RAILWAY MANIA

'New Standard 18"' Bagnall 0-6-0ST
Conversion Kit
Designed by Adam White and Michael Edge
Test Build and Instructions by Kyle at TRS Trains

Variants Available:
Steel Company of Wales - Large bufferbeams, sliding cab cutout shutters, 2 steps on saddle tank (fireman's side), 1 step on driver's side
Victor (Preserved) - Short bufferbeams, 3 steps each side of saddle tank, no cab shutters

Included in the conversion kit:

Printed items
Saddle tank and cab
Detail pack (bufferbeams, sandboxes, cylinders, valve chests, counterweight, tank support, chimney)

Other items
Handrail wire (0.45mm)
Brass handrail knobs x 15
Smokebox door dart
2 x dummy coupling hooks
Fixing bolts/screws

Valve gear etch
1mm square rod
1mm round rod (for piston rod)
Dolly pins for valve gear

SCOW decals (optional)

Modeller must source:
Whistle
Large buffer heads if desired

Donor model:
Hornby or Dapol 'Austerity'/J94

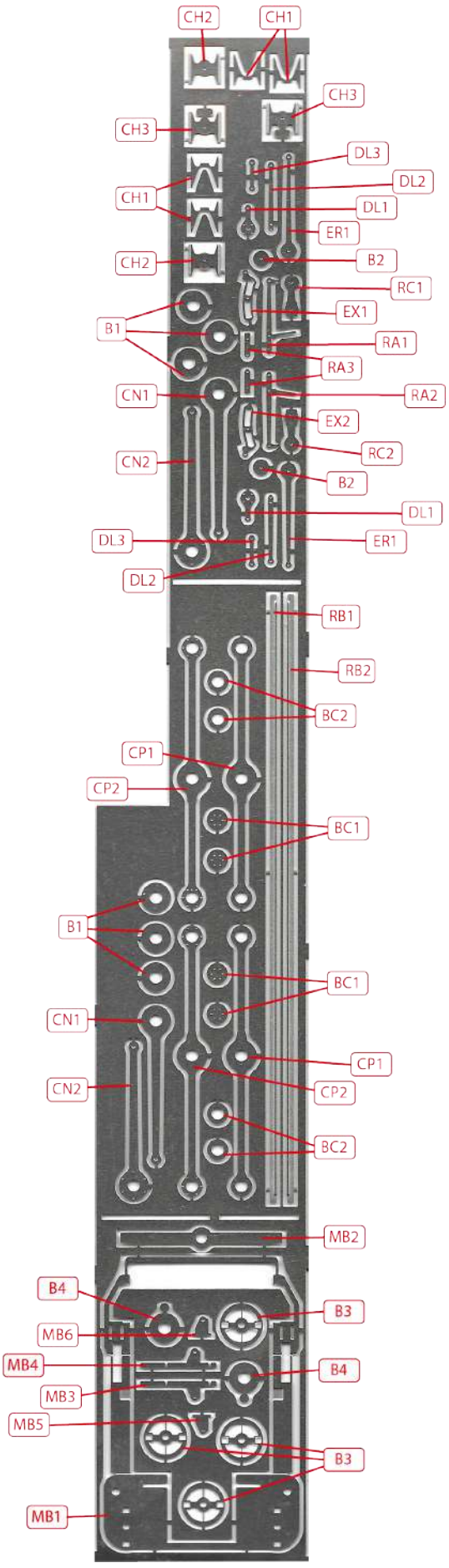
Components reused:
Chassis/wheels/motor
Running board/lower saddle tank
Buffer heads
Hand brake and reverser linkage

If you have purchased the simple version of the kit without the valve gear, you can skip to Pic 21 in the instructions. With the dummy valve gear you simply have to glue it to the J94 chassis with the cylinders covering the front sandboxes.

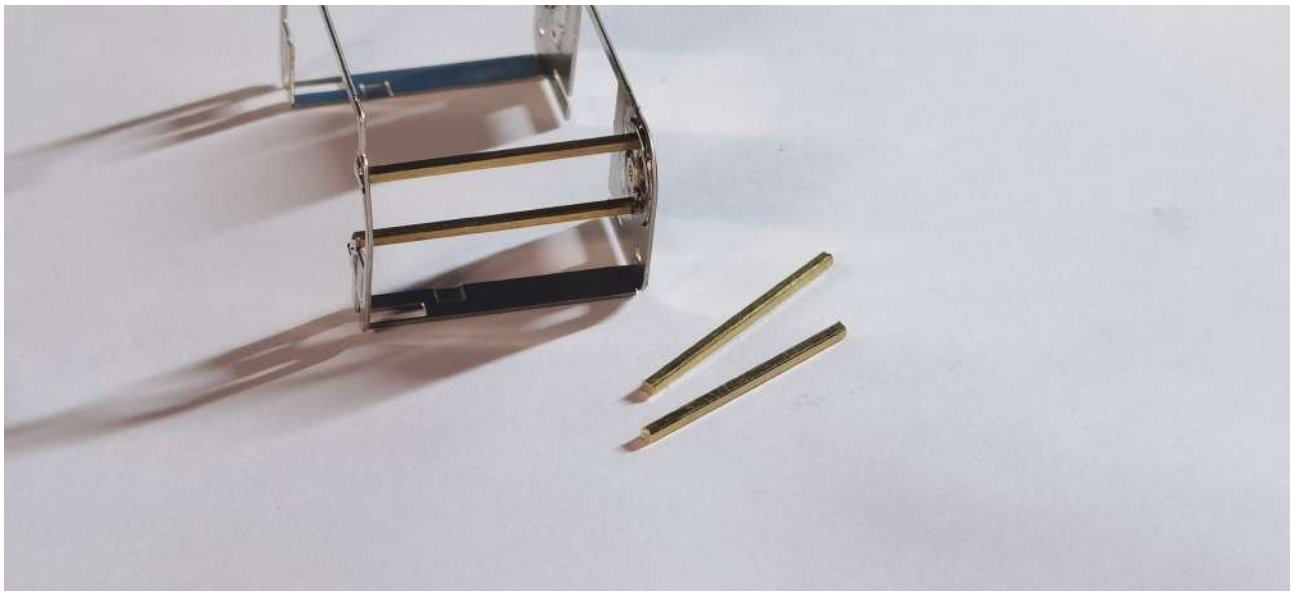
RAILWAY MANIA

Bagnall 18" 0-6-0ST Walschaerts Valve Gear Component List

B1 - Bearing 1
B2 - Bearing 2
B3 - Bearing 3
B4 - Bearing 4
BC1 - Bearing Cap 1
BC2 - Bearing Cap 2
CH1 - Crosshead 1
CH2 - Crosshead 2
CH3 - Crosshead 3
CN1 - Connecting Rod 1
CN2 - Connecting Rod 2
CP1 - Coupling Rod 1
CP2 - Coupling Rod 2
DL1 - Drop Link 1
DL2 - Drop Link 2
DL3 - Drop Link 3
ER1 - Eccentric Rod 1
EX1 - Expansion Link 1
EX2 - Expansion Link 2
MB1 - Motion Bracket 1
MB2 - Motion Bracket 2
MB3 - Motion Bracket 3
MB4 - Motion Bracket 4
MB5 - Motion Bracket 5
MB6 - Motion Bracket 6
RA1 - Radius Bar 1
RA2 - Radius Bar 2
RA3 - Radius Bar 3
RB1 - Running Board 1
RB2 - Running Board 2
RC1 - Return Crank 1
RC2 - Return Crank 2



VALVE GEAR
Step-by-step guide (built by TRS Trains)
PLEASE READ BEFORE CUTTING ANYTHING OFF THE FRET



Pic 1

It is advised to start with the etch with Part MB1 (motion bracket etch). This is creased and needs to be bent 90 degrees in 2 places. Next take 1mm square brass bar, and cut to rough length. Ensure they are soldered flat at the open end, as they can be filed back on the cylinder end when they're soldered in position. Whilst fitting the brass bar, fit B3 to the end of the cylinder.

