



GOLDEN STAR

Thank you for buying this locomotive kit from Boot Lane Works, please read all the instructions carefully before assembly.

Tools & Adhesives

I recommend a few tools to help you assemble your kit –

- Small Bench Vice
- Modelling Knife (*I use a scalpel*)
- Tweezers, Pliers, etc...
- Needle Files, various shapes
- Wet & Dry abrasive paper (*the mixed selection from Halfords is very good*)
- Selection of small twist drills, including 1.5mm & 2mm diameter - **A COUNTERSINK DRILL**
- A 90-degree angle (*I use a set block, but a small set square will work well*)
- Personally, can't manage without my small, tapered reamer, look for them on eBay!
TAKE CARE WITH THE REAMER - MAKE A SMALL CUT, TRY, AND CUT AGAIN

I also recommend the following adhesives –

- Super Glue
I use Gorilla Super Glue
- Dichloromethane, A liquid solvent for the acrylic
I use E.M.A. Model Supplies "Plastic Weld"

A little about the printing process.

The printer extrudes a filament of plastic, layer by layer, to create an object. As it does so, it can leave tiny ridges along the object.

The printer can also leave a bit of a "squish" from the build-plate and there is usually a tiny "ridge" around the flat surface of the object that was attached to the build-plate.

For best results, clean the ridges off with a file.

THE RESIN PARTS ARE BRITTLE AND MUST BE HANDLED WITH CARE

The resin is hardened by an ultraviolet light process but continues to adsorb the light after the process.

Please ensure the resin is thoroughly painted to stop the hardening process.

THE ACRYLIC IS ALSO BRITTLE, CARE SHOULD BE TAKEN DURING CONSTRUCTION

***** IMPORTANT *****

Please bear in mind that this kit, although intended for garden use, is a reasonably small power unit, designed for hauling a handful of wagons or a couple of carriages.

We DO NOT guarantee this model if used for “Heavy Haulage”!

Released at the National Garden Railway Show Stoneleigh, April 2025. GOLDEN STAR is a representation of the Ffestiniog Railway’s James Spooner as it ran in 1887.

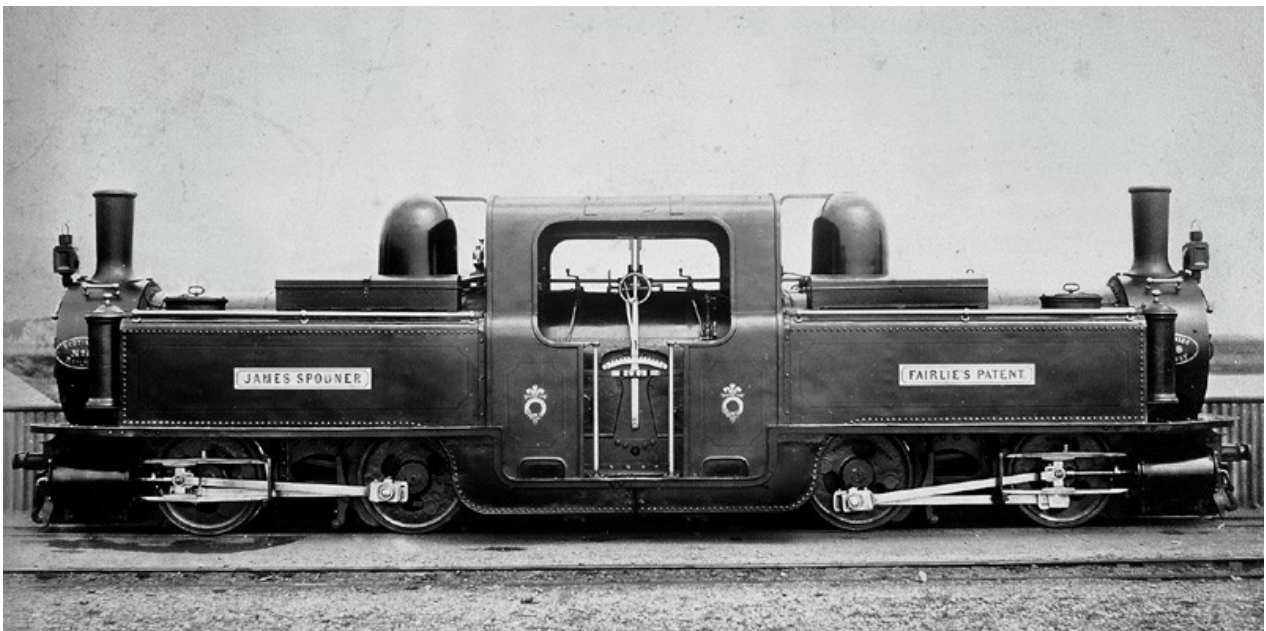
Built in 1872 by the Avonside Engine Company, it was the second Double Fairlie to operate on the Ffestiniog Railway. The locomotive underwent many changes during its lifetime before finally being withdrawn from service in 1928. In true Ffestiniog style, the engine was never fully scrapped, and parts of the machine were still in existence when the preservationists moved into Boston Lodge in the 1950’s. The wheels still exist under Livingston Thompson at the Nation Railway Museum, York.

