

Introduction to Machine Embroidery

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History of Embroidery

- Art or (handi)craft of decorating fabric or other material with needle and thread or yarn
- Fossilized remains of heavily hand-stitched clothing, boots & hat dating back to Cro-Magnon (30,000 BC)
- Pictures depicting embroidery of clothing with silk thread, precious stones & pearls (China 3,500 BC)
- Believed to have originated in Orient or Middle East, all the way to present times



Machine Embroidery

- Embroidery process whereby a sewing or embroidery machine is used to create patterns on textiles
- Used commercially in product branding, corporate advertising & uniform adornment
- In fashion industry to decorate garments & apparel
- By hobbyists & crafters to decorate gifts, clothing & home decor



Embroidery Machines



What Do You Need?

- Embroidery machine
- Needles
- Hoop
- Stabilizer
- Thread
- Fabric
- pattern



Machine (Brother NV800E)

- 850 stitches per min (spm)
- 160 mm x 260 mm embroidery area
- 138 built-in embroidery designs
- 11 styles of lettering
- Automatic thread cutter
- Automatic needle threader
- Automatic thread tension
- Color LCD touchscreen
- USB port



Brother PR-1050X

- 1000 stitches per min (spm)
- 360 mm x 200 mm embroidery area
- 516 built-in embroidery designs
- 37 styles of lettering
- Automatic thread cutter
- Automatic needle threader
- Automatic thread tension
- Full color touchscreen
- Camera function
- Jump Stitch & Wiper function
- 10 needles
- USB port



PR-1050X Operation

Manuals

Quick reference guide

Operation manual

Operation

Installing bobbin

Threading upper thread

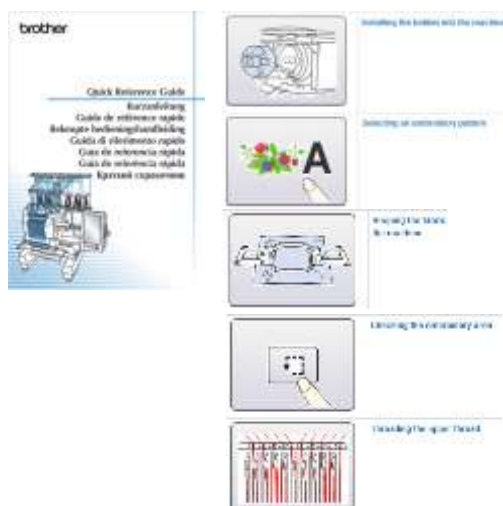
Hoooping the fabric

Selecting embroidery pattern

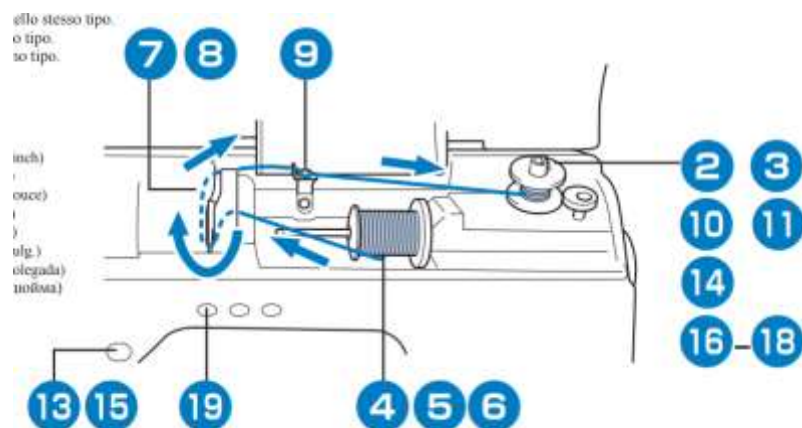
Editing embroidery pattern

Checking embroidery area

Starting the embroidery



Operation: Winding Bobbin Thread



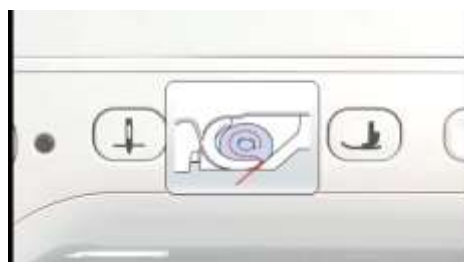
Ref: [Brother NV800E Quick Reference Guide](#)

