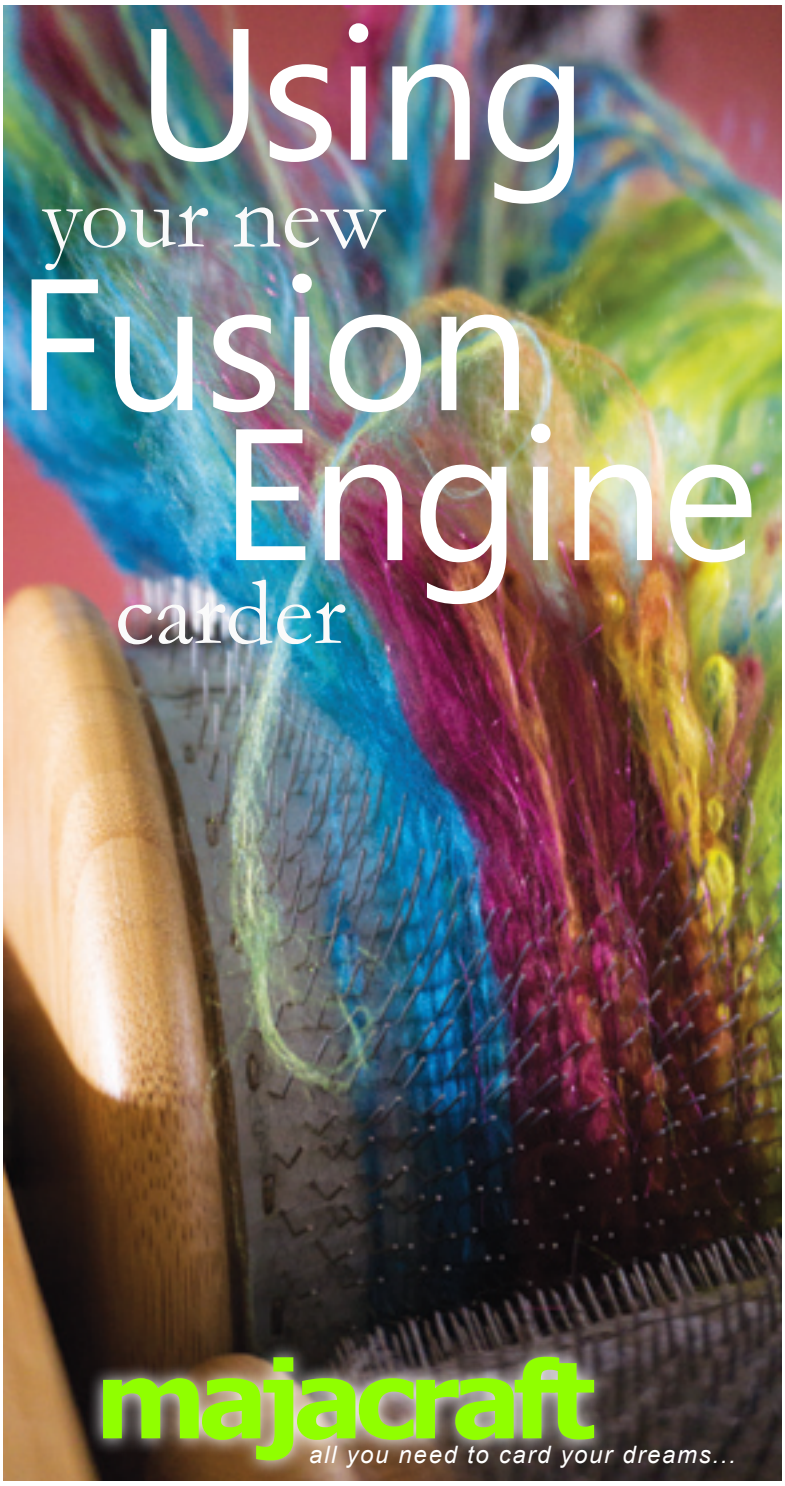
Using
your new
Fusion
Engine
carder
majacraft
all you need to card your dreams...

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Welcome to the Majacraft family

Congratulations on purchasing your new Majacraft Fusion Engine carder.

The seeds of this carder started with a conversation with Pluckyfluff (Lexi Boeger) in 2009. She discussed with us the sort of features she needed from a carder and these kind of challenges always get the Majacraft creative juices flowing. The carder existed for many years after that as sketches, rough prototypes experimenting with different ideas as well as one or two working models. Other friends of Majacraft provided impetus along the way to help keep the project moving. So thank you to those who helped and encouraged along the way!

Majacraft creativity has been applied to the design of this carder to make it as versatile, effective and simple to use as possible. Ideas like the specially shaped drums that actually draw the fibre on the drum, easily changeable drums, adjustable feed tray, integrated gearbox that is always positive and never slips like band driven carders, a ratcheted packer brush that stays where you put it, ability to use it as a left or right handed machine and new picker design that does not damage the carding cloth allow you to card your fibre in new ways.

We design our Majacraft craft tools and accessories to be compatible with each other and have interchangeable components. If you have an interest in a specific technique, we are likely to have specialist accessories that will fit straight on to this carder or tools to make creating easy. Talk to your dealer, visit our web site or email us directly and we will do what we can to help.

Thank you for choosing Majacraft, it is your belief in us that motivates the innovation and creativity to building captivating tools for you.

From the team at Majacraft, Good carding!

Fusion Engine features

The Fusion Engine has many new subtle and not so subtle innovations. By outlining these features, we hope you will be able to expand your experience of this tool.

It uses a gearbox

The fusion engine has a gearbox - with real gears! This was chosen as it could offer multiple benefits. Firstly it makes the mechanism for changing the ratios between the main drum and licker-in much more compact, small enough to be embedded into the side of the carder. This consequently will keep your carder cleaner as the gears are hidden away and will not get clogged with fibre and other debris.

A gearbox also permits running a much greater ratio in a compact space. Typically carders have between 3:1 and 4:1 gearing ratios. The Fusion Engine has a ratio of 8:1 which will produce a more evenly blended batt.

Great for lefties and righties

The axle on the main drum has been specially drilled to allow it to be inserted on either side of the carder. By unscrewing the M6 grub screws on the main drum, the carder can be adjusted to suit left or right handed users. Inserting the axle assembly from the Passive side (the side without the gearbox) of the carder will suit left handed carding artists better.