Originally built with a parallel boiler and open cab, the locomotive was successively rebuilt over the years at Boston Lodge to closer resemble the FR Double Fairlie’s we know and love today.

For a very brief period, James Spooner ran with the original parallel boiler, the classic FR Fairlie cab, and sandpots (plus handrails on the side of the smokebox), while still retaining the stovepipe chimneys originally built with.

The classic oval holes in the wheels were added in 1882 to enable access to the axle boxes for lubrication purposes.

This is, in our view, one of the most beautiful interpretations of the FR Fairlie, and one we’ve always wanted to reproduce it.



James Spooner at Boston Lodge in 1887 (Wikipedia)

RIGHT, LETS JUMP IN AND BUILD THE POWER BOGIES.

*There are included within the kit, a couple of jigs to enable a reasonably easy build.
We shall describe the process for building one bogie, it will need repeating for the second.*

Locate four of the printed wheels.

We seriously recommend painting these prior to assembly. We could have printed these black, but we have discovered that painted printed wheels work much better than unpainted.

Unpainted, the prints seem to collect muck and grime from the rails, painted wheels seem to be more resistant to the garden detritus...

The wheels need pressing onto the 1/8" axles.

Before we do that, we need to screw crankpins into the wheels. ***We thoroughly recommend that you tap each hole with an M2 tap, it's not completely necessary as the screws will self-tap into the plastic, but the use of a tap makes it much easier to assemble.***

Two of the wheels require M2 16mm conehead screws, the other two require M2 12mm conehead screws. Screw the M2 screws into the rear of the wheel and into the countersink in the wheel.

You have four axles in total, they are all the same length.

Before we press the wheels on, we need the top-hat brass bushes, and the metal washers from the screw-bag. The washers act as a boss to the rear of the wheel.

Push a top-hat bush onto the axle with the grey drive gear, then a washer. The lip of the top-hat bush should be on the outside next the washer. As in the photo below.

Push the two wheels with the longer M2 16mm screws into the ends of the axle with the grey drive gear, they should start onto the axle easily.

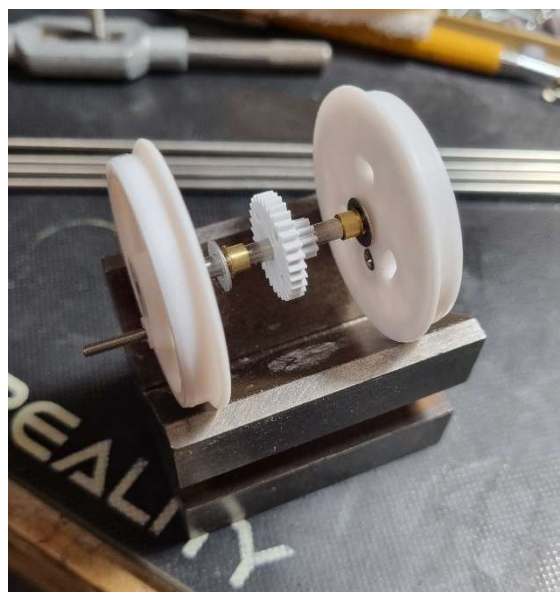
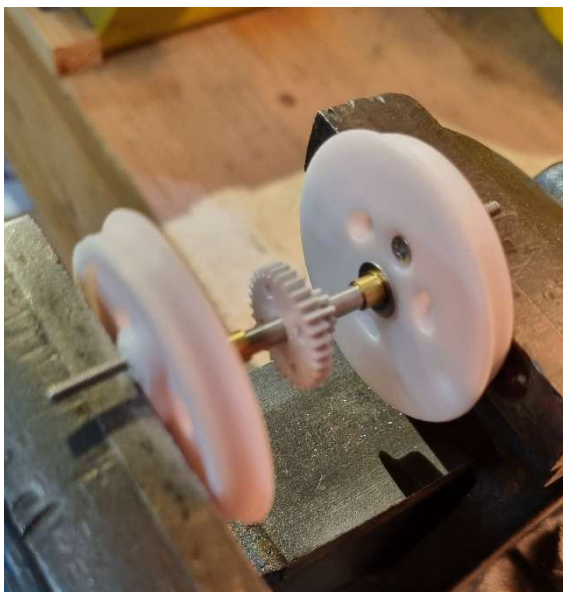
Place both crankpins along the same degrees. We will quarter the wheels shortly.

