UNDERLAY

The Foundation

I like to say, "Underlay is cheap". I use this phrase because underlay reduces the need for heavy top stitches without adding a significant number of stitches. There is a misconception that underlay means "wasted stitches" and pads the design's stitch count. I can't deny that I have heard punchers say they used such tactics to drive up the price of designs; and this only supports my philosophy that the price of embroidery design work should be based on complexity and not stitch count.

I'm ashamed to say those people are from the same profession, but the truth is, the underlay they are "sneaking" into their designs in no way resembles the underlay I will teach you to use. I look at some designs and it appears the designer was merely going through a mindless routine, clicking at random within the object's boundaries until they thought they had clicked enough times. Then other designs appear as though the designer had never heard of the term underlay. There were a few travel stitches present, but they did little good at all. In many cases, underlay is either non-existent, sparse or inconsistent and sporadic

Underlay has a purpose, and when you place underlay, you should do so with that purpose in mind. Underlay is not random, it's planned. To properly select which form of underlay to use you must have a understanding of fabrics, embroidery limitations and the desired look. The following example was part of a larger design. I thought it made a good example because of it's content and mostly because it lacks proper underlay. The embroiderer sent the

logo to us to edit because it didn't sew well and was "especially poor in the word Embroidery", the customer warned. Those comments didn't surprise me in the least. If we take a closer look at the uppercase "E" we can see it begins to sew at the little circle in the center of the vertical stem, runs to the end of the center stem, satins back to the left, runs to the end of the upper stem and then satins around to the end of the bottom right stem. What may appear to be underlay is actually only travel stitches.

Then in the lowercase "m" it seems the designer decided to run to the end of the letter and back again. In the M's center vertical stem there are two runs of underlay and one travel stitch, three runs in all. If the designer felt this was needed on the M, why wasn't it needed in the E? The required underlay isn't based on what you feel like putting out at the time. It should be consistent, orderly and full of pur-

pose.

By comparing the "E" to the "m" we can see this underlay isn't consistent at all. How about orderly? Look closely at the letters "e" and "r". The underlay in the upper portion of the "e" hugs close to the edge of the satin, where it should be centered. Again in the "r", the underlay isn't centered and runs at an angle from the bottom to the top. The line of stitch running vertically on the left side of the "r" is not underlay, but a jump stitch due to poor pathing.

There is no reason for the underlay to be so sloppy. The discipline required of designing orderly underlay follows through in other design areas. As much as I promote creative thought, digitizing requires many rigid disciplines and underlay is just one.

Consistent

Each pass of underlay will build a bridge between the fabric and top stitches. The more underlay, the higher the top stitch will be lifted up and a different look will be acquired. If the underlay isn't consistent, then one letter may appear fuller and others could look very weak. This was the case between the "E" and the "m".

This doesn't mean if you use two passes in one letter, there must be two passes and no more in every single letter. This simply isn't possible, because proper pathing will result in odd numbers of passes as often as not. What it means though, is if one pass is needed, sometimes there will be two, or if two passes are needed, then sometimes there will be three. It also means if two passes are needed, then to sometimes have none is unacceptable.

In the case of fill stitch areas, random underlay patterns result in random coverage by the top stitch. The underlay pattern must be consistent throughout the fill area to achieve a uniform look after the top stitch is applied. Random underlay, whether for fill areas or satin, normally have random stitch lengths as well. Soon you will learn what effects can be achieved with different stitch lengths, but for now lets just say that random lengths will give you random effects, a sure killer for effective underlay.

Orderly

Underlay which is misaligned or isn't centered can cause many problems. For starters, the underlay is ineffective. If underlay is off to one side on a column, any effects desired from the underlay on the other side are non-existent. It's as though there isn't any underlay at all. This is noticeable on finished products where the thread density appears satisfactory on one side of a satin column and weak on the other side. Center run underlay needs to be in the center. Secondly, underlay too close to the edge tends to "pop" out. This is seen when going around curves as in the example of the "e". It seems to be natural for designers to cut too close to the inside when going around curves. Sometimes it's exaggerated by using too long of a stitch length. This explains

This is the way the lettering and underlay looked after we edited it.

Look over designs you have done and see if you aren't cutting it close to the inside of curves.

why you may often see underlay stitches popping out on the inside of curves. On very small letters these stitches popping out on the inside can close up the holes in lower case letters such as "e" and "a". Keeping the underlay centered will eliminate this problem.

Purpose

There are three main reasons for underlay; to secure the target fabric to the backing, to reduce the push and pull effect and to raise the top stitches up off the garment. In any given application, you may be applying underlay for one or all three of these purposes. In addition there are several different types of underlay; center run, edge walk, zigzag, double zigzag and fill stitch. Each of these underlay types accomplishes different effects. The type of underlay you choose will be determined by the purpose of the underlay.

❦ When you know what purpose your underlay is intended to serve, then your underlay will be effective.