Easy to adjust

The licker-in drum is mounted on the two actuators which can be very simply adjusted by unscrewing the locking JCB bolts - the gearbox cover does not even need to be removed for this. A 4mm T-wrench is provided for this purpose.

Lickers and trays

The feed tray position is different to most other carders. Our experiments demonstrated that the more time the fibre spent on the licker-in, the more effectively the carding process worked. This is why the feed tray is positioned so high.

We also made the feed tray adjustable. Underneath the tray is an easy-grip wooden nut that lets you position the feed tray close or far from the licker-in. The ability to adjust the tray lets you card anything from washed fleece to combed tops.

Clampable

The carder has four holes around the sides. These have been added to allow you to clamp the Fusion Engine to a table or bench. Two clamps have been included for this. When the machine is clamped, the combination of rubber feet and the clamping means your carder will not move while you work. A special clamp has been designed to hold the carder extra firmly on the corner of a table.

Multiple drums

A major feature of the Fusion Engine is the ability to change drums. From a financial perspective this makes great sense as you do not have to purchase multiple carders to do different jobs. Your carding then becomes considerably cheaper and your machine far more versatile. Should your carding cloth ever wear out, it is not necessary to purchase an entirely new machine.

Functionally, you can purchase one Fusion Engine with different main drums and be able to carry out different specialised tasks with the one machine.

Magic drums

The Fusion Engine drums have a new construction technique that offers several benefits. The most obvious being the prominent edges that are designed to keep the fibre on the drum and prevent it from clogging around the axles. The special shaping of the edges actually draws the fibre on to the drum - almost to the point of appearing as though it is 'sucking' the fibre in. This in turn significantly reduces the maintenance and cleaning required for your carder.

Power brush

We have added a brush to the Fusion Engine so that more fibre can be packed on to your drums. Our design differs in that the brush is positioned near the back of the main drum so as much of the drum is exposed as possible. This makes it easier to remove the batt after carding. It also leaves a clearer space to work if you wish to lay fibre elements directly on to the main drum or to diz from the drum.

The brush is secured in place using a ratchet mechanism so once you set the pressure of the brush, it will not slide out of place which can happen with brushes held by nuts and bolts. It is also easier to position by simply clicking the gears on the ratchet rather than having to tighten nuts as firmly as possible - only to have them move when you don't want it.

Foldy handle

The Fusion Engine has a folding handle. The primary benefit with this feature is that it allows the carder to fit into a more compact space. It is very strong and attractive and made from a reinforced thermoplastic. Overall, the transport of this carder is much easier by the inclusion of the folding handle.

Many testers of the Fusion Engine were excited by the prospect of no more bruised hips that they have had to accept for so long when they would clip the handle with their body when walking past.

The handle is positioned so that it can be turned and clear the surface the carder is sitting on. While recommended, it is not essential that you use the carder on the edge of a table.

Direct Injection

Because this carder is so effective at blending fibres, techniques like the "Fibre Sandwich" that require **less** carding can be slightly more difficult. So to accomodate this, we included provision for the Direct Injection feed tray that supplies the fibre to the licker-in much later. Hence the fibre sandwich can be fed into the machine and minimal blending of the batt will occur. A pair of screws secures this tray onto the main brace.

And hidden extra bits...

There are many other small features we have included to make this the best tool we can. Whether it is the rubber feet underneath the Fusion Engine that stops it sliding on smooth surfaces or the gentle picker which does not damage your carding cloth we are certain you will be surprised and delighted at what you can create on your new Majacraft Fusion Engine.

Let's get started carding

Without a doubt, you are simply bursting to get started carding. This is the place to start reading!

If you are unfamiliar with any of the components or terms, skip to the appropriate pages listed below.

Fusion Engine Description - page 8

The Jargon - page 9

To card some fibre or other materials for spinning or felting, you will need to go through four steps, fibre preparation, machine setting, carding and batt removal. Enough of the talking, lets go...

This is not going to be the last time you read this but it is really important so listen hard

DON'T DON'T DON'T CARD A GREASY FLEECE!

IT WILL RUIN YOUR CARDING CLOTH

What you will need

Fibre

Fibre preparation

If fibre is not clean then you will need to wash it. Choose a gentle washing detergent like soap flakes and leave it overnight to dry. There are plenty of great tutorials on YouTube if you search for "washing fleece".

The fibre may have some knotty staples still in it. You can use the cleaning brush or a flick carder to loosen these up a little before you start carding.

Carder setting

1. Put the carder on the corner of a table and use the two Majacraft clamps to secure it to the table. The handle should be off the side of the table so you don't hit your knuckles when you turn the carder handle.

2. Set the feed tray position by loosening the lock nut underneath the tray and then retighten it when it is in position. The tray should be close to the licker-in for fine or previously carded fibre and far from the licker-in for rough or tangled fibre.

3. If you are going to use the brush to pack more fibre onto the main drum, click it into position using the ratchet mechanism.

Carding the fibre

1. Spread the prepared fibre on the feed tray touching (or very close) to the licker-in. Fibre should not be too thin on the tray that there is nothing to card but not so deep you can't see the carder under it! There are different trains of thought as to how to lay the fibre down, you can lay it in line with the direction it will be drawn in or alternatively across the line of the licker-in, each with compelling reasons. For now it is simplest to lay the fibre in the direction it will be drawn in - perpendicular (at a right angle) to the licker in axle.

2 Turn the handle in the clockwise direction - assuming right-hand configuration and looking from the Active side. This will draw the fibre on to the licker-in where it will be transferred on to the main drum. Do not hold the fibres back as you turn as they will bind tightly on to the licker-in and not transfer cleanly. It is not possible to crank too slowly - apart from taking you a long time - but it is possible to crank too fast. So turn at a steady pace.

3 Load more fibre on to the feed tray and card it on to the main drum until the drum is full. This is when there are fibres at the top of the tines or even protruding past the top of the tines. Putting more pressure on the packer brush will let you fit more fibre in your batt.

4 Take the pressure off the packer brush by lifting the ratchet up and rotating the brush out of the way of the main drum.

5 Turn the crank handle to the bottom of the stroke (when the Fusion Engine is in the right handed configuration), the join in the cloth on the main drum will now be at the highest point. Take the picker tool and slide it along the aluminium groove lifting and separating the batt as you go. Do this across the main drum until there is a free edge of carded fibre in the air.

6 Now carefully pull the batt from the drum, 'peeling' it downward and away from the cloth. You will be working from the top of the drum and peeling toward the packer brush at the rear of the carder. You may need to turn the handle a little counter-clockwise to keep exposing the carded fibre on the drum ready to peel it away more. Do this until you have the batt free of the drum.