Winding Bobbin

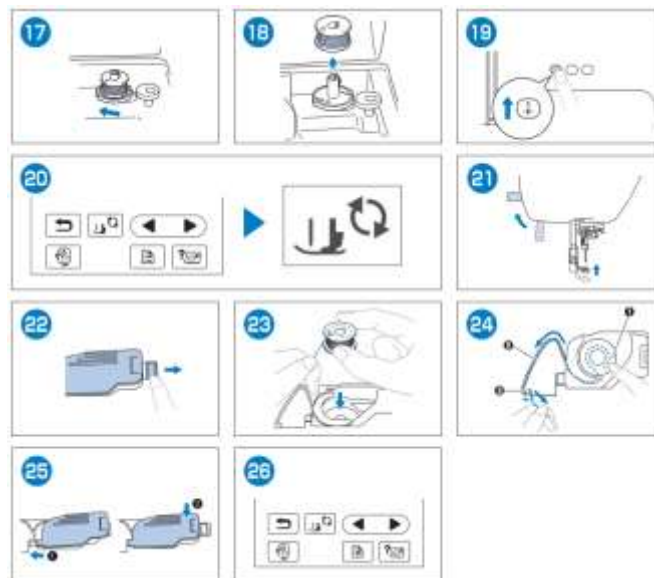
Winding bobbin



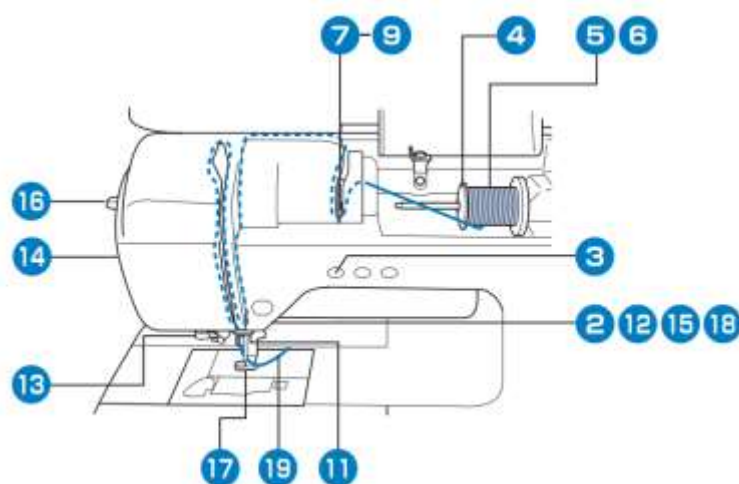
Setting bobbin



Operation: Installing Bobbin

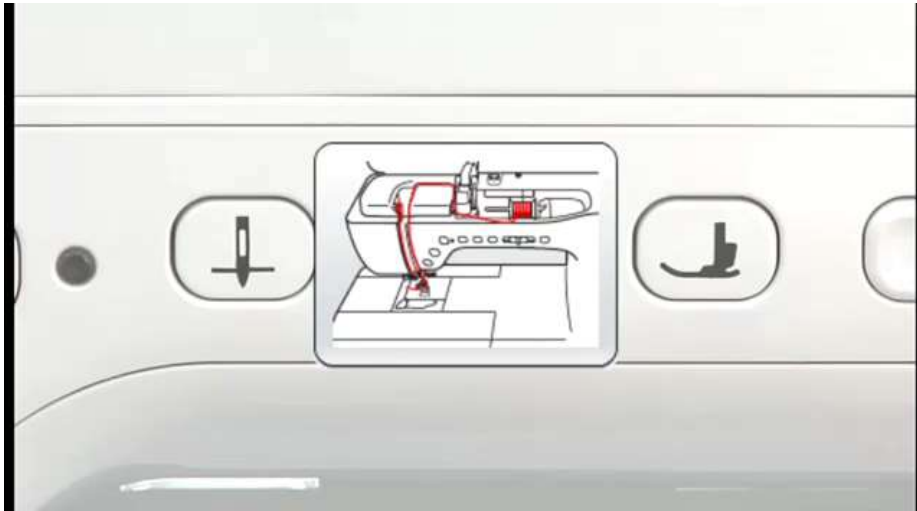


Operation: Threading the Machine

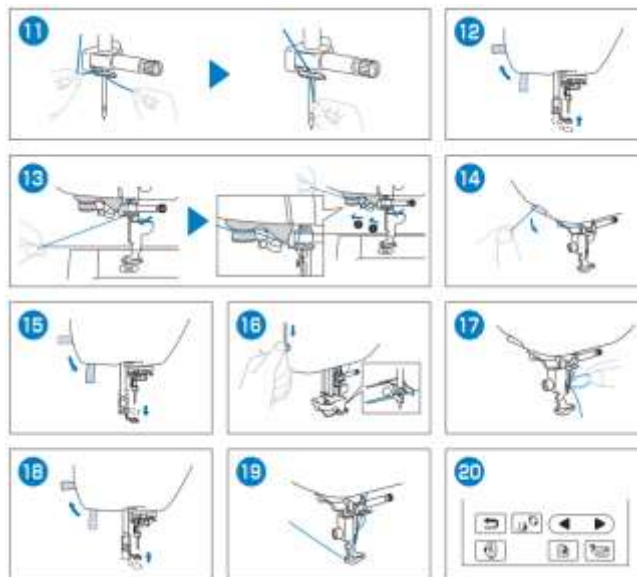


Ref: [Brother NV800E Operation Manual](#)

Threading Upper Thread



Threading the Machine



Threading the Machine

Note

- If the presser foot has been lowered and the shutter is closed, the machine cannot be threaded. Be sure to raise the presser foot to open the shutter before threading the machine. In addition, before removing the upper thread, be sure to raise the presser foot to open the shutter.