Secure the target fabric to the backing

It's important to properly hoop the garment, but the target fabric can still slide around causing registration problems and fabric bunching. Using underlay to secure the target fabric to the backing will reduce the chances of this happening.

Reduce the push and pull effect

Unlike ink, thread objects such columns and fills, pull in or push out on the fabric. We refer to this as the "push and pull" effect. Underlay pins the top fabric to the backing and reduces the amount the garment will push or pull.

Raise the top stitches up off the garment

Embroidery stitches sink into plush fabrics. Underlay can provide a bridge which lifts up the top stitches out of the fabric. This allows for the top stitches to be set with a lower density. Attempting to increase density in-lieu of proper underlay creates very thick embroidery referred to as "bullet proof" embroidery. Bullet proof embroidery tends to pucker and curl at the edges.

❦ Bullet proof embroidery is only acceptable if your niche market is the FBI or another law enforcement agency.☺

Multiple purposes

Since you may be applying underlay for more than one purpose, and because the different types of underlay accomplish different effects, it only stands to reason you may be applying more than one type of underlay in order to fulfill all the underlay needs. Once you determine the purpose for your underlay, then choosing the type underlay is simple. Master this concept, and your embroidery will never look the same again, because underlay selected with a purpose will improve the quality of your embroidery immeasurably.

Types

The type underlay you choose will be determined by what purpose the underlay is to serve. Any combination of underlay types can be applied in order to achieve the underlay's purpose. There are very few instances where some sort of underlay would not be useful. One such example would be very fragile garments like christening or wedding gowns where a tone on tone effect will be used. In situations like this, the thread and garment are the same color and underlay is not required to block out the fabric.

Center run underlay is given it's name because it runs through the center of column objects. The underlay is shown here in blue. Center run is used for thin columns and serves both purposes of securing the target fabric to the backing and lifting the top stitches up off the garment.

In this illustration you can see how the underlay thread running up the center of a column would lift or bridge the top stitches up off the fabric.
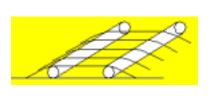
When no underlay is applied, the thread making up the satin column lays flat on the fabric. This not only makes the embroidery look flat, but it allows the grain or nap of the fabric to peek through. Many new designers would increase density to block out the fabric peeking through, but it would be more effective to apply the proper underlay.

Edge walk underlay is given it's name because it walks along the edge of the object. When satin columns become too wide for center run underlay to remain effective, edge walk is used to provide the same effect. As with the center run, edge walk lifts the top stitches off the fabric. Sometimes you may use center run to secure the target fabric to the backing and then edge walk to provide the lift effect.

When you compare the two illustrations with underlay to the one without underlay, it's easy to see how effective underlay is at lifting up the top stitches. This is mandatory on any fabric with a texture or nap. It wouldn't be as necessary for fabrics such as nylon, unless you're trying to achieve a raised look.

Zigzag or Double Zigzag underlay provides additional loft than what can be achieved by center run or edge walk. These two underlay types are especially effective at lifting the top stitches on fabrics such as pique, terry cloth and fleece. Due to their lofting

📁 *Underlay01*

🍓 *Your software may use different terminology. I will describe each type of underlay and you will then apply the techniques in the way you see appropriate.*

📁 *Underlay02*

📁 *Underlay 03*

characteristics, they are also used to give life to design aspects such as leaves or muscle tone to animals. Zigzag underlay is often used in addition to center run underlay where the center run is securing the fabric and the zigzag is creating the loft. This combination is the most under-used of the underlays, but when used at the appropriate time can set your design apart from others.

📁 *Underlay04*

Fill underlay can best be described as a light density fill, normally running perpendicular to the top stitch. The fill underlay anchors the target fabric to the backing and is the best way to reduce the push and pull factor so common to fill areas. It also lifts the top stitches up and allows a much less dense fill to be applied. This is the best way to prevent your designs from suffering from "bullet proof" fill areas.

First placing an edge walk underlay and then a fill stitch underlay has proven to be the best combination for medium to large fill areas. I refer to this as "trapping the fill".

Auto-underlay was not mentioned as a type of underlay, because it isn't a type of underlay, but a method of applying underlay. Of the types listed, you may apply any of them by either placing them manually or by automatic means. It's fitting though to mention auto-underlay here, because some of you might be thinking you won't ever need to apply what I just taught, because you have auto-underlay features in your software. Be careful!

As mentioned earlier, automation speeds along our work, and auto-underlay is a perfect example of this. Software can automatically add the desired underlay we select, but it can't determine which underlay to select. Your software may have default values, but you must move past what I call the "World of Default" and begin controlling your designs. The software doesn't know if the target fabric is nylon or terry cloth. Only you, the designer, knows this and have the ability to respond intelligently.

Utilizing auto-underlay as a means to quickly apply the proper underlay is smart business, however without the proper knowledge of what the purpose of the underlay is, you can't select the appropriate underlay. Can you imagine what the software is applying by default? I don't want to think about it.