Finally

The batt is now ready to spin or felt and can be rolled up for working with later.

If you are not happy with how well carded the batt is, you can separate it length ways and run each of the two halves through the carder again to get a more even blend of your fibres. First card one half and then follow it through with the other.

If there is fibre left on the drum and you have a new project, you may need to use the cleaner brush to clear the fibre from the main drum and the licker-in. Gently draw the cleaner brush through the tines in the same direction the tines are pointing. Sometimes a rolling action can be more gentle on the carding cloth. Repeat with the licker-in.

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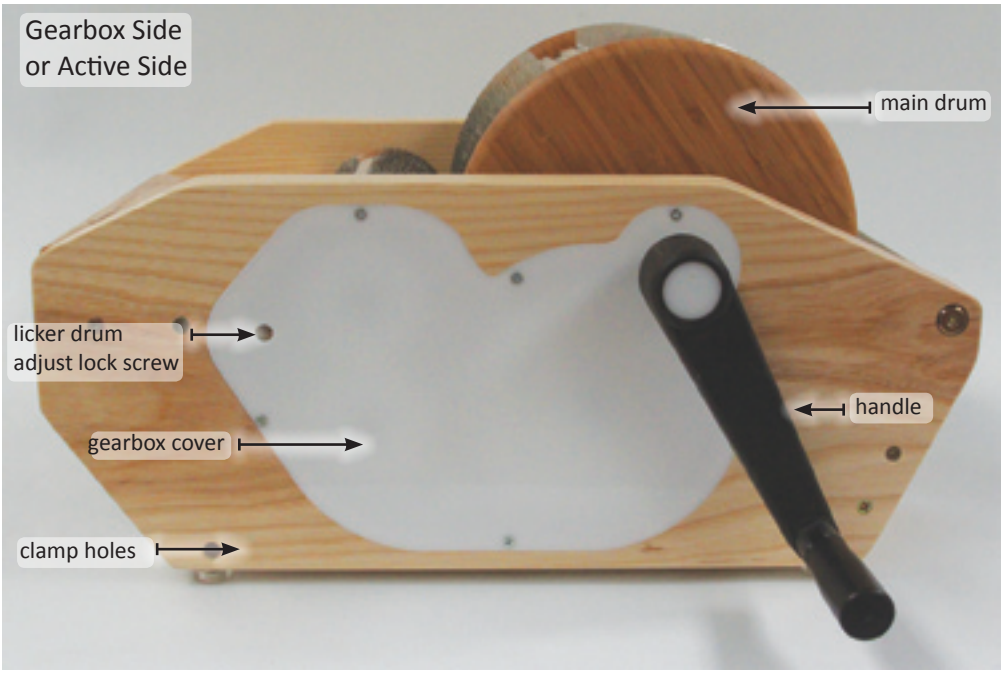
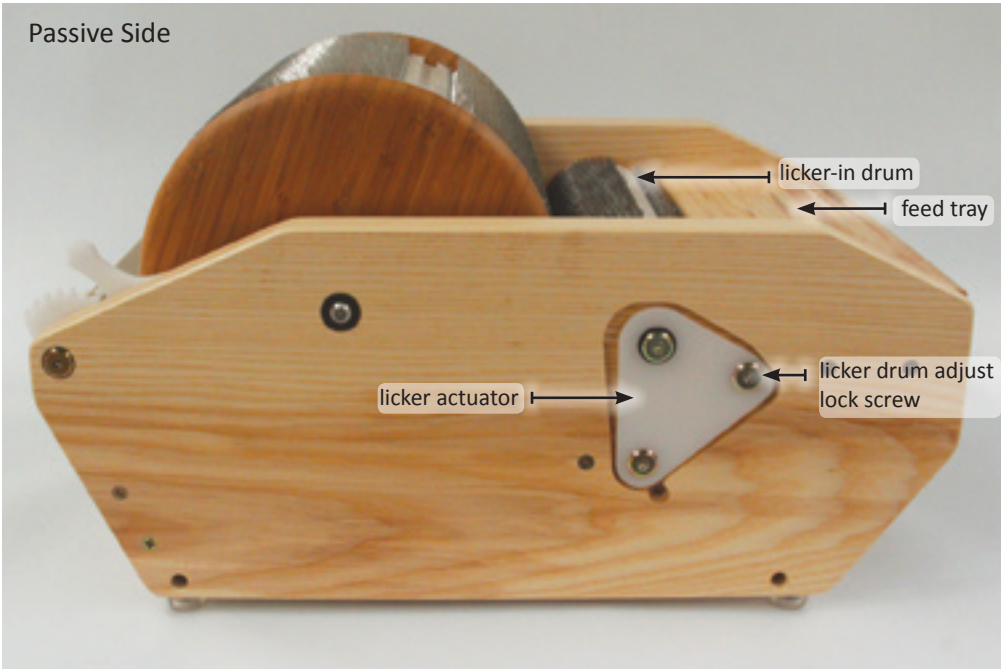
Fusion Engine description





The jargon

The Main Drum is the large drum at the rear of the carder. It is involved in the transfer of the fibre from the Licker-in and does the final aligning and blending of fibres in the carding process. The drum has specially designed edges that draw fibre onto the drum and keep it there while reducing the build up of debris around the axles.

The Licker-in is the small drum closest to the Feed Tray at the front of the carder. This does the initial aligning of the fibre in the carding process. The Licker-in drum also has specially designed edges that draw fibre onto the drum from the Feed Tray and keep it there while reducing the build up of debris around the axles.

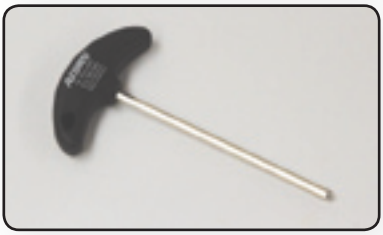
The adjustable feed tray is at the front of the carder and is one of the important Fusion Engine features. It is positioned close to the top of the Licker-in so the fibre has as much opportunity as possible to align on the Licker-in drum. It is also movable so you can adjust the separation between it and the Licker-in dependent on the type of fibre you are carding. It also has a special scoop tray to make sure the fibre stays on the Licker-in rather than dropping out of the way or doing a straight transfer from the Feed Tray to the Main Drum.