- This machine is equipped with a window that allows you to check the position of the take-up lever. Look through this window and check that the thread is correctly fed through the take-up lever.



Note

- If the needle is not raised to its highest position, the needle threader cannot thread the needle. Turn handwheel counterclockwise until the needle is at its highest position. The needle is correctly raised when the mark on the handwheel is at the top, as shown under step 3 on page B-19.

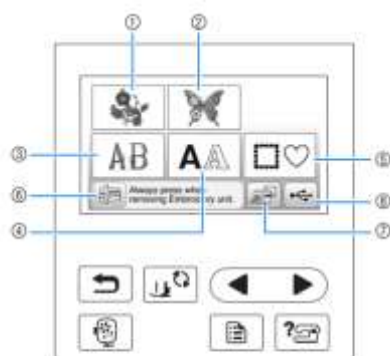
- 6 Raise the presser foot lever, pass the end of the thread through and under the presser foot, and then pull out about 5 cm (approx. 2 inches) of thread toward the rear of the machine.



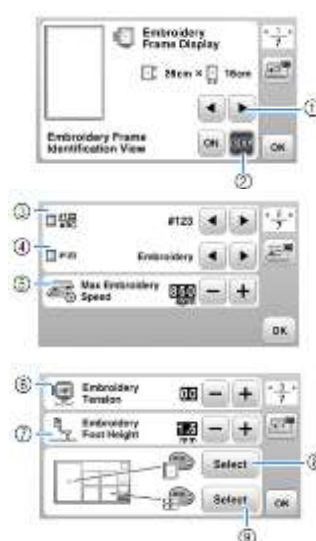
① 5 cm (approx. 2 inches)

- 7 Press to unlock all keys and buttons.

