: Digital font technology designed by Apple Computer and now used by both Apple and Microsoft in their operating systems.

TWAIN: Industry standard which allows devices (such as scanners) to communicate directly with design and layout programs. Both device and program must be TWAIN-compliant. This lets you use any TWAIN-compliant scanner with your software.

Underlay: Stitches sewn before other design elements to help stabilize fabrics. The stitching action that will attach the backing to the fabric being embroidered. It also supports the top embroidery for a more lofty, dimensional look. Underlay stitches are made up of a series of single run stitches, usually with a very short stitch length, and are digitized manually or placed automatically under the column (satin) or fill stitch areas of your embroidery design.

Values: The actual settings – letters and numbers – that you enter into dialogs. See also [Object Properties](#).

Variable sizing: Ability to scale a design to different sizes.

Weave stitch: See [Tatami stitch](#).

Weight: When referring to T-shirts, the three standard weight divisions are mid-weight/value, heavyweight/premium, and super heavyweight.

Write: To send design information to an embroidery disk, design card or embroidery machine for immediate stitchout or storage.

X/Y coordinates: The horizontal (X) and vertical (Y) distances on a graph or computer screen. Use X values to measure width, and Y values to measure height.

Index

A

ABC arrangements, see 'pattern arrangements'
arrangements, see 'pattern arrangements'
artwork
 adjusting 22
 enlargement drawings 20
 graphics files 20
 preparing 20, 22
 scanned images 20
automatic color change, machine types 67

B

Begin Jump
 see 'machine functions'
Begin Jump tool 36
Blatt
 checking for digitizing errors 50
 see also 'machine functions'
Blatt tool 36
Borer control 7
borer depth
 adjusting 48
 adjusting with digitizing tablet 49
 checking with Stitch List 47
 logical vs physical 47
 modifying 47
 see also 'machine functions'
 specifying numbering system 18
Borer Depth dialog 49
Borer Depth tool 38
Borer In tool 37
Borer In/Out
 see 'machine functions'
Borer Out tool 37
Borer tool 36, 49
Boring Tension Start/End
 see 'machine functions'

C

checking
 design rotation and size 20
 machine functions 81
 stitches 81
Clear Function tool 42
Clutch In/Out 41
color change
 automatic 67
 control 7
 see also 'machine functions'
Color Film 33
Color Palette
 Edit Thread Tool 33
colorways 33
COM port, changing 97
combining split designs 30
conversion settings, changing defaults 93
Converter, Schiffli Disk 75
converting

 designs with Schiffli Disk Converter 90
 EMB to RCC 74, 75
 tape files 91
Cord In/Out
 see 'machine functions'
Create Special Tools Flyout Borer 36
custom machine formats 14

D

decoding
 limitations 72
 options 103
default values
 encoding defaults 74
 format 93
 loading settings 96
 modifying 93
 RCC/INC 74
 saving settings 95
DEFCED
 changing defaults 93
 default settings by category 96
 encoding defaults 74
 loading default settings 96
 modifying default settings 93
 saving default settings 95
Define Color/Stop Sequence dialog 75
design files
 opening 57
 outputting 60
Design Properties dialog 33
Design Repeat dialog 25, 32
design repeats 4
 changing 71
 defining 24
 displaying 23
 displaying with FIXPAT 88, 89
 horizontal repeats 25
 number of repeats 24
 printing 65
 vertical repeats 25
 viewing 25
 viewing with digitizing tablet 26
 viewing with pattern arrangements 32
designs
 checking rotation and size 20
 converting EMB to RCC 74
 digitizing for RCC 78
 digitizing RCC 71
 INC 67
 Pentamat 67
 RCC 67
dialogs
 Borer Depth 49
 Define Color/Stop Sequence 75
 Design Properties 33
 Design Repeat 25, 32
 Edit Thread 33, 77
 FIXPAT 82
 Insert Function 42, 43, 49
 Machine Format Values 17–18, 19

Machine Format Values >
 Standard 14–15
Object List 58
Object Properties 52, 53
Open 58, 72
Open Options 58–72
Options 30
Print 65
Print Options 65
Repeats 26, 65
Save As 61
Save Options 61
Schiffli Arrangement 28, 30, 32
Schiffli Disk Converter 75
Select Input Filename 75, 91
Select Machine Format 14
Select Output Filename 75, 91
Thread Colors 77
Wilcom ES Schiffli Converter 91
digitizing tablet
 adjusting borer depth 49
 viewing design repeats 26
Disk Converter, Schiffli 75
disk formats 9, 104
drawing
 reference points 20
 scale 20
Drop Sequin
 see 'machine functions'
Drop Sequin tool 38