Care needs to be taken here, a great deal of experimentation has led us to the perfect size bore in the wheel, with the perfect lead taper. PLEASE DO NOT ALTER THE BORE IN THE WHEEL.

The whole assembly should now be placed into a vice and lined up so that the wheels are at 90° to the axle, both while looking from the top and the sides.

Ensure that the jaws of the vice are only touching the wheel centres, and not the raised bosses of the crankpins.

When you are happy, close the vice until the jaws push up against the axle.



*Unpainted (for photos only) wheelset in the vice (left), and ready to be quartered (right).
(These are the wheels from our HEIDI kit, the process is the same, just different diameter wheels).*

Do the same for the other driving wheelset, just no grey drive gear and the shorter crankpins.

Locate the two, wheel quartering jigs, they are two square prints, with the wheel shape recessed into the block.

Quartering is a simple matter of dropping the jigs over both the wheels and turning one jig so that it is at 90° to the other. Place the whole assembly on a flat surface to check that they are at 90°.

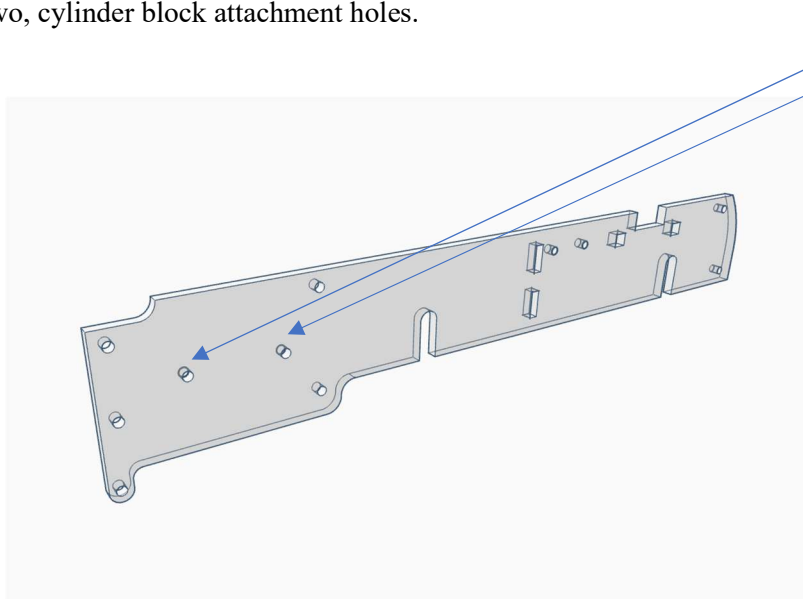
PLEASE TAKE CARE – do not excessively twist the wheels on the axles. If possible, do the process in one smooth movement, then leave alone. Excessive twisting can loosen the wheels on the axles.

You should now have two wheelsets.

Let's build the chassis block.

Locate the two of the 2mm thick acrylic frame plates, and the two 2mm acrylic motion brackets.

You will need to countersink all the 2mm holes on one side of each frameplate, **DO NOT** countersink the two, cylinder block attachment holes.



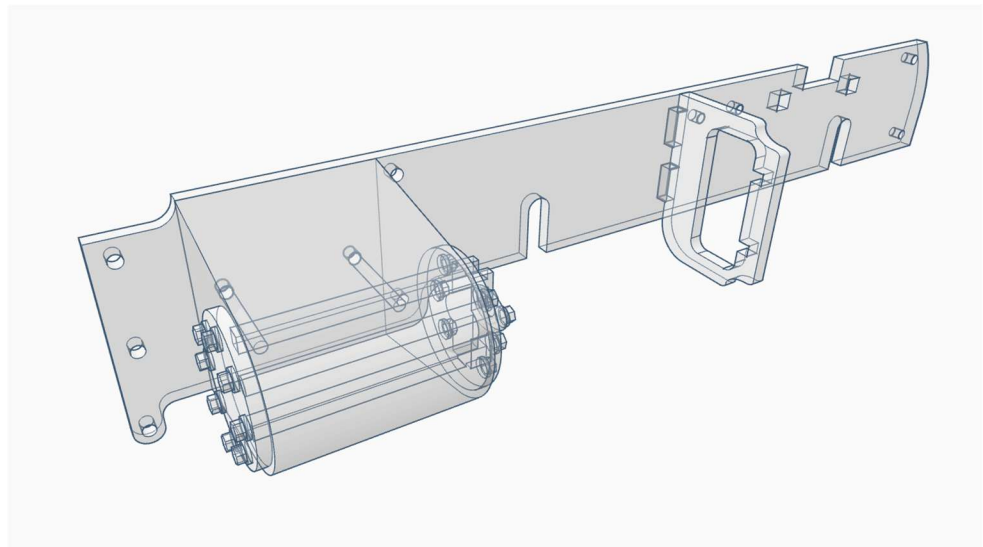
WE WANT TO HAVE ALL THE COUNTERSINKS ON THE SAME SIDE AS THE CYLINDER AND MOTION BRACKET.

