

## Ruston & Hornsby 20 HP Locomotive Assembly Instructions

Ruston & Hornsby of Lincoln first manufactured narrow gauge diesel locomotives in the early 1930's. Over the next four decades they built thousands of locomotives, mostly between 18- and 24-inch gauges. Rustons used a number of engines in these, first bought in from Listers and then manufacturing their own range of engines. Bodywork evolved continuously even before they left the factory. Once on site, their owners soon started adapting their locos to meet their own particular needs. This means that no two locomotives appear to be the same when studying photographs!

Seventy-seven of these "20HP" locomotives were built 1932 and 1938 using 2-cylinder Lister diesel engines. The first batches featuring the straight side radiator modelled.



## General Assembly Instructions

Do take time to read through the instructions and understand how the parts fit together before reaching for the glue pot. Where ever possible parts have been designed to be symmetrical but occasionally parts have to be left or right-handed so take care to follow the instructions carefully at these points.

### Gluing

The 3D printed components in this kit are best glued with a good quality cyano glue (e.g. "Roket Max"). When fixing parts to pre-painted parts, aero modeller's "canopy glue" works well without any risk of "smoking" the paint surface.

### Painting

This is very much a matter of personal choice. The 3D printed parts are easily painted with either acrylic or enamel model paints. We also find acrylic car paint in an aerosol works very well. The small components are best painted before fixing to the larger assemblies.

We usually find it best to paint components "as you go along" but by all means leave it all to the end if that's what works for you.

### Tools

The following tools will be required:

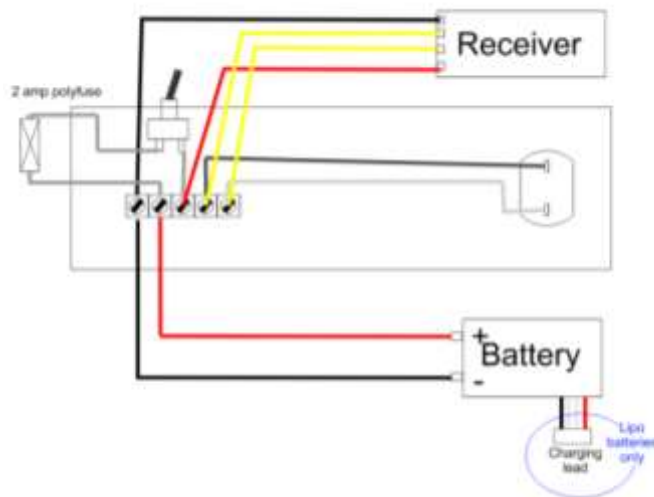
- A sharp modelling knife or scalpel
- 1.5mm and 2 mm drill bits (to clean out various holes)
- A small file, wet and dry paper or an emery board "nail file"
- A pair of side cutters or "snips"
- Small Philips or pozi-drive screw driver

The following tools are recommended

- A cutting matt
- A jewellers pick-up tool (very useful for holding the M2 bolts)

## Radio Control

The kit comes with the chassis pre-wired for simple “Forwards-Stop-Backwards” control with a battery holder for 9volt PP3 battery. Our locomotive kit chassis include a 5-way screw connector block. This is to facilitate the fitting of a remote control if required.



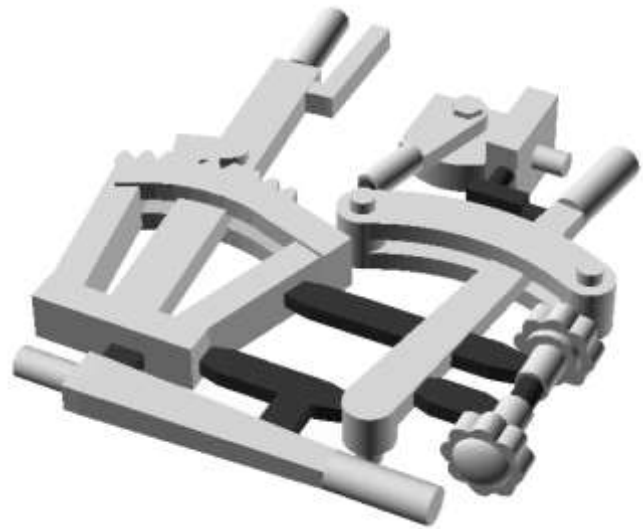
However if you fancy fitting radio control there is sufficient room in the bonnet cavity to accommodate either a 3 cell lipo battery and a Micron Mr603 or a pp3 9v and a Locoremove Maxi B (pre wired leads recommended).

### Points to note

- 1) Do observe the polarity, i.e. black to black; red to red. Getting this wrong could wreck the receiver.
- 2) The kits come fitted with a switch that has been wired as a “change over” with center off. We suggest that you change the switch for a simple on-off switch, or at the very least rewire the existing switch. Using “as is” could result in the polarity to the receiver module being reversed!
- 3) If when you test the loco, it goes backwards when the transmitter/phone says forwards; then transpose the two output wires (yellow in the diagram) from the receiver.
- 4) If you are using a lipo battery we strongly recommend that you attach the battery to the bonnet side with some Velcro. Leave the little charging lead loose towards the top so that you can connect the charger relatively easily.

### Step 1 – SLS Component Preparation

The majority of the SLS components are joined together with little sprues (the dark areas in the picture) and will need separating with a sharp knife, scalpel or modelers side cutters. These components take acrylic modelling paint very well and it is suggested you paint them before assembly.



### Step 2 – Resin Components

The majority of the body work parts are 3D printed in resin with a much higher resolution than most other kits on the market leaving near invisible layer lines. If you do want to remove the last traces of these lines you will find the resin sands easily with wet and dry paper.