E

Edit Thread dialog 33, 77
Edit Thread tool 33
editing stitches 82
 displaying design repeats with FIXPAT 88, 89
 finding bad stitches with FIXPAT 86
 finding functions with FIXPAT 86
 inserting/deleting functions 85
 repairing patterns with FIXPAT 87
 showing frame movements with FIXPAT 90
 showing stitches with FIXPAT 87
 showing thread paths with FIXPAT 90
ElectroCard, transferring designs to machine 64
ElectroPunch 65
EMB
 converting to RCC 74, 75
 see also 'file formats'
emblem work 3
embroidery disk formats 104
Empty/Empty Jump
 see 'machine functions'
encoding
 options 103
 RCC/INC defaults 74
 station numbers 70
End Jump
 see 'machine functions'
End Jump tool 36
enlargement drawing
 checking rotation and size 20

- rotation and size 20
- ESL, see 'file formats'
- expanded designs 27
 - viewing pattern arrangements 31

F

- Fadenleiter Minus tool 40
- Fadenleiter Plus tool 40
- Fadenleiter Plus/Minus, see 'machine functions'
- Fast tool 37
- Fast, see 'machine functions'
- Festoon In/Out, see 'machine functions'
- file formats 11
 - Plauen 103
 - Saurer 103
 - supported 100
- FIXPAT
 - displaying design repeats 88, 89
 - displaying pattern names 87
 - displaying threads or frame movements 90
 - editing stitches 82
 - exiting 90
 - finding bad stitches 86
 - finding functions 86
 - inserting/deleting functions 85
 - repairing stitch patterns 87
 - showing stitches 87
 - utility 81
 - window 82
- frame movements, automatic 71
- French inch 3
- function states 42
- functions 86, 87
 - finding with FIXPAT 86
 - inserting/deleting with FIXPAT 85

G

- Geflecht Stitch 53
- Generate toolbar
 - Penetrations 36
- generic Schiffli machine 13

H

- horizontal design repeats 25

I

- image to repeat, adjusting 22
- INC
 - color change control 68
 - Individual Needle Control 8
 - opening files 72
- Insert Function dialog 42, 43, 49

J

- Jacquard cards 9
 - checking 81
- Jacquard Punch 97
- Jump(M), see 'machine functions'

L

- lacework 2
- limitations
 - decoding 72
 - file recognition 102
- logical
 - borer depth 47
 - machine functions 5

M

- machine controllers 64
- Machine Format Values dialog 17–18, 19
 - Standard 14–15
- machine formats
 - adjusting borer functions 18
 - adjusting needle spacing 18
 - adjusting stitch and jump length 16
 - adjusting trim functions 17
 - creating 14
 - creating custom formats 14
 - customizing for specific designs 15
 - modifying values 18
- machine functions 5
 - adjust borer depth 48
 - Begin Jump 36
 - Blatt 6, 36, 50
 - Borer Depth 7, 38
 - Borer In/Out 7, 18, 37
 - Boring Tension Start/End 40
 - Clutch In/Out 41
 - Color Change 7, 39
 - Cord In/Out 41
 - displaying 50
 - Drop Sequin 38
 - Empty/Empty Jump 39
 - End Jump 36
 - Fadenleiter Plus/Minus 40
 - Fast 6, 37
 - Festoon In/Out 41
 - frequently used 36
 - function states 42
 - general 99
 - indirectly supported 41
 - inserting 41
 - inserting manually 42, 43
 - inserting with Stitch List 45
 - Jump(M) 39
 - less frequently used 38
 - machine-specific 40, 100
 - machine-specific functions 46
 - Needle In/Out 51
 - Pause 40
 - RPM Plus/Minus 40
 - selection method summary 45
 - Slow 6, 37
 - Stepp 6, 36, 50
 - Stop 38
 - Stuepfel In/Out 41
 - supported in ES Schiffli 35, 99
 - Thread Brake Plus/Minus 40
 - Thread Roller Plus/Minus 41
 - Trim 8, 17, 39
- machine types, automatic color change 67
- machine units 3
- Menu Chart, Borer 49

N

- Needle In/Out 36

- needle spacing 3, 20
 - adjusting 18
 - setting 14

O

- Object List 58
- Object Properties dialog 52, 53
- Open dialog 58, 72
- Open Options dialog 58–72
- Open tool 57
- opening files 56
 - INC 72
 - Pentamat 72
 - RCC 72
- Options dialog 30
- output devices 64
- outputting designs
 - ElectroPunch 65
 - Wilcom Schiffli Punch 65
- outputting EMB to RCC 74
- overshooting 6

P

- paper tape 9
- Part A/B/C
 - see 'pattern arrangements'
- pattern arrangements 5, 27
 - 'out of sync' 27
 - aligning parts 29
 - applying to new design 27
 - combining split designs 30
 - renaming thread code labels 33
 - saving 31
 - viewing 31
 - viewing with repeats 32
- patterns, RCC 71
- Pause, see 'machine functions'
- Penetrations tool 36
- Pentamat, opening files 72
- physical borer depth 47
- physical machine functions 5
- Plauen
 - card format 10
 - formats 103
- preparing artwork 20
- Print dialog 65
- Print Options dialog 65
- printing
 - design repeats 65
 - production worksheets 77
 - renaming thread code labels 33
- product range, Wilcom ES 1
- production worksheets 33
 - printing 65
 - printing station information 77
- properties
 - Object Properties tool 52–53
- Punch, Jacquard 97
- punching
 - Schiffli cards 65
 - stitch files 97
 - tape files 97
 - to Wilcom Jacquard Punch 65