The integrated gearbox is another major feature of the Fusion Engine carder. It is contained in the side of the carder and is covered so that it eliminates any clogging up with fibres. The gears will NOT slip unlike belt driven carders. The configuration of the gearbox has allowed the carder to have a high ratio of 8:1 between the Main Drum and Licker-in and yet is very compact. We have also designed the gearbox to allow adjustment of Licker-in to control the drum separation which is unique in a gear driven design.

The Packer Brush design is also unique on the Fusion Engine. It has a ratchet mechanism that locks it into position and will not move and change the pressure on the fibre as bolted brushes do. It uses natural fibres in the brush that pack down the fibres and minimise any fibre picking up from the batt. If you do not wish to use the brush, it can simply be rotated out of the way.

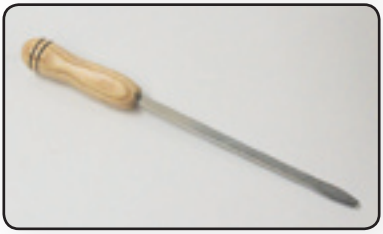
The licker-in Acutator is used to adjust the separation between the two drums. It has a single JCB bolt locking it in place which is located closest to the front of the carder.

Clamping holes are present at each corner of the Fusion Engine to allow you to use the two Majacraft clamps provided to secure the carder to a table. It also has rubber feet to prevent the carder from slipping during use.



The 4mm Allen T wrench is used to adjust the drum separation

A 3mm Allen T wrench is used for removing the Main Drum for cleaning or changing



The Majacraft Picker tool is slightly different to most pickers. Rather that a pointed tool that makes it very easy to damage the carding cloth on your drums - and hence reduce the life of the drum - this picker has an end that is smooth and rounded. It lets the user slide it easily underneath the batt while eliminating the possiblity of unnecessary damage to the carder.

The Main Drum picking groove is a metal slot that secures the ends of the carding cloth and provides a location for the picker tool to slide along and remove the batt.

Two Majacraft bench clamps are included with the Fusion Engine. One is the standard clamp as used with hackles and comb systems. The standard clamp will secure a hole that runs perpendicular to the edge of a table. Use this clamp on the side of the carder when clamping it to a table.

The second clamp has right angle bend in the metal frame and has been specially designed to secure a hole that runs parallel with a table edge. Use this clamp on the end of the carder when clamping it to a table.

The lightweight and ergonomic Majacraft Cleaning Brush is used to remove fibres stuck to the drums. It is also an excellent flicker tool as well.

The brush has special plastic caps on the cloth ends to provide nice clean lines.

How to card fibre

This is a more thorough explanation of the carding process, expanded from the brief description on page 6

Preparation

Carders are very effective at straightening the fibres and adding loft to the finished batts. They are not, however, capable of working miracles. So if you think you can feed in a felted, lumpy mass resembling a dreadlock, and expect the carder to produce a beautiful batt, you will be disappointed. That aside, let's get started.

If you are starting with a washed fleece (remember, do not card unwashed fleece!), you may wish to line all the fibres up the same way on your table. Cut ends at one end and the tips of the fibres at the other. If the fleece is still quite clumpy then it is recommended to use a flick carder or the little cleaning brush to tease the locks open at either, or both ends. It is not necessary to do this excessively but it will help you produce a nicer batt first time around from your Fusion Engine.

Different fibres may require different preparation techniques but doing this teasing in fibres that have some matting will set you up well for the carding process.

Laying the fibres out with the ends approximately lined up.

Flick carding to open up the locks ready for feeding onto the carder.

The teased fibre on the feed tray and ready for carding.

Fixing to a table

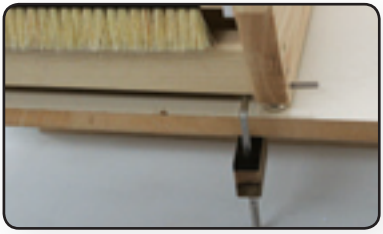
If you have very gentle carding to do, for example combed top, you may be able to do this with the carder sitting directly on the table top. If the batt you wish to make is going to have a lot more texture and is using uneven or tough fibre or possibly large quantities of fibre, then you will need to clamp the carder to a table top. Two clamps are included with your Fusion Engine. One will be very familiar as it is a standard table clamp. The second has an extra bend in the stainless steel shaft that is specially designed to hold the carder very securely to the corner of a table.

Whether to have the feed tray pointing away from the table or toward the centre of the table when positioning the carder on the table corner is a matter of personal preference. Some good reasons for having it pointing to the table centre are having the fibre immediately on hand to load on to the feed tray and there is easy access to the main drum for removing the batt after carding. You will learn what you like in time.

Position the Fusion Engine at the corner of the table. The carder sides go to the edge of the table but do not need to overlap.

The standard clamp will go in the clamping hole beneath the feed tray. Tighten it up.

The special clamp will go through the hole on the other side of the carder (most likely the passive side if you are right-handed) underneath the main drum. It may have to be pushed in from the inside of the side as the extra bend is intended to extend back over the table so the clamp will pull down firmly. When pushed in, tighten this clamp too.



The Fusion Engine is now secured and ready for the carding to begin.

Setting the feed tray

The Fusion Engine feed tray is quite unique as it is positioned differently to many other carders. It has also been designed to be adjusted quickly and easily.

Underneath the feed tray, there is a large wooden nut. If you loosen this nut about half a turn, you can slide the entire tray to be close to or far from the licker-in. When the feed tray is positioned as desired, retighten the nut to secure it in place. With fine fibres that require little carding the feed tray will need to be close to the licker-in. Alternatively, if the fibre is coarse and rough or you are trying to card a large clump of it, then the feed tray will need to be positioned farther from the licker-in.

Locate the lock bolt underneath the feed tray and loosen it half a turn.

Slide the feed tray into the required position and re-tighten the bolt.

If you are working with very fine fibre or precarded fibre like combed top, the feed tray should be adjusted to be close to the licker-in drum.

Alternatively, if you are using coarse fibre or matted material or a large volume then the feed tray should be adjusted to be further from the licker-in drum.

Using the Direct Injection tray

The Fusion Engine has an accessory feed tray called the Direct Injection that can transfer the fibre to the main drum with much less carding by the licker-in. It has fittings to allow it to be screwed on to the centre brace.

The Direct Injection tray is ideally used for creating an art batt that keeps the texture. It combines the fibres without opening out locks too much or taking out extra additions such as sari silk or noils. It can be used for sandwich style techniques (staples between a sandwich of combed top fed into the carder in one go) or feeding more directly on to the licker-in. There is less blending taking place compared to using the standard feed tray - and this is sometimes the desired outcome.