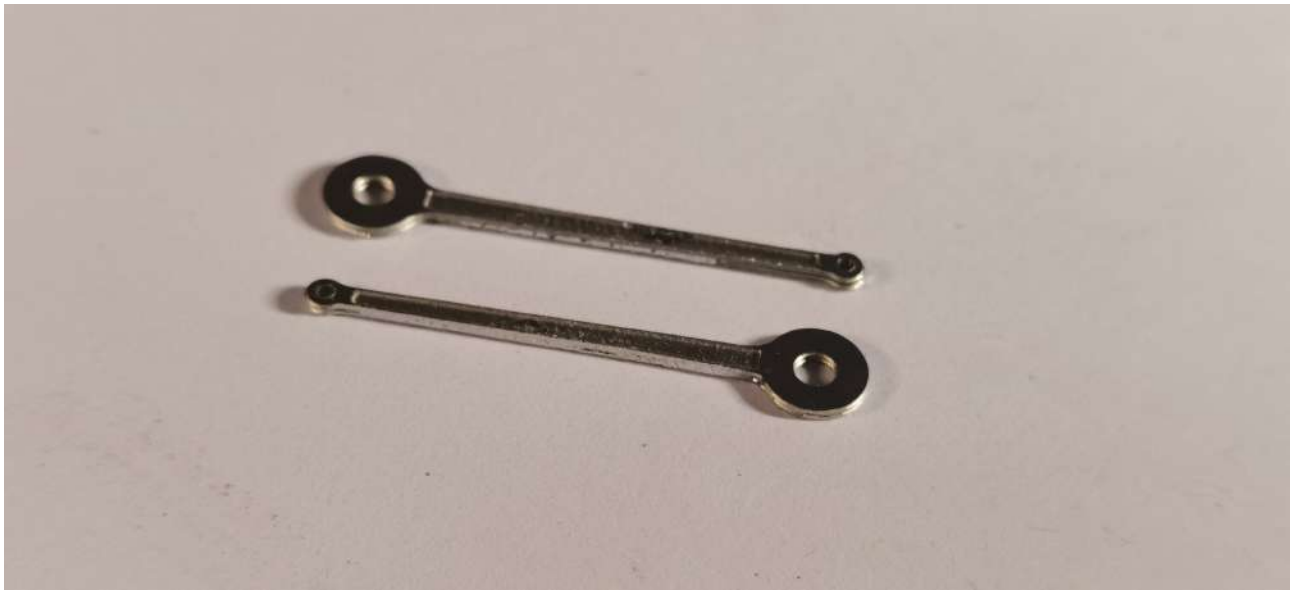
Pic 2

At this stage I must stress it is **absolutely advised that all pin holes are drilled whilst the parts are still on the fret**. Take MB4 and MB3. MB4 has 2 crease marks, this fits in the outside slot of the Motion bracket end. With the creases facing inward, bend this part to follow the contour of the motion bracket. MB3 goes into the inward slot. Both can be tacked in place with a spot of solder.

Pic 3

Take RA1, DL2, and DL3. These parts make up your drop linkage. Cut a dolly pin to about 3mm in length. Push the pin through 1 of the links, then press some painters tape over the pin, followed by the 2nd link (to be soldered). The tape will act as a barrier to stop the solder flowing to the 'free' link. Be advised, if you hold the iron and solder on the pin too long, it will flow to both links regardless. Overlay in the following order from BOTTOM to top. RA1 – DL2 – DL3 (Ra1 would be closest to the wheel)

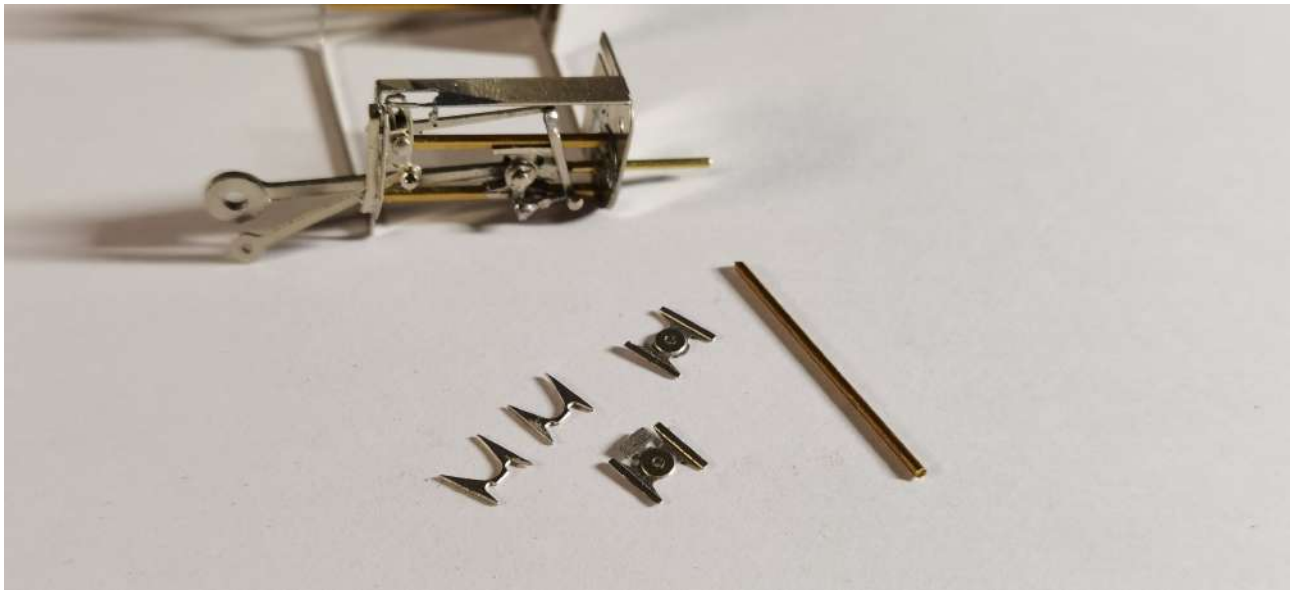
Pic 4
Next is the main driving coupling rod. Take CP1 and CP2. CP1 has an indentation on 1 side along the length – this is the outer side. Use pliers to hold both parts together, ensuring the etched side faces outward and touch a few dots of solder along the edge. Hold the iron for a moment or two to allow the solder to flow between the rods, then clamp to cool. Next you can use the thin file and file out any bumps of solder on the rod edges.



Pic 5
The same goes for the connecting rod, take CN1 and CN2 and repeat the steps taken for the coupling rod.