Attach the cylinders using M2 8mm panhead screws.

Glue (use a liquid glue) the motion bracket to a frameplate. Ensure the motion bracket is the correct way up (see image)

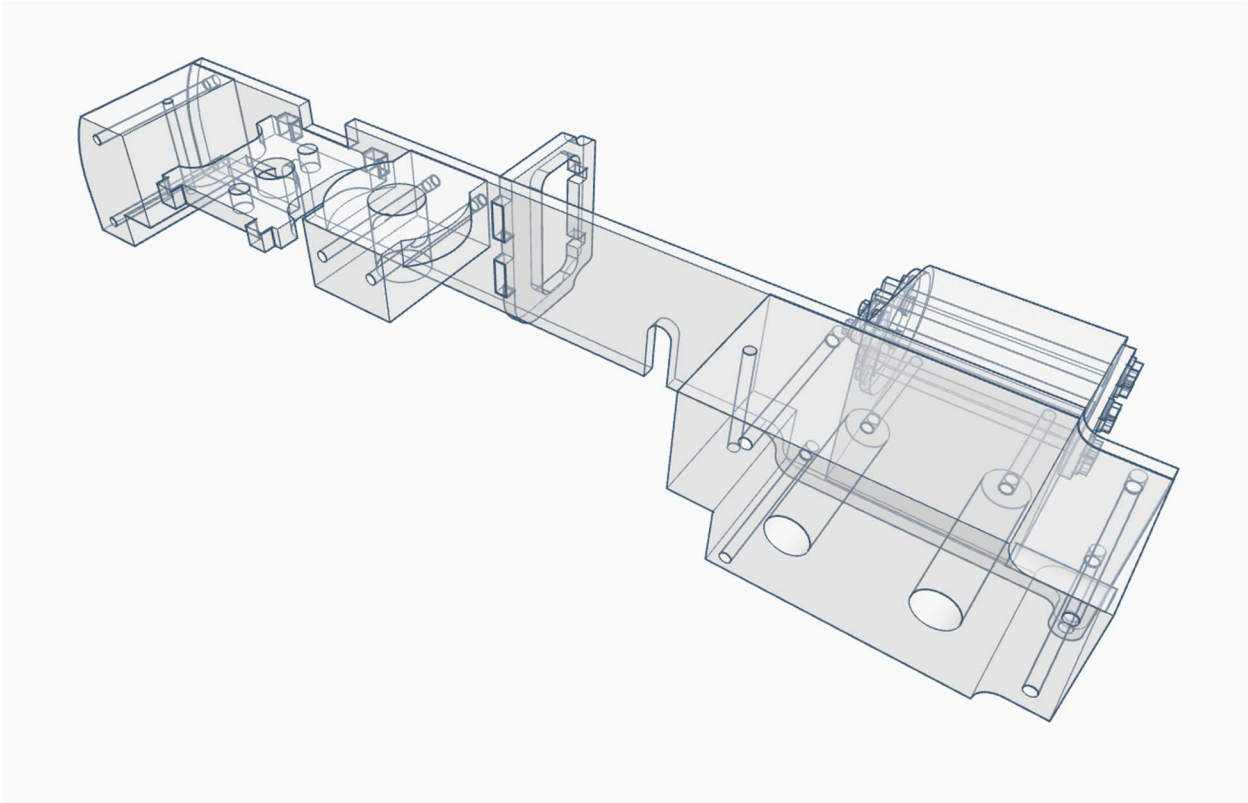
Ensure a 90° angle between the motion bracket and the frameplate.

Do the same for the other side, remember to “mirror” the two frameplates.



Next, we need to attach the stretchers (front & rear), motor mount plate and the centre (pivot) stretcher.