To use the Direct Injection feed tray, use the following instructions.

Locate the lock bolt underneath the feed tray. It needs to be unscrewed completely and stored safely.

Lift the feed tray off and store it also.

It may be simplest to put the tray on by tilting the Fusion Engine on it's side. The Direct Injection tray has a metal plate with two exposed holes and these holes must be aligned with the two threaded inserts on the underside of the centre brace.

Slide the angled edge of the Direction Injection tray against the angled edge of the centre brace. Align the holes and then screw the provided thumb screws into the inserts. Tighten them firmly with your fingers.

Setting the packer brush

The packer brush works on the ratchet mechanism that makes it easy to set and maintain a constant pressure. The more pressure exerted by the brush, the more fibre you can fit on the main drum - but it also creates more resistance when turning the handle. Sometimes you may not want to use the packer brush at all as it may compress a sandwich batt that you want extra lofty.

The minimum pressure is exerted when the packer brush is close to vertical and barely touching the main drum. To set the brush this way, turn the brush around until it is only just touching the carding cloth tines. The ratchet mechanism will click into place and hold the brush securely.

The maximum pressure is exerted when the packer brush is horizontal and brushing firmly against the carding cloth. Turn the brush around until it is parallel with the ground. Again the ratchet mechanism will hold the brush in position.

Carding the fibre

As indicated earlier, there are many ways to card your fibre. This is one way to help you get started. Practice, experiment, see what works and produces the results you desire.

Place your prepared fibre on the carder feed tray - teased ends first and laid out evenly so the fibre is touching the licker-in drum.

The amount of fibre on the feed tray is diificult to quantify and can be very subjective. The general rule is you should be able to see the feed tray through the fibre. About a handful is the right amount.

DON'T OVER FEED!

If you cannot see feed tray through the fibre then you likely have too much.

DON'T UNDER FEED!

If there is no fibre on the feed tray then the carder cannot do its job.

Now the fibre is laid out, start turning the handle in a clockwise direction (assuming right-hand configuration and viewing from the Active side). Using a nice even pace that is not too quick is perfect. The fibre will start drawing on to the licker-in and transferring on to the main drum. Continue with this until all the fibre has been transferred to the main drum.

Because of the higher ratio of the Fusion Engine, it is important to remember not to turn it too quickly, especially if you are used to the lower ratio of other carders. Slow and steady is best, especially when carding fine fibres.

DON'T HOLD THE FIBRE BACK!

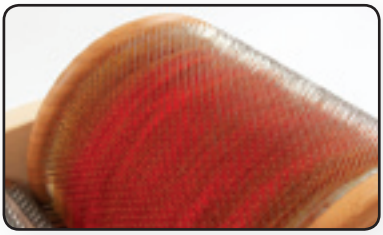
There is often a temptation to hold on to the fibre. This is not necessary and not advised as it can end up winding the fibre tightly around the licker-in and preventing it transferring to the main drum. It also makes for a trickier clean up job.

This being said, it is sometimes desirable to try to spread the fibre by drawing it out a little as you card so a huge mass is not drawn on to the licker-in in one go. Awareness of the issue with wrapping the fibre tightly around the licker-in should help you judge if you are holding it back too tightly.

If you are familiar with other carding machines, you may have been warned about keeping the fibre away from the edge of the feed tray so it does not spill over the sides of the drums and tangle around the axles. The special drums on the Fusion Engine prevent this so you are free to use all of the feed tray area.

Continue carding until the drum is filled to your satisfaction but do not fill it beyond the height of the drum sides. If you go beyond this, the fibre could spill over and cause unecessary tangles. Another sign of overfilling is if the fibre no longer transfers to the main drum and starts building up on the licker-in.

When the main drum is filled, it will look similar to this.



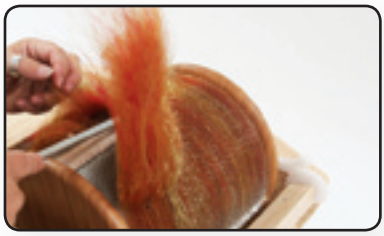
Picking and removing the batt

Now that your batt has been carded, it is ready to be removed from the main drum. You will need the picker tool.

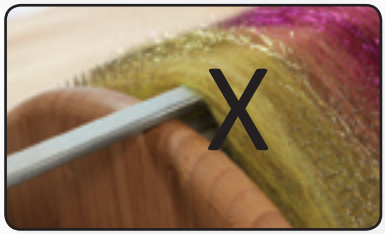
Start by turning the handle to the bottom of its stroke (when in 'right hand configuration', to the top when it is in 'left hand configuration'). This will position the picking groove that is located in the join of the carding cloth on the main drum in the topmost position. If the packer brush is still in place, release the ratchet mechanism and turn the brush out of the way away from the main drum.

You need to separate the fibres in the batt by 'ripping' it in half across the 'grain' or fibre direction of the batt. Put the tip of the picker tool into the groove at the edge of the drum and slide it along the groove a little way.

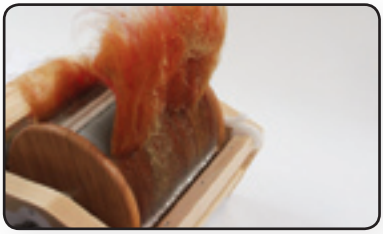
You can either lift the picker tool straight up into the air to separate the fibres. This may require considerable strength though. Alternatively you can lever off the tip of the picker by pausing several times as you slide the picker across and lifting it to pull the fibres apart. Make sure the picker point is in the groove though as you can damage the carding cloth if you dig directly into the cloth.



Due to unique shape of the Fusion Engine drums with the raised edges, there may be a temptation to lever off the edges of the drum. This is NOT recommended, you will likely damage the drums if you do this.



Work your way across the drum separating the fibres, effectively splitting the batt into half.



Now you need to tease up the back edge (the edge closest to the rear of the carder) of the partially separated batt to prepare it for peeling from the drum. You can use your hands to gently lift the fibre away from the drum. It is also possible to use the drum cleaning brush (with the tines pointing toward your body) to tease the fibres up.

Start by rolling the fibre over on to itself. The process now is to sequentially turn the main drum anti-clockwise and then lift the fibre away from the drum while rolling the batt up further. The rolling makes it easier to manage the batt and it also clears the fibre from the main drum much better.

Continue all the way around until the batt has been lifted completely from the drum.