Pic 6

Next take EX2, ER1, and a dolly pin. This makes up the expansion linkage. It is important that the pin is soldered to ER1, with EX2 being the 'free' link. Be sure to take note of Left and Right hand sides when assembling.

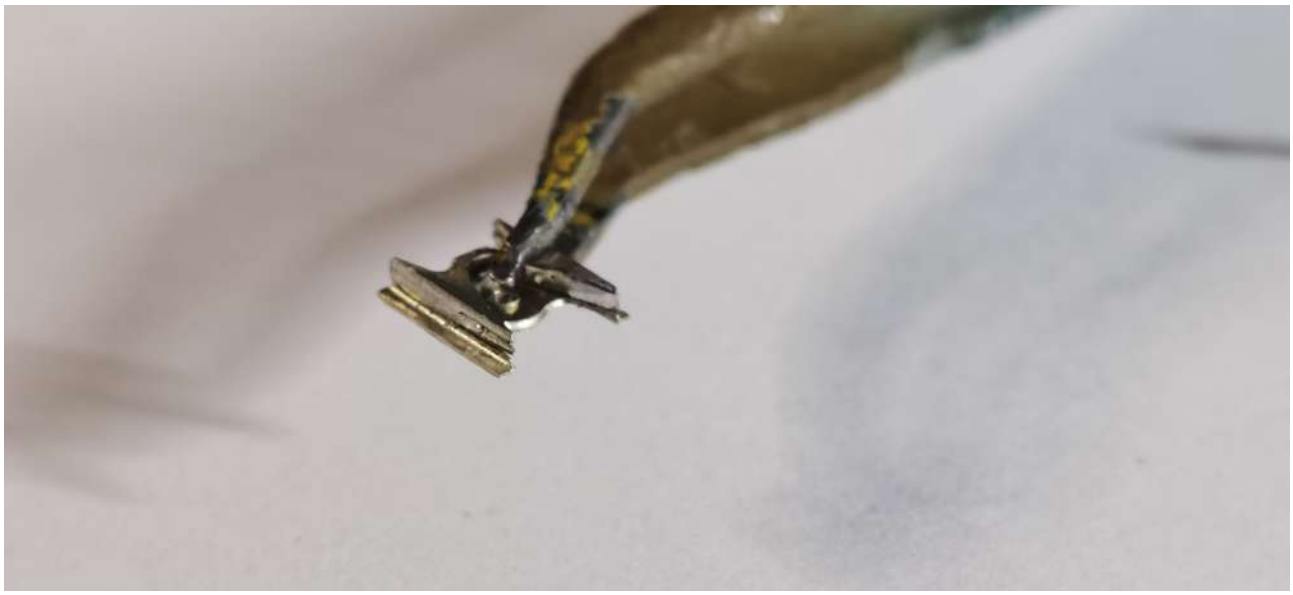


Pic 7

Next is the Crosshead assembly. This comprises of CH1 (x2), CH2, CH3 and a length of 1mm round brass bar. Cut the bar to the length of the Motion bracket – this will be cut to size in situe.

Pic 8

Both CH1 parts make up the centre of the cross head that will sit on the slide bars. Clamp both pieces together, and touch a few spots of solder, holding the iron on the part to let the solder flow. It is important here that both parts are lining up exactly. Once cool, file the flat sides.



Pic 9

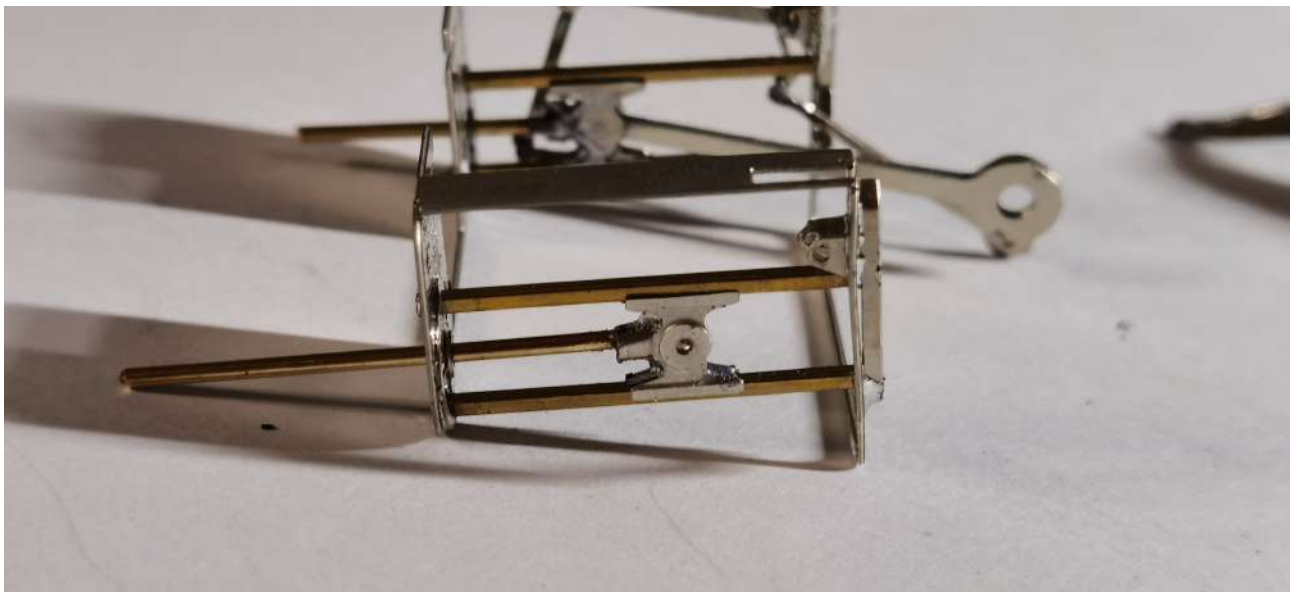
CH2 acts as the back of the crosshead. Clamp this to the piece you just made, and touch a spot of solder on the FRONT of the cross head. Do no put any solder on the end with the hole.

Pic 10

Take CH3 and repeat. Again do not allow any solder to reach the end with the hole.

Pic 11

Piston rod. File the end of the 1mm round bar to allow the solder to hold. Touch a spot of solder on the extended piece of the crosshead, tin the end of the piston rod – then marry the two parts together. It is important that the piston rod is straight or it wont run the full length of the sliders.



Pic 12

Dry test your assembled cross head on the slide bars to ensure it moves freely over the entire length of the bar with no tight spots.

Pic 13

Take your Crosshead assembly, connecting rod assembly, and DL1. The connecting rod fits in the open end of the crosshead. Next place DL1 on the front of the crosshead assembly, and slide a pin through from the front of the crosshead, ensuring the rod still has motion. Solder the pin to the back plate of the crosshead, and check all 3 parts still move exclusive of each other.

Pic 14

The assembled crosshead.

Pic 15

File the back of the crosshead where the pin was soldered. This needs to be flat so not to foul the crankpin of the forward wheelset.