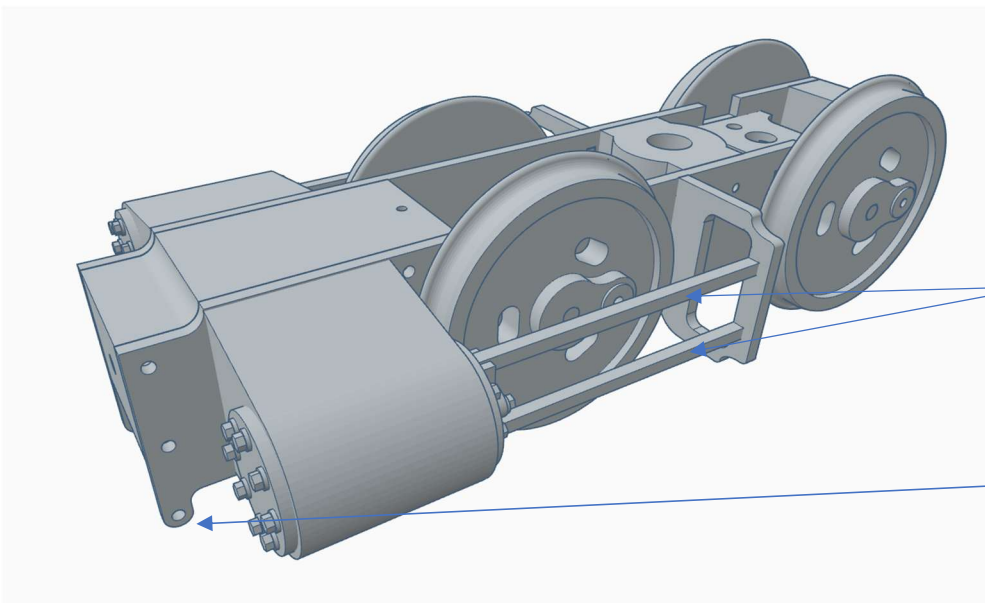
The stretchers are all attached using M2 8mm conehead screws. They need to be countersunk into the frameplates to allow the wheels to clear the screwheads. They don't all need countersinking, but it seemed easier to countersink them all, rather than identify those that do!



Attach one plateframe first, then the other.

NOTE – the motor mount plate is simply captured between the frameplates and does not require any screws. The motor mount plate has a slot on one face, this should be placed downward, as it allows the grey drive gear (on the rear wheelset) to clear the motor mount plate.

With the chassis block assembled, the wheelsets can be dropped into place. The lip of the top-hat bushes siting between the washer and the outside of the frameplate.



The retaining plate will hold the wheelsets in place. Use M2 8mm panhead screws to hold the retaining plate

Cut the 2mm square brass rod into 60mm lengths and push each 60mm length into the cylinders to create the slidebars.

You can fit a length of 2mm round brass through the frames at the front of the bogie, if you wish.

Let's fit the motion.

You need two coupling rods (couple the wheelsets), two connecting rods (connects the wheel to the piston rod), & two crossheads.

You will need two M2 nuts, 8mm conehead screws & steel washers.

Start by screwing the 8mm conehead screws into the connecting rod, there is a countersink printed into the rod. This part fits into the back of the crosshead and should be a nice loose fit.

Opening the hole in the crosshead accept the 2mm brass piston rod. The rod will need cutting into two 40mm lengths. Make sure the end of the rod is nice and clean with no sharp edges.

I opened the hole in the crosshead with a 2mm drill bit. Push the rod in as far as you can. But do not obstruct the bore for the connecting rod.

Nearly there, one last fiddly bit!

Locate the four ABS crankpin sleeves. These have been cut to the correct length for your crankpins, there are two different lengths, the short ones are for the short crankpins, the longer ones for the long crankpins!

The sleeve fits over the crankpin, and the rod fits over the sleeve.

The M2 nut captivates the rod while allowing it to move freely on the sleeve.

The bore holes on the rods are reasonably loose on the sleeves, to allow for inaccuracies in the quartering.

But still tight enough to give smooth operation.

The sleeve acts as a spacer on the crankpins, and in a moment, you will be able to tighten the nuts against the tubes but allow the rods to remain free.

Offer the coupling rod to all the crankpins on one side of the bogie.

Annoyingly, on this bogie kit, you will need to place the crosshead onto the slidebars and push the piston rod into the cylinder block; offer the connecting rod up through the motion bracket and attach with a M2 nut...

Do the middle crankpin, then attach the rear of the connecting rod onto the rear crankpin and fix with a M2 washer & nut on top of the coupling rod.

Repeat for the other side.