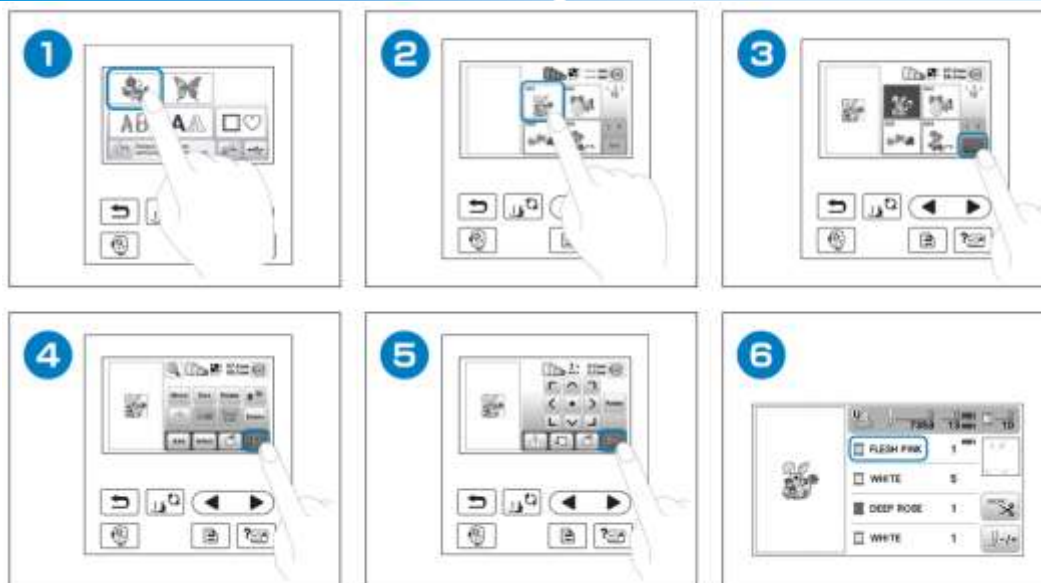
Operation: LCD Touchscreen



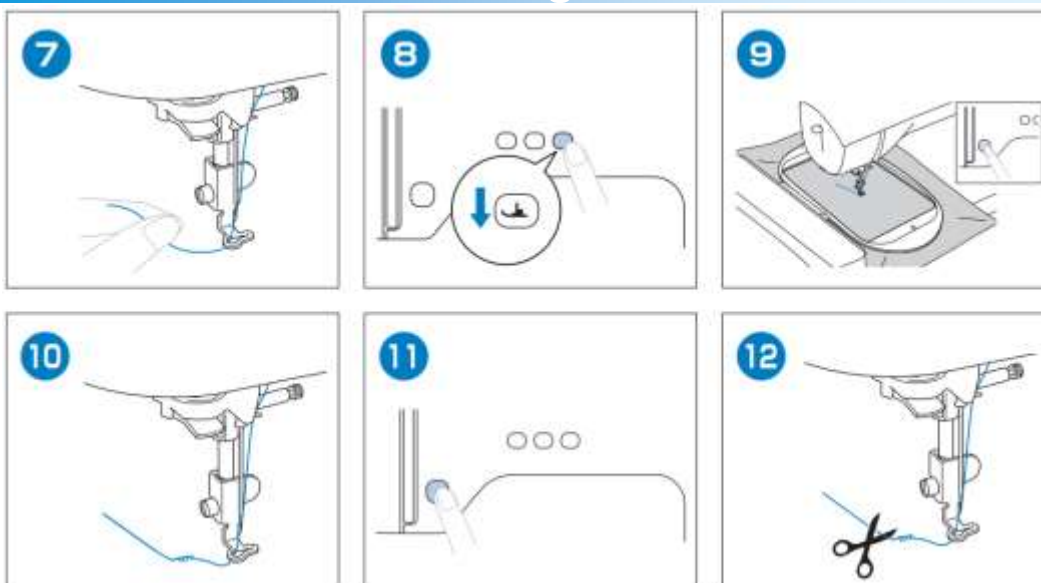
- ① Embroidery patterns
- ② Brother "Exclusives"
- ③ Floral alphabet patterns
- ④ Character patterns
- ⑤ Frame patterns
- ⑥ Press this key to position the embroidery unit for storage
- ⑦ Patterns saved in the machine's memory
- ⑧ Patterns saved in USB flash drive



Embroidering a Pattern

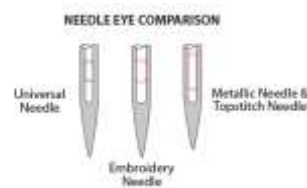
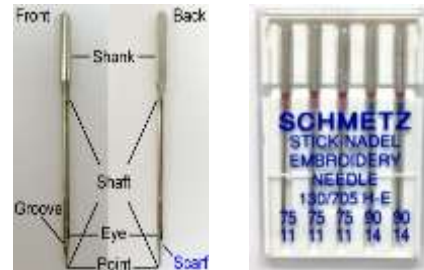