And there it is, congratulations on creating your first batt with the Majacraft Fusion Engine!

Roving dizzed directly from the Fusion Engine drum

Cleaning the drums

The drum cleaning brush is essentially a little flick carder and can be used to clear fibre easily from the drums. This is particularly important if you are creating a variety of batts and do not want the fibre from one contaminating the other.

Start off with holding the brush as demonstrated so the pins on the carding cloth tines point toward you.

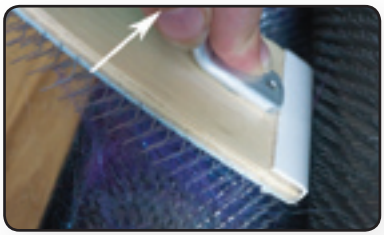
Make sure the batt is removed from the main drum as described on page 17

The licker-in cloth has been carefully selected for its abilities to clear very well. Even so, there may be some fibre still wrapped around the licker-in drum after use - particularly if you have been holding the fibre back. When cleaning the drums is required, start with the licker-in drum.

If you do need to clean the licker-in, then the following tips will guide you through this.

Cleaning from the licker-in is a little trickier on the Fusion Engine as the feed tray is higher than most other carders. If you tilt the cleaning brush well forward and use just the first few rows of pins, you can carefully pull the left over fibres from the drum.

Crank the handle anti-clockwise as you clean to expose a new area. Working from the front toward the back of the carder, use a gentle rocking and flicking action to carefully pull the trapped fibre from the drum. You can only get quite short strokes in. You can also work across the drum, perpendicular to the direction of the pins to remove any other resistant fibres. The short rigid licker in tines make this quite easy.



Another little trick that may work better is simply undo the nut under the feed tray and lift the feed tray out of the way. It will take a little longer this way but give you more room to work with.

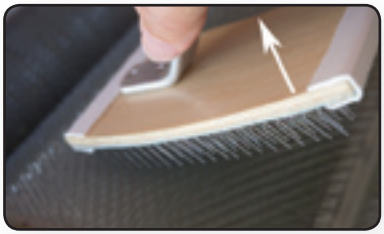
Once you have completed any necessary cleaning of the licker-in, you can commence with the main drum.

Start at the picker groove on the main drum. With the drum cleaning brush, use the same gentle rocking and flicking action to pull the trapped fibre from the drum.

When the working area is clear, turn the drum anticlockwise a little more to expose more of the uncleaned cloth.

You may need to clear the fibre from the drum cleaning brush as it fills. It is simple to pull it off with your fingers.

Continue cleaning and rotating the main drum until it has been entirely cleared.



Carding for spinning

The Fusion Engine has been designed - to the best of our abilities - to be very versatile for all types of carding. If you want a very even blend for your fibre then use the standard feed tray. Art yarn sandwich style techniques are going to be achieved much more effectively by using the Direct Injection feed tray or laying fibre directly on to the main drum. The point is that you can create carded fibre for spinning in many different ways to achieve myriad results.

The following instructions are to help you produce a well blended batt for spinning an even yarn.

The thorough carding instructions starting on page 12 mention, but do not elaborate on, completing multiple carding passes on the batt to get an even blend.

If your first carding does not produce what you desire, then multiple passes are likely necessary.

For your first pass through the drum carder, separate your fibres and add it in thin alternating layers. The thinner your layers, the faster the blend will occur. Remove the finished batt from the drum with the picker.

The image to the right shows both the original fibres and batt from the FIRST pass through the carder.

Once the batt has been removed from the main drum, split the batt into three or four strips lengthways by gently pulling it apart.

Take one strip of the batt and spread it out across the width of the feed tray by opening out the fibres further. Remember you should be able to see the tray through the batt. This opening of the fibres will create a better blend.

Repeat this with the remaining strips of the batt. This image shows the batt after the SECOND pass. You can see how much more the fibre is blended together.

This carding-splitting-recarding process mixes and blends the fibres. It can be repeated as much as you like although after three passes, minimal futher blending will take place

If you are using very fine fibres such as merino, or alpaca, take care to turn your carder slowly and do not make more passes than necessary, to prevent damage and the formation of noils and nepps.

You can produce a roving from your batt by using the diz to pull the fibre directly from the main drum. The instructions on page 25 explain this in more detail.

Carding for felting

Because felting requires the layering of aligned fibres, while not immediately obvious, a carder can help with your felting process.

The Fusion Engine is a fibre and colour blender. Because it is going to mix everything up, it is not possible to create pictures by sending a pattern through the carder or trying to build something on the main drum.

What you can use it for is creating colour tones in the materials. If you are building a foundation material then whole batts can be used in this way (they may need to be broken up a little first). You can use the carder to darken and lighten your raw materials to build colour accents to help highlight or give depth to your felt art.

You can also create the rovings that are used in traditional layered felting. The section on pulling roving with a diz on page 25 explains this process. Create the batt, pull the roving and then separate and use the rovings in your felting.

A final method you can use in felting is to pull the entire batt from the drum in one piece and separate it into long strips that can also be used in the place of rovings. This technique has a little less control over the shape and weight of the roving but has more control over the way the roving appears. Using a diz tends to blend the fibre colours even further (assuming you are using coloured fibre).

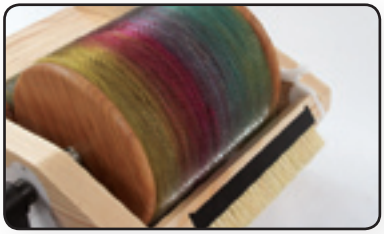
Pulling roving with a diz

Dizzing rovings straight from the drum can offer many benefits but the overarching reason is based around control. A diz will keep your fibres smoother and straighter, it will organise the fibres and avoid the fluffed out edges you get when splitting a batt for spinning. A diz usually has multiple holes so by making a thicker or thinner roving you have control over creating a roving best suited for what you want to spin or felt it into.

There are some colour related reasons and these too are based around the idea of controlling what the roving or finally spun yarn will look like. If you have carded a striped or graduated batt, splitting it will break up the colour design you have created whereas dizzing it will keep the changes in order. This will then maintain the colour layout when you come to spin the roving too - unless your roving has some other destiny.

A quick guideline for resultant roving is that a striped batt will produce a striped roving whereas a layered batt will give you a multicoloured or blended roving.