With all the rods on, you should now have a free running chassis?

If not, try and locate where there is a bind.

Usually it's the quartering, opening out the holes in the rods a little will cure this.

If your chassis is running freely, then attach the motor. There are two 5mm M3 screws to fit the motor.

After much experimentation, I have eliminated the adjustment of the motor relevant to the gears. Just screw the motor to the motor plate and away you go!

There are two M2.5 5mm screws that should already be in your motor.

The motor is 3-6V and is adequate for "Light Haulage"

**A LITTLE OIL ON THE GEARS AND ALL BEARINGS WILL WORK WONDERS FOR THE
MODEL LOCOMOTIVE – BOTH FOR SMOOTH RUNNING AND LONGEVITY OF THE
GEARS, ETC.**

THE BODY

The locomotive body is broken down into several parts, that primarily all screw together.

All these parts can be painted individually, prior to finally assembly.

The overall strength of the model is gained from a combination of the running plate, the boiler, and the tanks. All three come together to create a rigid structure.

THE RUNNING PLATE

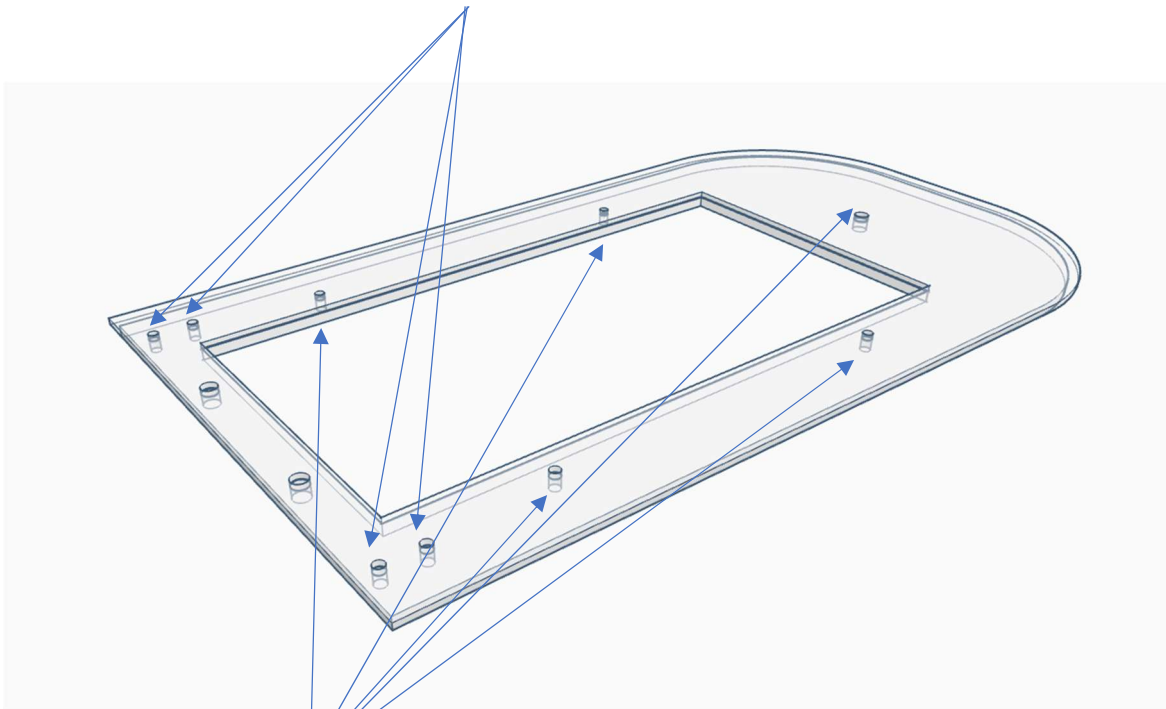
Each end of the running plate is built up from two pieces of acrylic. 1x 1mm thick, and 1x 2mm thick. Rub the acrylic down with wet'n'dry (we usually use 240), to enable the liquid glue to get a good hold, and the paint to get a good key.

Glue a 1mm piece to a 2mm piece.

The holes must align, you will notice however, the edges do not align.

You will need to countersink holes in both the top and bottom of the running plate assembly.