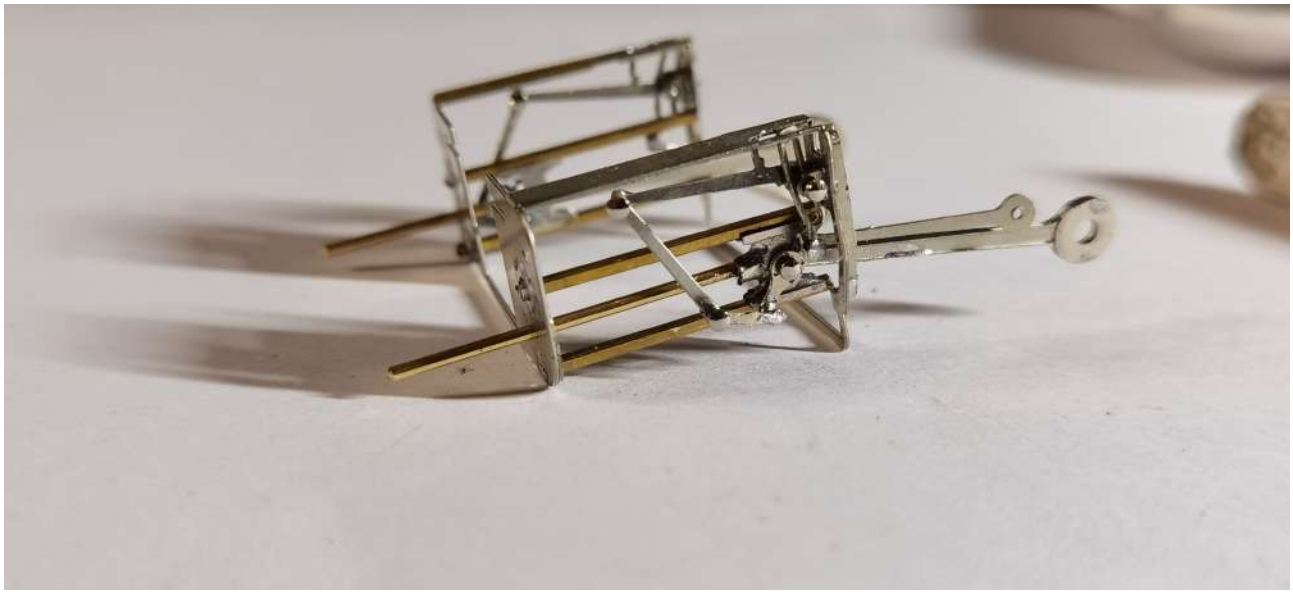
Pic 16

Next take a pin, and affix your drop linkage, to the crosshead assembly. Instead of having a 'freelink' here, I simply soldered the smaller of the drop linkage at a right angle to DL1. DL1 then moves as 1 part with DL3. This also removes the need to provide clearance from the slide bar and a pin.

Pic 17

With the crosshead assembly in place, join both the drop linkage, and the expansion linkage to the Motion brocket by sliding a pin through the parts in the following order. MB5 – EX1 – RA1 – MB4. Solder the back of the pin to MB4. At this point I found RA1 had nothing stopping it moving sideward, so I soldered the thin branch to the

top of the motion bracket. If you do this also, be sure to file it flat to the top of the motion bracket as this part must sit flush against the underside of the footplate.
PLEASE NOTE: The expansion link in the step-by-step pics has been assembled back-to-front. The inside of the curve should face toward the front of the loco as shown in the photo below.



Pic 18

Test all your parts now, making sure the crosshead travels the full length of the slide bars, and ensure none of the links bind. Pull the crosshead to the start of the slide bars

(in its furthest position from the cylinder) and trim the piston rod with 1mm inside the cylinder.

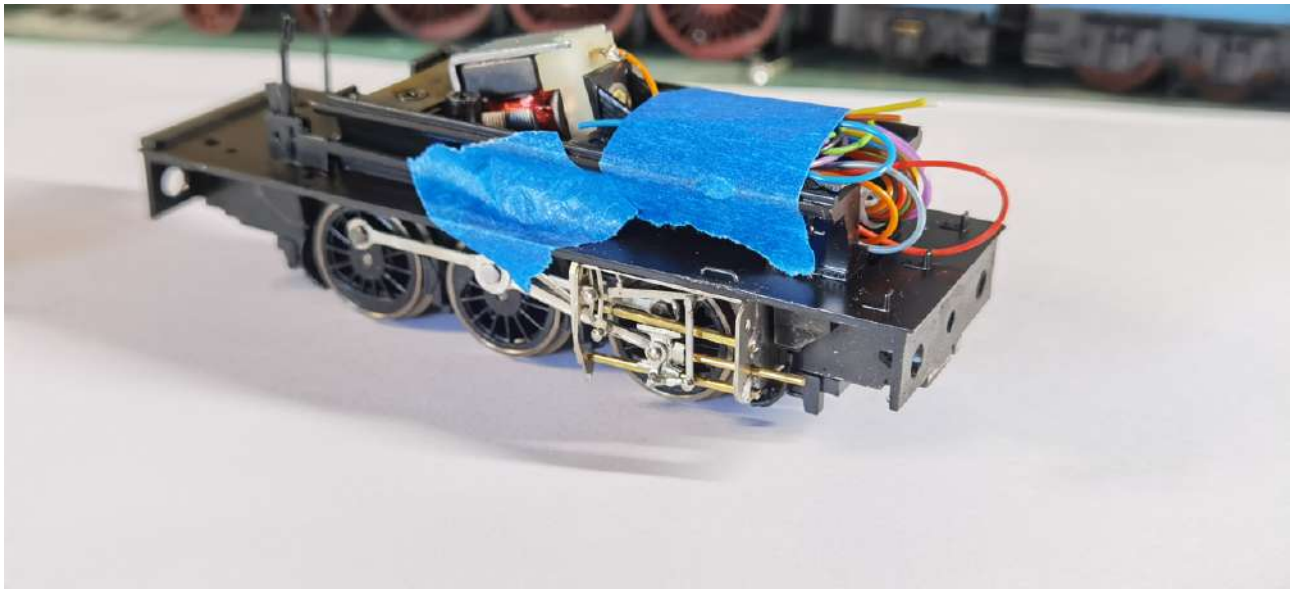
Pic 19

Remove the keeper plate from the bottom of the chassis, and fit your motion bracket assembly. This must be pushed up against the sandboxes to be in the correct position. I then glued the tops of the motion brackets to the footplate.

Add 2 plastic spacers (cut from styrene sheet or similar) behind the front wheelsets to ensure the side-to-side play is reduced, preventing them catching on the crosshead.

Pic 20

Make a 1mm slit between the front brake shoe hangers and sandbox downpipe detail. Don't cut all the way through, just enough to allow the keeper plate to fit over the motion bracket assembly.