Embroidering a Pattern



Embroidery Needles

- Not the same as sewing needles
- Has flat side & round side to fit into machine
- Different types of needles for different fabrics & threads
- Use larger needle for dense fabric
- Typical size:
 - 75/11 (standard)
 - 90/14 (thicker fabric)



Stabilizers

- Plays a key role in ensuring professional looking designs
- Keeps stitches intact, prevents fabric tear, prolongs embroidery
- Types:
 - Tear-away
 - Cut-away
 - Water soluble
 - Heat-away
- Points to consider:
 - Type of fabric
 - How dense is the design?
 - How is fabric laundered?
 - Is fabric difficult to hoop?
 - Does fabric have nap or pile?
 - Type/end use of project

Ref: [How to Choose Embroidery Stabilizers](#)

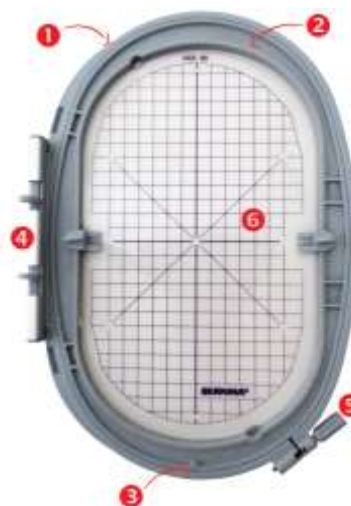
Choosing Stabilizers

Stitch Count*	Cut-Away	Tear-Away	Wash-Away
12,000 or less	PolyMesh Cut-Away	LightWeight Tear-Away	AquaFilm Backing
12,000 to 15,000	PolyMesh Cut-Away	Ultra Clean & Tear or Medium Weight Tear-Away	OESD BadgeMaster
15,000 to 25,000	Medium Weight Cut-Away	Ultra Clean & Tear or Medium Weight Tear-Away	OESD AquaMesh
25,000 or more	Heavy Weight Cut-Away	Heavy Weight Tear-Away	Wash-Away not recommended

*Stitch counts are provided as a guideline only. There are many additional factors to consider including design density. Design density is the relationship between the stitch count and design size. For example, a 4" design with 15,000 stitches will need a heavier stabilizer than an 8" design with the same number of stitches. For best results, do a test sew of your design.

Hoop Anatomy

- One of the most important aspects for beautiful embroidery
- Parts of hoop:
 - 1) outer ring
 - 2) inner ring
 - 3) alignment marks
 - 4) hoop bracket
 - 5) hoop screw
 - 6) hoop template



Hooping Technique

Hooping
embroidery frame



Hooping technique



Embroidery Threads

- Use threads specifically manufactured for machine embroidery
- Use bobbin fill for bobbins, typically 60-wt
- Types of embroidery thread:
 - Polyester
 - Rayon
 - Speciality threads
- Choose the correct thread weight:
 - 40-wt (general)
 - 80-wt (heirloom, fine)



Embroidery File Formats

- Machine formats:
 - ART (Bernina)
 - DST (Tajima)
 - HUS (Husqvarna Viking)
 - JEF (Janome)
 - PEC (Baby Lock/Brother)
 - PES (Baby Lock/Brother)
 - SEW (Janome/Elna)
 - VIP (Husqvarna Viking/Pfaff)
- Software formats:
 - ART (Bernina)
 - BE (Embrilliance)
 - C2S (Floriani)
 - DSG (Sierra)
 - EOF (Embird)
 - EMB (Wilcom)
 - PES (PE Design/Palette)

Ref: [Machine embroidery design formats](#)

Embroidery Design/Patterns

- Built-in with embroidery machine
- From embroidery design collection
- Downloaded designs
- Design it yourself