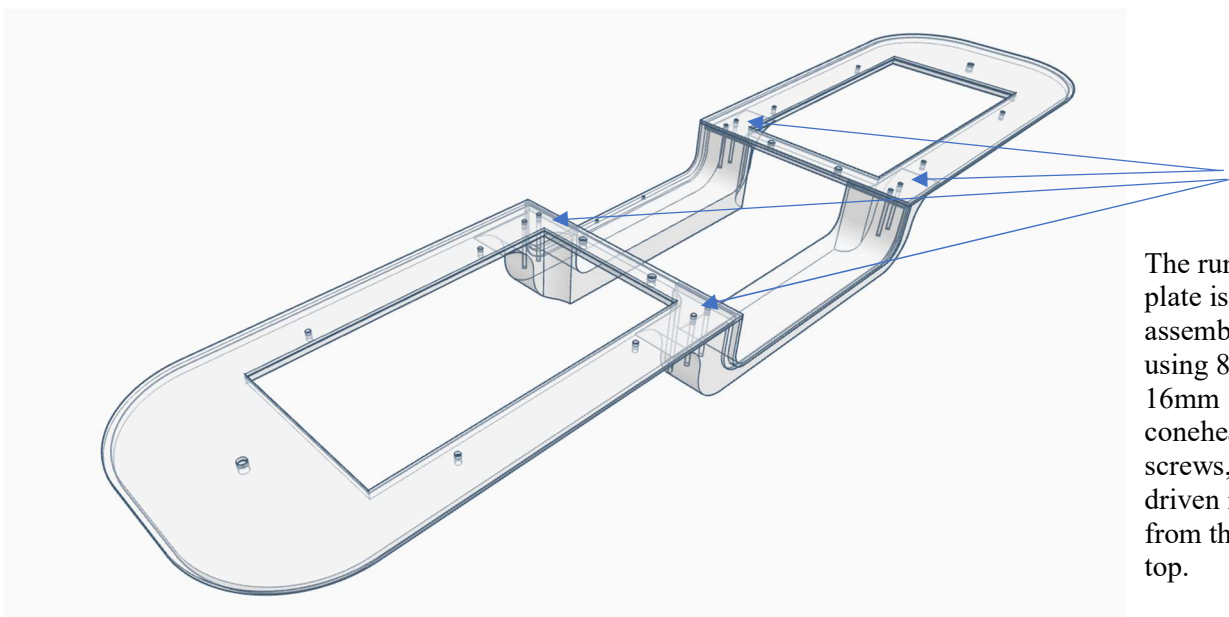
Countersink these four holes from above.



And these five from below.

The two end running plate assemblies attach with the cab tank pieces.

These two sections are water tank balance pipe (and additional water space) on the real Fairlie.



The running plate is assembled using 8x 16mm conehead screws, driven in from the top.

THE TANKS

The tanks are handed.

There are two plain topped tanks, one with a switch slot and one with a charging socket hole.

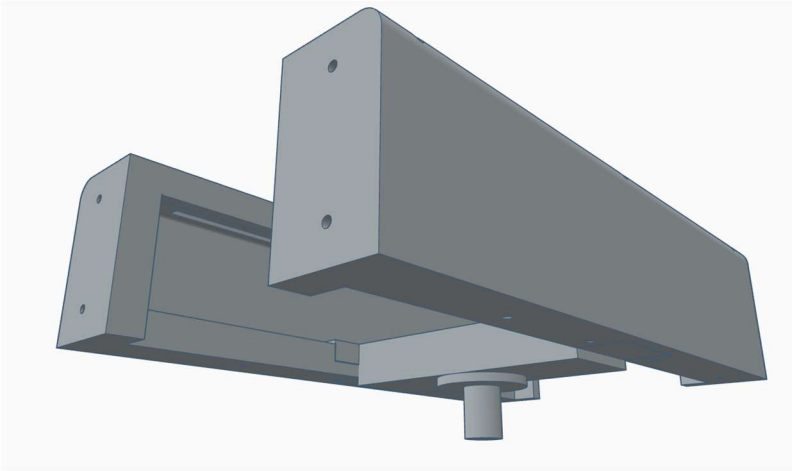
We would suggest that you place the switch and charging socket at opposite ends to each other, and the two plain topped tanks on the other side.

NOTE that all four tanks have two holes in one end. This is to enable the cab to be screwed to the tanks.

Select the two tanks for one end.

The tanks are held together with the carrier plate. The carrier plate should just slot into the tanks, some cleaning of the parts may be required to enable a good clean fit.

The tanks are attached to the carrier plate with 4x 8mm cone head screws. A little countersink may be required on the underside of the tanks.



The tanks also have holes in the top for tank fillers at the front.

The charging socket hole is for convenience, we do not supply a charging socket.

Repeat for both ends of the locomotive.