R

- RCC
 - color change control 67
 - converting from EMB 75
 - designs 67

- digitizing 71
- digitizing designs 78
- displaying patterns 71
- machine types 69
- opening files 72
- stations 67
- templates 70
- reading files 56
- recognition limitations 57, 102
- recognize Jumps as Trim 58
- reference points 20
 - enlargement drawings 20
- repairing patterns with FIXPAT 87
- Repeat Color Change (RCC) 7
- Repeats dialog 26, 65
- repeats, see 'design repeats'
- RPM Minus tool 41
- RPM Plus tool 40
- RPM Plus/Minus, see 'machine functions'

S

- Satin split stitch 52
- Saurer
 - card format 9
 - formats 103
- Save As dialog 61
- Save Options dialog 61
- saving files 56
- scale factor 22
- Schiffli Arrangement dialog 28–32
- Schiffli Automat 64
- Schiffli card, punching designs 65
- Schiffli designs
 - converting from tape file 91
 - showing repeats 23
- Schiffli Disk Converter 75
 - converting designs 90
 - converting stitch files 91
- Schiffli Disk Converter window 75
- Schiffli disks 11
- Schiffli file formats 11, 100
- Schiffli machine formats 14
- Schiffli machine settings 13
- Schiffli Punch
 - changing COM ports 97
 - sending files 97
 - utility 97
- Schiffli toolbar
 - Begin Jump 36
 - Blatt 36
 - Borer Depth 38
 - Borer In 37
 - Borer Out 37
 - Clear Function 42
 - Drop Sequin 38
 - End Jump 36
 - Fadenleiter Minus 40
 - Fadenleiter Plus 40
 - Fast 37
 - RPM Minus 41
 - RPM Plus 40
 - Show Repeats 25, 32
 - Slow 37
 - Stepp 36
 - Thread Brake Minus 40
- Select Input Filename dialog 75, 91
- Select Machine Format dialog 14
- Select Output Filename dialog 75, 91
- SHC, see 'file formats'
- Show Repeats tool 25, 32
- showing repeats 23
- showing stitches with FIXPAT 87

- SLC, see 'file formats'
- Slow tool 37
- Slow, see 'machine functions'
- SNC (Single Needle Control) 68
- speed control 6
- split designs, combining 30
- split stitch
 - alternate 53
 - effects 51
 - Geflecht Stitch effects 53
 - Satin 52
 - Tatami 53
 - Zigzag 52
- Standard toolbar
 - Open 57
- stations
 - assigning color sequence 70
 - encoding numbers 70
 - printing information 77
 - RCC 67
- Stepp
 - checking for digitizing errors 50
 - see also 'machine functions'
- Stepp tool 36
- stitch blocks, mapping to
 - repeat/needles numbers 74
- stitch editing
 - displaying design repeats with FIXPAT 88, 89
 - finding bad stitches with FIXPAT 86
 - finding functions with FIXPAT 86
 - inserting/deleting functions 85
 - repairing patterns with FIXPAT 87
 - showing frame movements with FIXPAT 90
 - showing stitches with FIXPAT 87
 - showing thread paths with FIXPAT 90
 - with FIXPAT 82
- Stitch Effects toolbar
 - User Defined Split 52, 53
- stitch files
 - recognizing Jumps as Trim 58
 - recognizing Stop Codes 58
- Stitch List
 - borer depth 47
 - inserting machine functions 45
- Stop codes, recognizing 58
- Stop, see 'machine functions'
- storage media 9
- Stuepfel In/Out, see 'machine functions'

T

- T10 (Plauen) 9
- T15 (Saurer) 9
- tape files 9
 - converting to Schiffli disk formats 91
 - punching 97
- Tatami split stitch 53
- templates, RCC 70
- tension control 6
- Thread Brake Minus tool 40
- Thread Brake Plus/Minus
 - see 'machine functions'
- thread code labels, renaming 33
- Thread Colors dialog 77
- transferring designs to machine
 - ElectroCard 64
 - WESS 64
- Trim, see 'machine functions'
- trimming control 8

U

- Use 33
- User Defined Split tool 52, 53

V

- vertical design repeats 25
- View toolbar
 - Object Properties 52–53

W

- WECS, transferring designs to
 - machine 64
- WESS
 - transferring designs to machine 64
- Wilcom Servo Control System 11
- Wilcom
 - ES product range 1
 - ES Schiffli Converter window 91
 - Jacquard Punch 65, 97
 - Schiffli Punch 65
- writing files 56

Z

- Zigzag split stitch 52