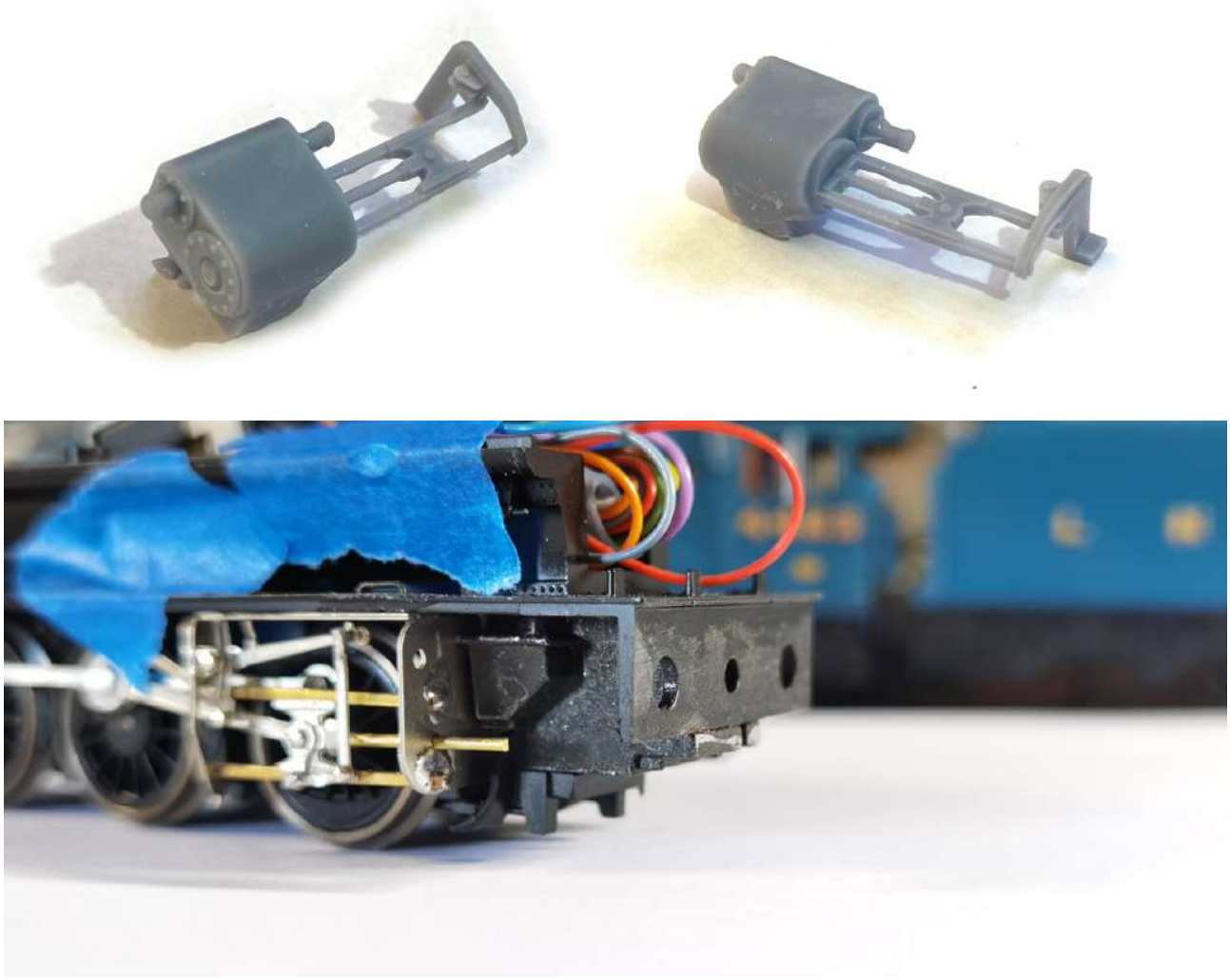


Pic 21

Fit the longer coupling screw provided in the kit to the middle wheelset. Before fitting, file the top of the screw to give a nice shiny surface on which to solder. It may also be beneficial to tin this part with solder before fitting, although it can be done in situ. To finish off the valve gear, take RC2 and a pin, and join it with ER1 from the expansion linkage. Be sure ER1 is facing outward, and run the pin through from the back. Solder the pin to ER1 and file flat. Next tin both sides of RC2, and solder it to the longer coupling rod screw of the middle wheelset.
It is much easier to do this in situ, but be sure not to hold the iron on the screw for too long or you risk melting the wheel. Again file flat.

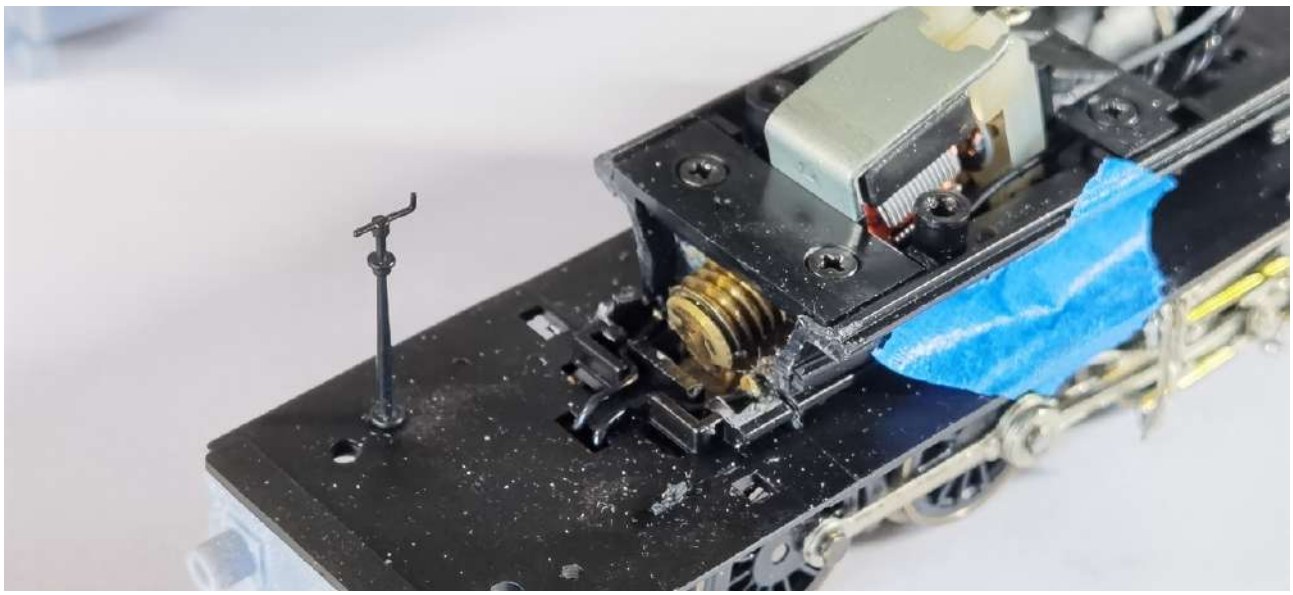
DUMMY VALVE GEAR

If you have chosen the version with dummy valve gear, you simply have to glue it to the J94 chassis with the cylinders covering the front sandboxes.