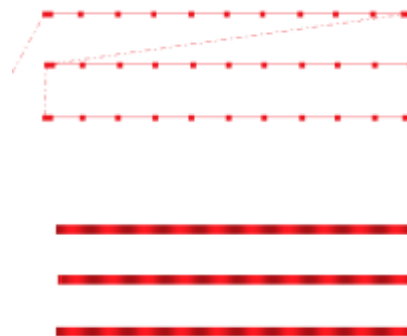
Types of Embroidery

- Lettering & Monogram
- Motif Designs
- Heirloom Designs
- Lace & Free-standing lace
- Cross-stitch
- Applique
- 3D Embroidery
- Fringe Work
- Photo-stitch
- Redwork



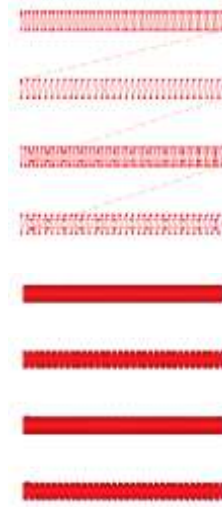
Basic Stitches: Run Stitch

- Running Stitch
 - Run pitch
 - Run time(s)
- Minimum run pitch 1.5 mm
- Maximum run pitch depends on application
 - Wearables: 5 to 7 mm
 - Wall hanging: 7 to 12 mm
- Repeats:
 - small, design design – 1x
 - Redwork – 2x
 - Bean stitch – 3x



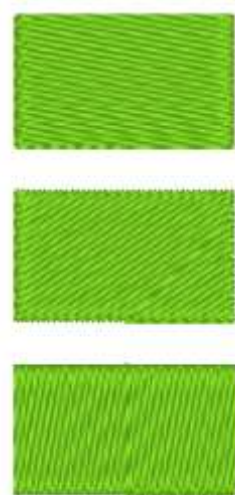
Basic Stitches: Satin Stitch

- Most reflective, 3D stitch
- Primarily for lettering & outlining objects
- Stitch length:
 - min 1.5 mm
 - Max 5 – 7 mm (wearables)
 - Max 7 – 12 mm (non-wearables)
- Stitch density:
 - Depends on width
 - < 2 mm: 0.6 ~ 0.8 mm
 - 2 – 7 mm: 0.3 ~ 0.6 mm



Basic Stitches: Fill Stitches

- For larger areas
- Stitch length:
 - Min 1.5 mm (not recommended)
 - Max 5 ~ 7 mm (wearables)
 - Max 7 ~ 12 mm (non-wearables)
- Stitch density:
 - Default: 0.4 mm
 - Base fill: 0.4 mm
 - Subsequent fills: < 0.4 mm
- Fill angle



PE Design: Stitch Density

PED10/11 (l/mm)	FCTU/Hatch (mm)		PED10/11 (l/mm)	FCTU/Hatch (mm)
2.5	0.8/0.8/0.9		4.5	0.4/0.5
3.0	0.7		5.0	0.4
3.5	0.6/0.5		5.5	0.3/0.4/0.4
4.0	0.5		6.0	0.3/0.3/0.4

Embroidery Software

Commercial

[PE Design 11 \(trial\)](#)
[Wilcom Hatch 3](#)
[Wilcom Embroidery Studio](#)
[Embrilliance](#)
[Embird](#)

Free Software

[Inkscape/Inkstitch](#)
[Turtlestitch](#)
[SophieSew](#)
[Embroidery Toolshed](#)
[2Stitch Organizer](#)
[Bernina Artlink](#)
[Wilcom Truesizer](#)
[Embroidery Explorer](#)
[Embroidermodder](#)
[PEmbroider](#)

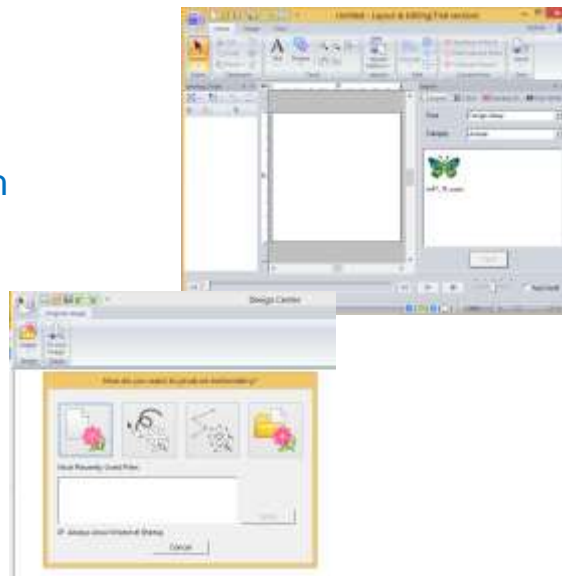
PE Design Basics

- Leading embroidery design software
- Over 1000 built-in designs
- Over 100 fonts, including 10 built-in small fonts
- Patch, applique wizards
- Many types of stitches & fill patterns
- Photostitch
- Intelligent color sorter
- Usb dongle