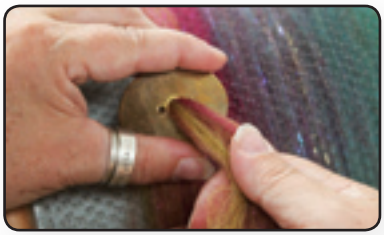
You will need to start off with a batt carded on to the main drum of the Fusion Engine. If you need any refreshment on how to do this, review the process on page 12



It is easiest to work if you position yourself at the rear of the carder. and make sure the packer brush is lifted away from the drum so the batt does not catch as you diz the roving off.

Start by positioning the picker groove at the top of the drum and carefully lift up some fibre from the left hand side of the drum over the groove. Use the groove as the pins can interfere with fibre. Thread it through the diz from the convex side through to the the concave side.

Hold the diz at a slight angle as this can help with getting the fibre off smoothly. Slowly and firmly pull the fibre through the diz so you get a rope of fibre which is called the roving. If you need a refresher on how do to use a diz, there is a free tutorial in the Resources section of the Majacraft website called “Using the Majacraft Diz” by Alys and John Vreede.



You need to work downward so you are peeling the fibre away from the drum. Also, remember to pull firmly enough that the fibre moves through the diz smoothly but not so strongly that it gets thin or breaks. Ensuring that your hands never get more than one fibre staple from the diz will minimise the chance for any breakages in the roving to occur. You should also try to keep a separation between the drum and the diz of no more than one fibre staple.

As you work downward pulling the fibre from the drum, you are going to get close to the packing brush and run out of room. At this point, slowly advance the drum a quarter turn. Looking at the carder from the active side, you will be turning the drum in the counter-clockwise direction. Return to pull fibre through the diz working your way downward until you run out of room again and will be required to turn the drum on another quarter turn.

Repeat this process, pulling the fiber downward off the drum and turning the drum. After a full rotation of the drum, you will need to work the diz to the right a little and then continue pulling the fibre and turning the drum. The process is very similar to a mechanical apple peeler where the roving is pulled off in a large spiral.

An important point to remember is to keep your hand between the freshly dizzed roving and the tines on the carding cloth. If the roving catches on the drum, it can break easily. You may want to roll the roving into a ball as you go to minimise the chance of this occurring. However, rolling the roving will likely require you to let go of the diz which may soon become fiddly and frustrating. The point is to be aware of the roving potentially catching on the drum as you work.

If your roving length breaks, or becomes thin and leaves fibre on the drum, just thread the next bit of fibre into the diz and continue as you were.

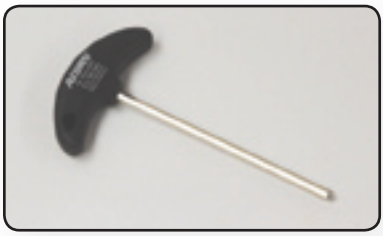
Continue this process until the entire batt has been removed from the main drum. You now have a ‘rope’ of roving ready for spinning or felting. If you did not roll it during the dizzing process, now may be the time to do this so it does not get damaged or contaminated.

Adjusting the drum separation

There are two nylon actuator arms on either side of the Fusion Engine that hold the bearings for mounting the licker-in drum. The actuators are secured in place with JCB lock bolts and these allow simple and quick adjustment of the separation between the main drum and the licker-in.

The general rule for setting the separation between the drums is close enough that they are almost touching but maintain enough separation to slide a piece of paper down between them.

First find your 4mm T-wrench.



Use the 4mm T-wrench to loosen the lock bolt accessed through the hole in the gearbox cover. Slip the T-wrench through the hole and undo it just a turn or two anti-clockwise.

Then loosen the lock bolt on the passive side of the carder as well, again just a turn or two. The lock bolt is the top one, on a similar horizontal plane to the licker-in axle.

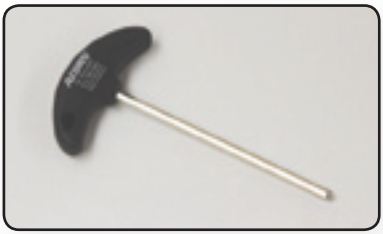
The licker-in can now be moved backward and forward by pushing the ends of the drum. It is recommended to use a piece of paper to slip down between the cloth on the drums. The important point is that the paper can still be slid when you have set the separation, it should not by trapped by the pins or rip when you try to move it.

When the licker-in drum is positioned correctly, retighten the JCB lock bolts on the actuator arms on the active and passive sides of the Fusion Engine by turning the bolts clockwise. You may need to support the edges of the licker-in drum with your hand as you tighten as the twisting effect of the turning bolt can move the actuator once it is set

Changing the drum

The Fusion Engine carder is incredibly versatile in having changeable drums. Not only are the drums changeable but it been designed to be a simple operation for all users. No longer are you forced to buy multiple carders to achieve different effects and results. You can now do it all with the one machine.

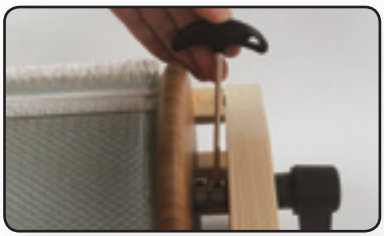
First find your 3mm T-wrench that is included with your carder kit.



Between the Main Drum and the inside of the carder sides are metal bosses with three grub screws. Two of these bosses are bonded into the main drum and the third is secured into the active side of the carder.

When in right-handed configuration, turn the crank handle to the bottom of its stroke and the three grub screws will be visible from the top of the carder.

These grub screws must be loosened with the accompanying 3mm Allen T-wrench The pictures below show the grub screws in place. You will need to unscrew them quite a bit as they are approximately 10mm long and screw into special holes in the axle. When you have the screws sufficiently loose, the main drum will spin freely on the axle and you can turn the handle without the gears turning.



Find a small towel and place it underneath the drum. This is going to support the drum and prevent it from dropping when the axle is removed.

Once the grub screws are loose, pull firmly on the handle to slide the handle and axle out as one unit. It is easier if you grip the handle as close to the axle as possible.

While you have the axle in your hand, take note of the small holes bored into the axle. The grub screws must be aligned with these when you put the axle back into the carder.

You can now lift the Main Drum out and place to one side.

With the support towel or cloth still in place, carefully set the new drum down into the carder. Take care to get the tine direction correct.

If you position yourself at the front of the carder by the feed tray and look toward the rear of the carder (where the packer brush is located), the pins on the carding cloth on the TOP of the drum will bend AWAY from you.