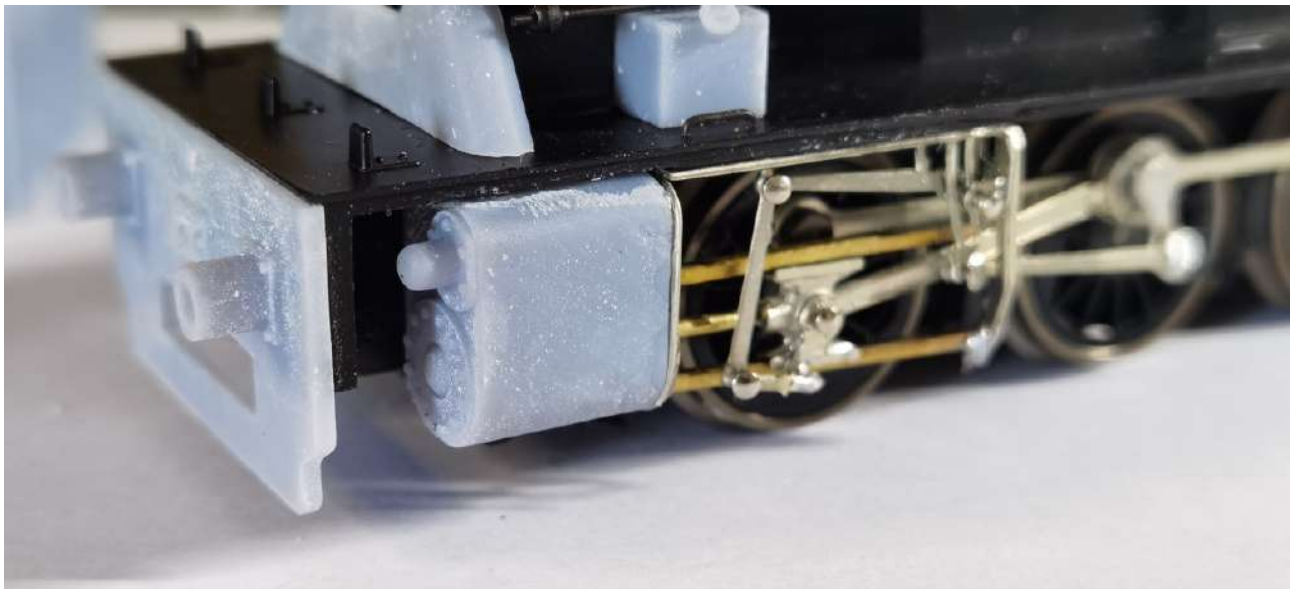
Pic 22

Remove the J94 buffer beam, and file the area underneath. Remove buffer heads and springs from the old beams. These are reused on the new beams.



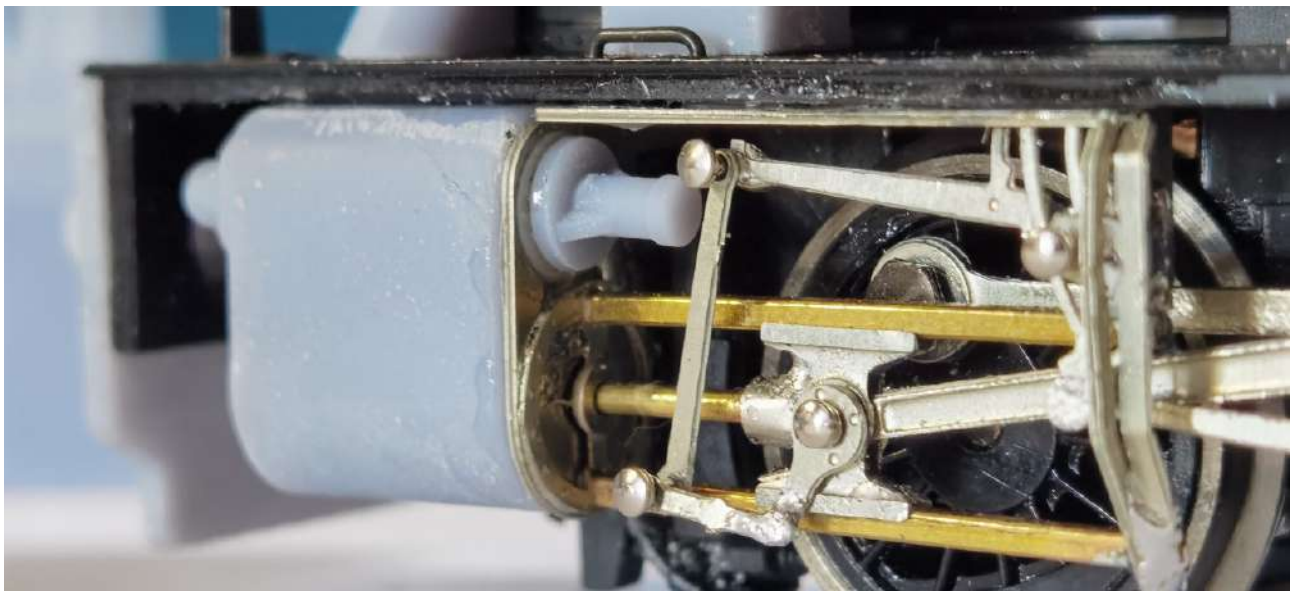
Pic 23

Align the Bagnall cab with the mounting holes on the chassis and mark how much needs to be trimmed from the lower boiler moulding. You may also need to remove part of the motor brace.



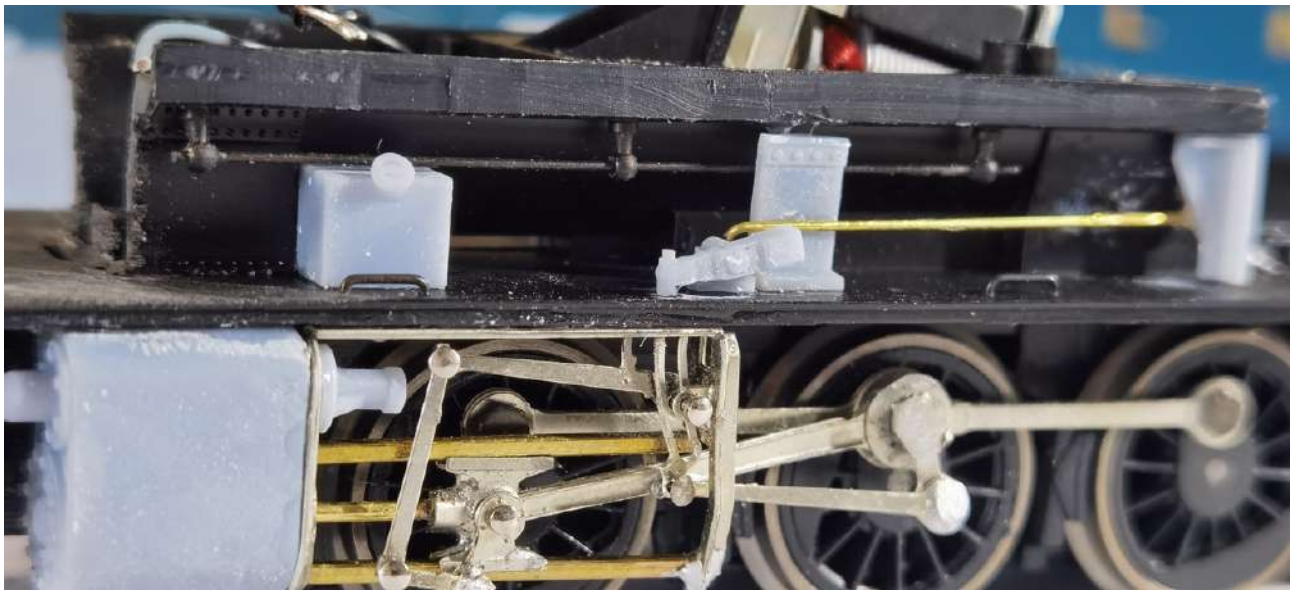
Pic 24

The resin cylinder moulding is square at both ends, so it is important to file any of the 1mm square rod that protrudes through the motion bracket so the cylinder can sit flush.
You can paint the body components separately before assembly if preferred.