PE Design 10/11 Modules

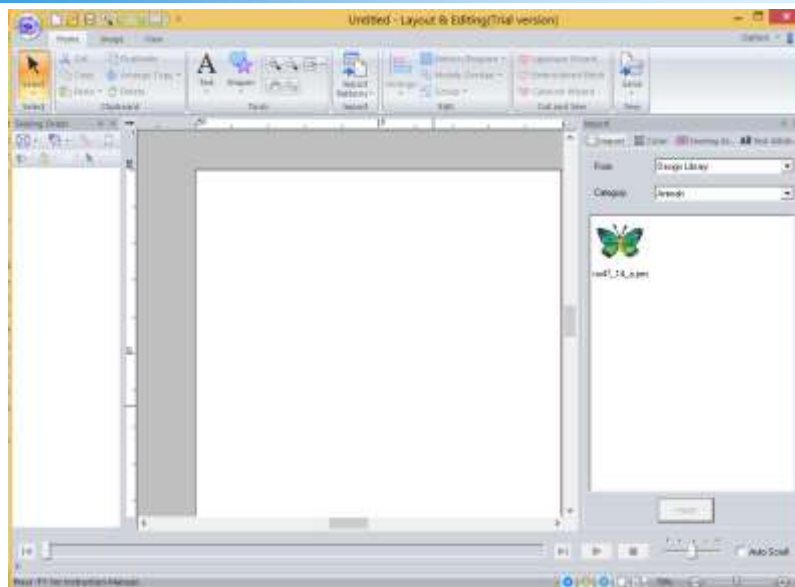
- Layout & Editing
- Design Center
- Design Database
- Programmable Stitch Creator
- Font Creator



PED10: Startup Screen



PED10: Layout & Editing



Ref 1: [PED10/11 Startup Reference Guide](#)
 Ref 2: [PED10/11 Instruction Manual](#)

Basic Layout & Editing

- Wizards
- Design Settings
 - Set Hoop Size
 - Fabric Selector
- Design Property
- Text Tools
- Shapes
 - Outline
 - Rectangle/Circle/Arc
 - Manual Punch
- Import Patterns
- Image tab:
 - Open > File
 - Stitch Wizard
- View tab:
 - Solid/Stitch/Realistic view
 - Attributes
 - Color
 - Sewing
 - Text
 - Grid settings
- Reference window
- Sewing attributes
 - Line Sew
 - Region Sew

Project 1: Monogram

Be Happy

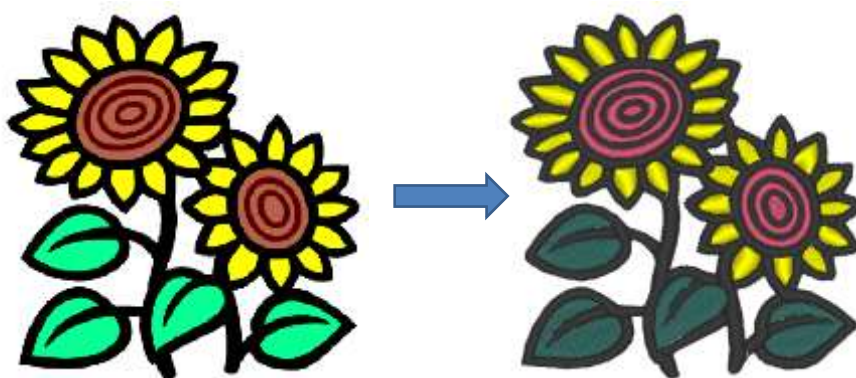


Smile!

Project 2: Embroidered Patch



Project 3: Basic Digitizing





Embroidery Practice