If you are putting the handle back in as a Right Handed Configuration (handle on the same side as the gearbox/ Active side) then the handle must go downward and be close to the table to align the grub screws correctly.

If you are inserting the handle from the Left Handed configuration (handle on the side opposite to the gearbox), then the handle must go upward and be as far as possible from the table to align the grub screws correctly.

Slide the handle carefully back into place - taking care not to push it hard against the gearbox cover. Align the grub screw holes in the bosses with the small holes in the axle. When in position, use the 3mm T-wrench to retighten the grub screws firmly into place.

Take time to make sure the holes are perfectly aligned. If you do not and actually tighten the grub screw against the edge of the holes then the main drum could possibly spin the next time you do some heavy carding.

The alternate outcome is the axle can become burred and the changing or removing of the drum will be much harder in the future as the burrs will jam against the edges of the bosses.

Take time to get this right, the grub screws will screw in easily when they are in the right position.

Helpful hints

Gentle with the picker

We have created a special picker that is designed to minimise the possiblity of damaging the carding cloth on your drums. Even with this, it is still recommended to be gentle on the carding cloth and not poke at it or the tines roughly.

Clean the fibre

Don't use greasy fleece! It coats the pins and cloth and taints any further work you do on the carder. Make sure you use washed fibre.

In case you missed that, DON'T USE GREASY FLEECE!

Adjusting the feed tray

There is no need to feel constrained by setting the feed tray and then leaving it. You may wish to move it during the carding process to achieve something specific. The arrangement for securing the feed tray makes it very easy to change things around as you go. Learn how to do this on page 14

Folding the handle

If you wish to store your Fusion Engine or plan on travelling with it, it is much easier with the handle folded out of the way. Grip the rotating 'handle' part of the handle and pull it outward. It can then be turned in toward the axle for the main drum and laid over parallel with the main arm.

Maintenance of your carder

Cleaning

The 'magic' drums and integrated gearbox keep the Majacraft Fusion Engine cleaner than most other carders, there is much less build up of fibre around the drums and none in the gear area.

If you do get a fibre build up around the axles, remove the main drum as described in the "Changing the drum" section of this manual on page 28.

We suggest you could use a small brush (perhaps a discarded tooth brush) and a small pair of scissors to clean around the axles and boss area.

Smooth feed tray

Majacraft polishing wax, wood polish, or talcum powder applied underneath the feed tray keeps it sliding nicely. Don't go overboard with the wax or polish or it will likely attract the soil and materials from the fibre and build up a dirty, abrasive layer

Oiling

The polymer bearings in the carder that the axles rotate on are the only components where oiling is needed to be considered. Only do this if you feel like resistance to turning the handle has been increasing over time. Use a very fine oil like sewing machine oil and very sparingly - only a couple of drops - and infrequently. Wipe away any excess oil that may be running down the side of the Fusion Engine.

Removing the main drum and tilting the carder on it's side so you can get the lubricant into the bearing may work best. There are instructions on how to remove the main drum on page 28. A fine tip on your oiling container will help direct the oil into the correct location too.

Carders can tend to get pretty dusty and dirty so if there is excess oil on your machine, again it is going to turn into an abrasive sludge that will actually end up blocking up your machine. Hence, please remember SPARINGLY and INFREQUENTLY, no oil is far better than an excess.

Carding accessories

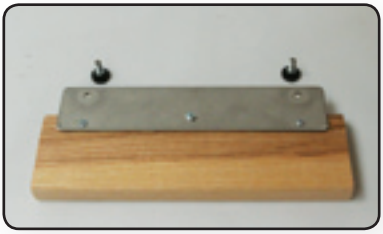
Carder bag

If you require a custom made bag with pockets for all your carding equipment then this may meet your needs.

Drums

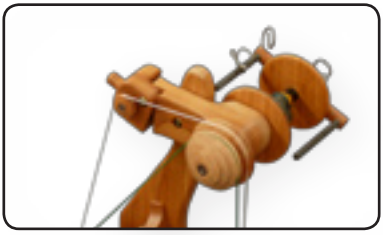
The Fusion Engine has interchangeable drums! No longer do you have to purchase an entirely new machine when you want to create different batts. Majacraft offers drums with different types of cloth for different carding techniques and fibres.

Direct Injection Feed Tray



The Direct Injection feed tray for creating more textured - and less blended - batts is available as an accessory. It is simple to bolt on to the centre brace of the Fusion Engine and transfers fibre to drum more quickly as required by sandwich techniques.

Create your own yarns



If you are wondering what to do with all the beautiful batts you create, then why not spin them into yarn? In case you did not know, Majacraft build spinning wheels. Spinning your own yarn is simple and fun. There is little that is more satisfying than carding, spinning and then knitting your own garments and art works. Visit www.majacraft.co.nz or speak to your local dealer to learn more.

and weave them

If you are not a knitter, the yarns created from your spun batts can be woven. Majacraft offer the very innovative Dynamic heddle loom that opens up many new possiblities for weaving. www.majacraft.co.nz or your local dealer are a great source of information about our weaving looms.

Recommended Resources

Ravelry - www.ravelry.com

Fibery Goodness - www.fiberygoodness.com

Majacraft - www.majacraft.co.nz

Facebook - we have a Facebook presence so you can search for Majacraft at www.facebook.com or find us at the super intuitive https://www.facebook.com/pages/Majacraft/120699558115947!

Credits

Many people both inside and outside of Majacraft have been instrumental in the creation of the Majacraft Fusion Engine. The following people require a special mention and I am particularly grateful for their valuable input.

Sincerely
Andrew Poad

Majacraft

Lance Hemingway
Andrea O'Brien
Owen Poad
Glynis Poad
Rob Poad
Toni Poad

Photography

Rob Poad
Suzy Brown

Spinners, weavers, carders and crafty people

Lexi Boeger - www.pluckyfluff.com
Mandie Chandler - www.ewegivemetheknits.com
Pat Old
Janet Knoop - www.nannysspinonthings.com
Suzy Brown - www.woolwench.com
Esther Rodgers - www.jazzturtle.com

Thank you for choosing and supporting Majacraft, we do what we do for you!

Contact

For further information and for a complete range of accessories and products, contact your Majacraft dealer or:

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DEALER

The carder project has been codenamed “Blue Sun” throughout it’s development and on occasion I have teased on the internet that I was working on Blue Sun. If you were wondering where the name comes from, here is the explanation.

I am a geek and adore the short lived science fiction TV series “Firefly”. Blue Sun was the name of a corporation in the Firefly universe.

Notes