Pic 25

Glue the valve chest detail onto the inner motion bracket.



Pic 26

Shown here are the resin detailing bits , and where they go. From left to right. Sandboxes, counterweight, tank support 1, tank support 2. Then add some 0.5mm brass wire. It is worth noting here that the lip needs to be removed from the side of the moulded lower boiler. It must be flush as seen here.
You can remove the handrails under the saddle tank if you want to, the real locos do not have them.

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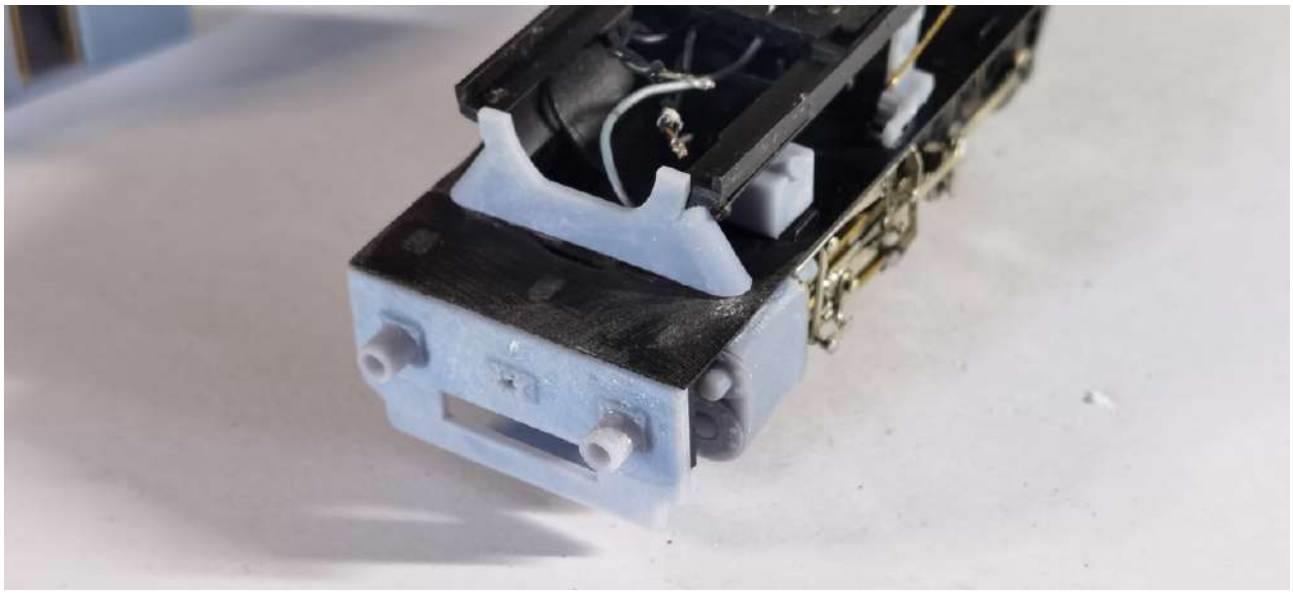
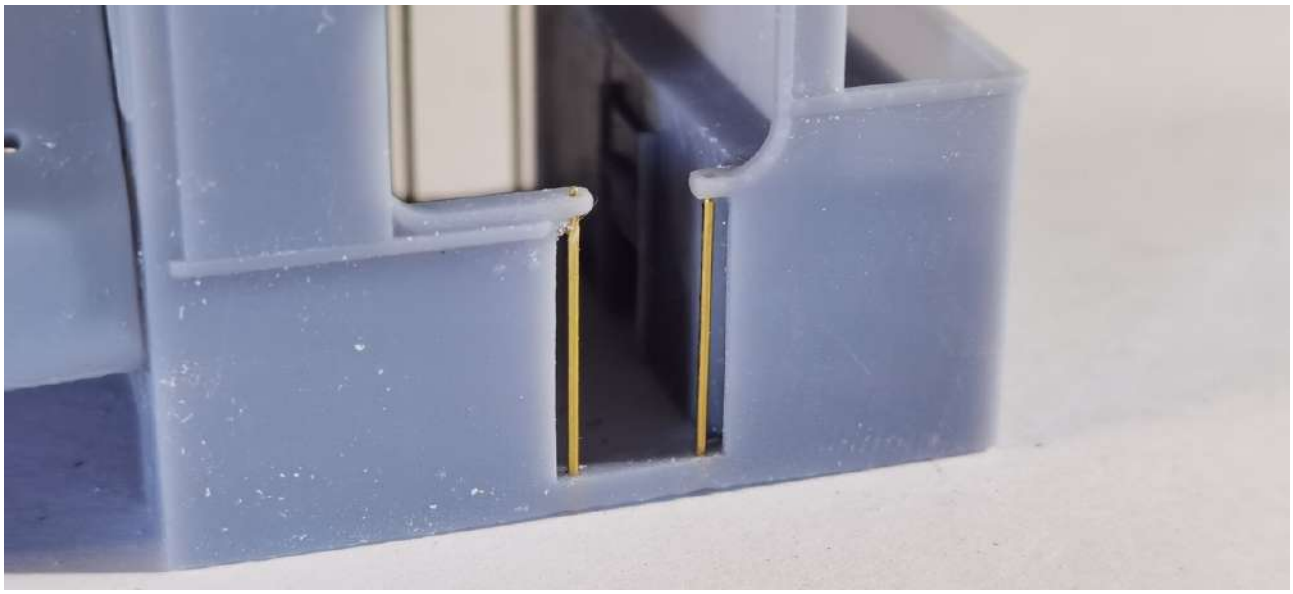


Pic 27

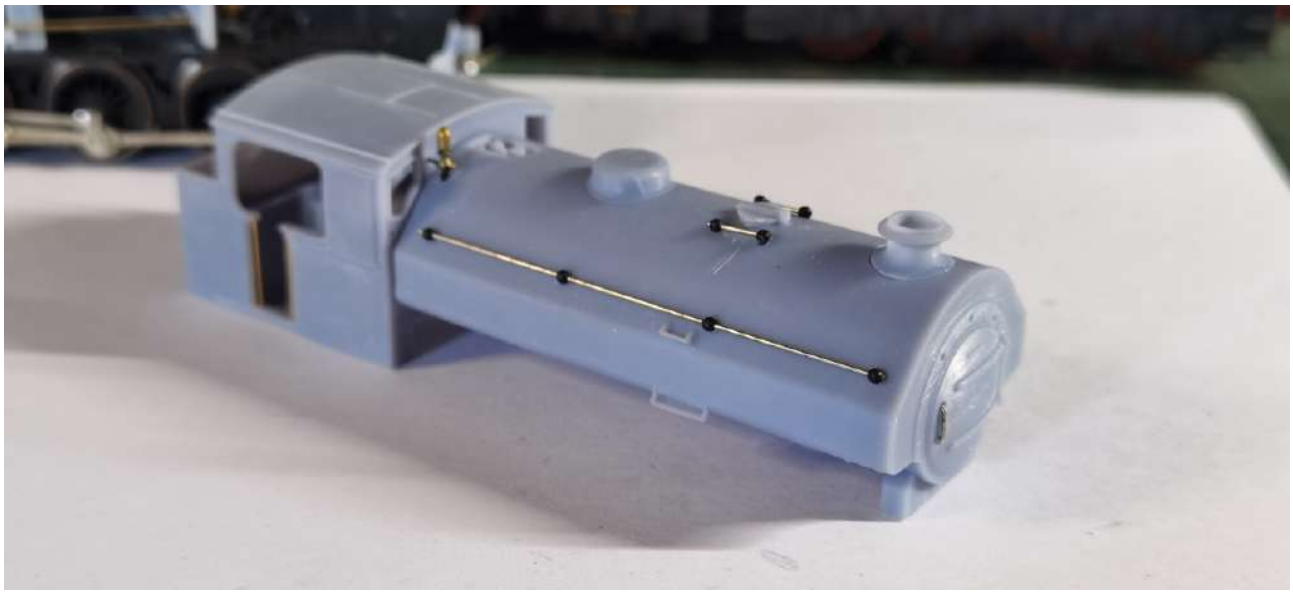
Next fit the new buffer beams and steam pipe detail.
2 options are included for steam pipes in the kit.
The first is a 1-piece print as shown in the instructions. This is great for quick assembly as it push fits onto the J94 boiler, however due to build variance it may not line up with the cylinders perfectly, so an alternative 3-piece version is also included which consists of a spacer for the boiler and 2 separate steam pipes.