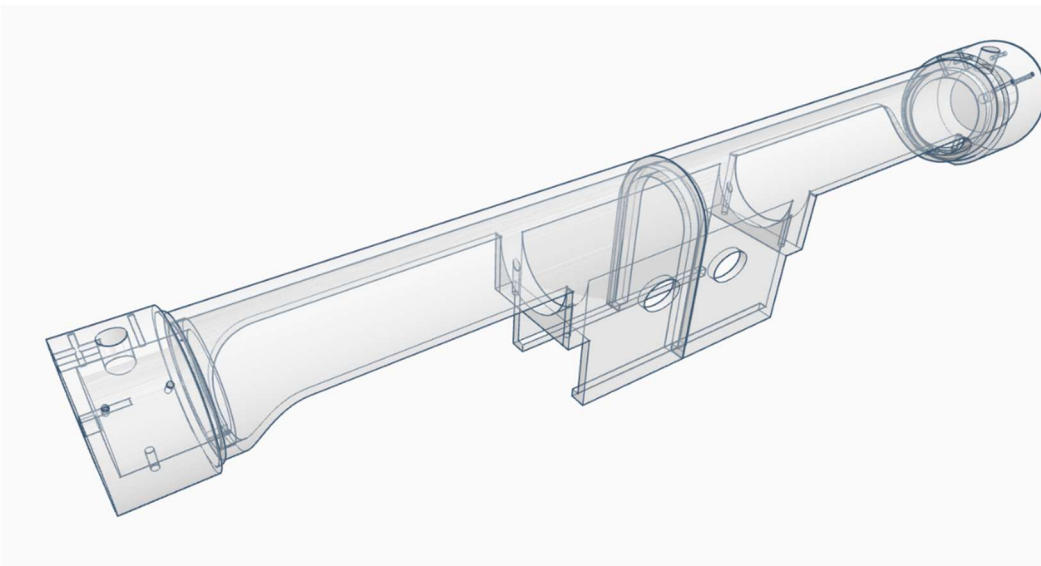
THE BOILER

The boiler takes a little work.

It has been printed to four parts, the barrel (in two parts) and two smokeboxes.

The barrel will need to be glued together at the fireboxes. We used superglue and there is a lip and recess to ensure it fits together perfectly. Once was glued together, a filler was used to smooth away the join.

There are lips on the underside & innerside of the firebox, this should help the builder create an “electronics” space should they require.



The smokeboxes are a good fit onto the barrels, with a locating lug on the bottom.

Again, we would suggest painting the smokeboxes separately from the barrel.

Do not glue the smokeboxes to the barrel at present.

THE CAB

The cab is in three parts, two identical ends and a small roof section.
The two end sections screw to the back of the tanks with 4x M2 8mm panhead screws.

BRINGING IT ALL TOGETHER

And here is the issue...
Try as we might, we couldn't find a way around this.

Take all the major components (excluding the bogies). The two tank/cab assemblies, the boiler and the running plates.

The boiler is attached to the running plate with x4 M3 10mm panhead screws at the firebox, and x2 M3 conehead at the smokebox.

However, the boiler fits over the carrier plate which is screwed to the tanks (x8 (x4 for each end) M2 8mm coneheads), so the tanks need to screw to the running plate first...

We found the solution was to bring all four parts together and screw them to each other all in one go.
We also found that the smokeboxes were easier to add to the whole assembly at this point too!

Once it is all together, the structure becomes quite ridged and easy to work with.

We added the handrails at this point, although the handrail knobs were added during the painting process of the build.

The small roof section is easily added between the two cab sections, Andrew used his age-old trick of double-sided tape to hold it in place. Our roof seemed to have lost a little of its curve during either the printing or painting process, but this was easily rectified by quickly dipping it into hot(ish) water and squeezing a tighter curve into it. (Please be careful if you practice this).

IN FACT - TAKE CARE WITH ALL FILAMENT PRINTS IF THEY GET HOT (DIRECT SUNLIGHT) THEY WILL ALTER SHAPE

The bogies are attached to the carrier plates with x2 (x1 each end) M3 1mm panhead screws. There are some printed washers to captivate the bogie.



We have personally found that we get best results with our Double Fairlie kits if the motors are wired in parallel. I.E. The power travels through one motor and then onto the other, not separate feeds for each.

OTHER DETAILS

Other details include smokebox doors with handles. Four round FR style sandpots. Chimneys & domes. Two toolboxes, one fits over the switch and slides along the tank! Two coal skuttles (fit on top of the tank). Tank fillers, firehole doors, windows and window frames.

There are four long handrails along the tank tops. And two each side of the cab. Plus, smokebox handrails. The handrail curve on the smokebox is 40mm diameter.

An electronic copy of these instructions can be found at - www.bootlane.org.uk

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