Pic 28

0.45mm brass wire was used for cab handrails.

Kyle says: "*I also sanded out the base of the firebox door with the intention to fit a firebox glow.*"



Pic 29

Fit the chimney and smokebox door dart.
A whistle (not included) can also be fitted at this point.

Pic 30

Fit the buffers, and test fit the body before proceeding.

Pic 31

Before going further with paintwork, run your model in. If you have a new donor, it will need running in regardless, but it is worth running in the valve gear to loosen everything up so all is seated correctly.

Pic 32

Clean off your model thoroughly, and use a good quality primer.

Pic 33

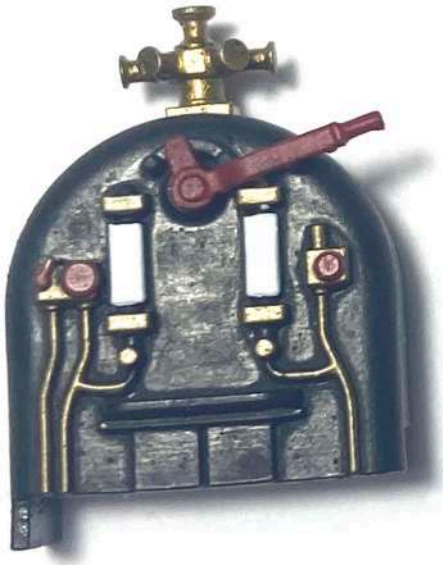
Paint and assemble the body components.

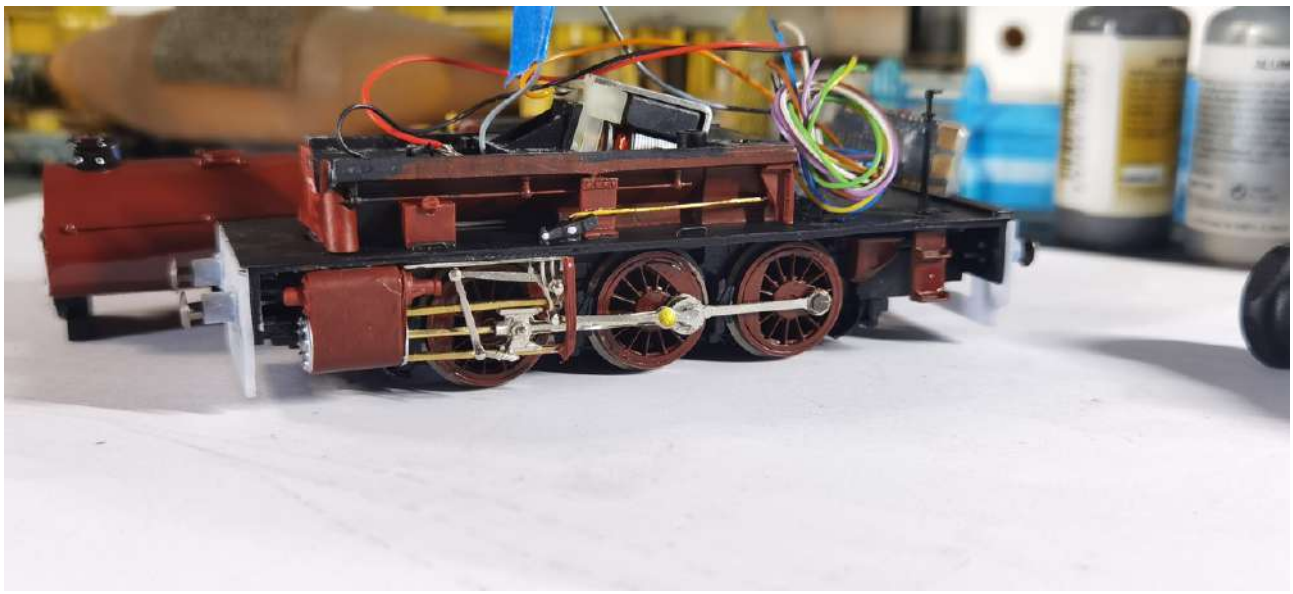
Kyle says: *"I mixed up my own colour using Ferrari red and black. I personally model Steel Co. of Wales, and the images I have are quite a dark red – although the colour in preservation is much brighter"*

Be sure to top with 2 gloss lacquer coats. It is important to get a good gloss finish for the transfers.

CAB INTERIOR

The cab interior has detail that comes in 3 pieces:
Firebox backhead
Steam manifold to go on top
Regulator handle
All of these should be pre-assembled, painted and glued into the cab. The reverser and handbrake are carried over from the J94 but the reverser linkage should be trimmed to suit.





Pic 34

The cylinders, wheels, motion bracket hanger, tank supports, boiler, sandboxes, steps and steam pipes all need to be the same colour as the body. The counter weights are black, and the buffer beams a much brighter red.

Pic 35

Once the gloss has dried, apply your decals being very generous with Microset and Microsol. If glossed properly, the decal carrier film will disappear. Not to everyone's tastes, but I also painted the valve gear. For this I mixed up a light grey with a touch of black and a touch of silver and a touch of brown. Don't mix it completely, you want it to be un-even. Apply this mix with a very tiny brush, very sparingly. Be sure

not to fill moving parts with paint. Whilst this is fresh, pop the loco on a rolling road and leave it running while the paint dries, this prevents any parts seizing up. And finish off with a drop of oil in all moving parts.
To finish the model, paint the cab interior, pick out parts in silver and gold, and cover the whole thing in a dusting of matt lacquer. Weathering is optional.

There are two 10BA nuts that need to be glued in to the recesses in the cab - use the glue sparingly as getting glue in the threads can be a nightmare.
The 10BA bolts will go through the chassis and into the nuts to hold the body on.

Thank you for the purchase of this kit!

Special thanks must go to:

Adam White for designing the kit.
Jack Dibnah for help with obtaining prototype details.
Mike Edge for designing the valve gear.
Kyle Humphries for the test build and detailed write-up.

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