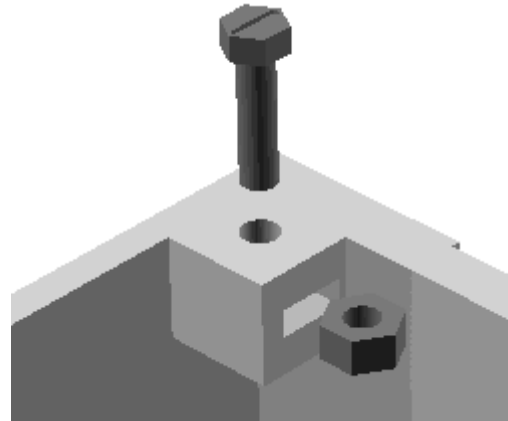
However, some faces (typically those where the printer supports attach) will need a little more sanding to flatten the face off. We have found the enclosed nail files very suitable for this and just a few gentle strokes will soon remove any irregularities.

### Step 3 – Captive Nuts

The bonnet and cab are secured to the chassis with M2 bolts and captive nuts.

First clean out the bolt holes in the “nut cages” by twiddling a 2mm drill bit in the hole. (The four cab cages are in particular need of this).

Gently push a M2 nut into the cage’s slot. If necessary clean the slot opening with the point of a sharp scalpel blade. The idea is for the nut to push in easily without being so loose it can fall out.



Temporarily thread a M2 bolt through the cage’s bolt hole into the nut so that the nut is perfectly aligned. This greatly assists the fitting of the cab and bonnet later!

If the nuts happen to be a loose fit in their cages, then a smear of contact adhesive or canopy glue will hold them in place without blocking the threads.

Repeat for all 7 nut cages.

## Step 4 – Chassis

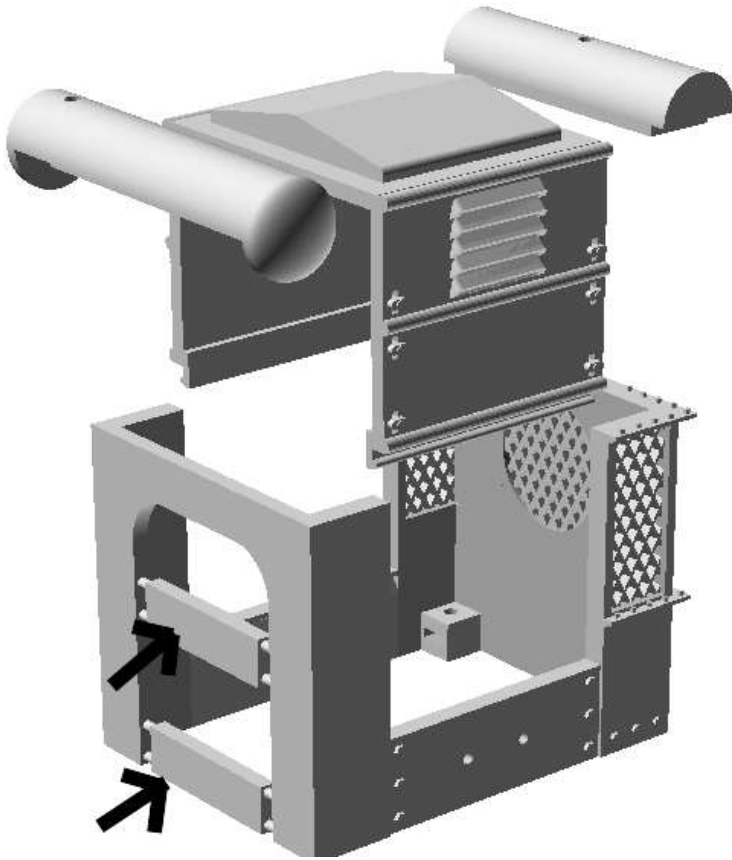


Temporarily fit the seat into its locating hole in the gear box top, you will probably need to ream out the hole slightly. Remove the seat for now, we will glue it in place later.

Ensure that the bottom surface of the gearbox “top” is flat by gently filing with the emery board and clean out the two screw holes with a 1.5mm drill bit. Attach the gear box top to the cab floor with 2 M2 self-tapping screws (or simply glue it in place).

Screw the buffers in place with a pair of M2 self-tappers. Note the chassis has a pair of centre holes if you rather fit your own choice of centre buffer.

## Step 5 – Bonnet



Clean up the “printing” faces of the four bonnet components with the nail file. Insert 3 M2 nuts into their “nut cages” as detailed in section 3.

Glue the tank and radiator to the main unit. The bonnet top/side unit should clip into place by gently squeezing the sides together. This should mean that it is possible to remove for access to the battery compartment when your model is in service.

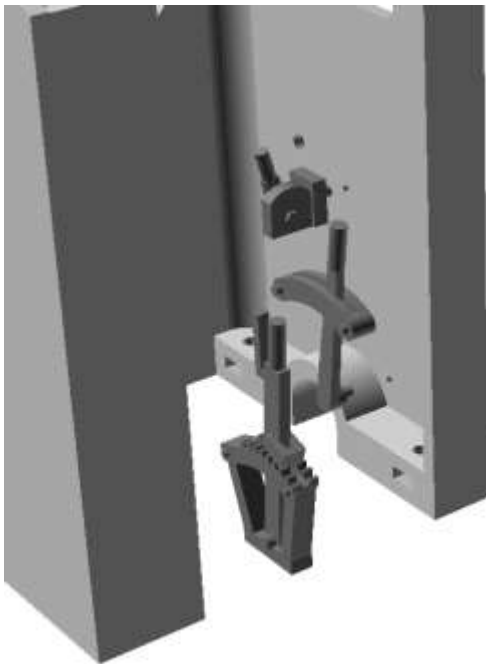
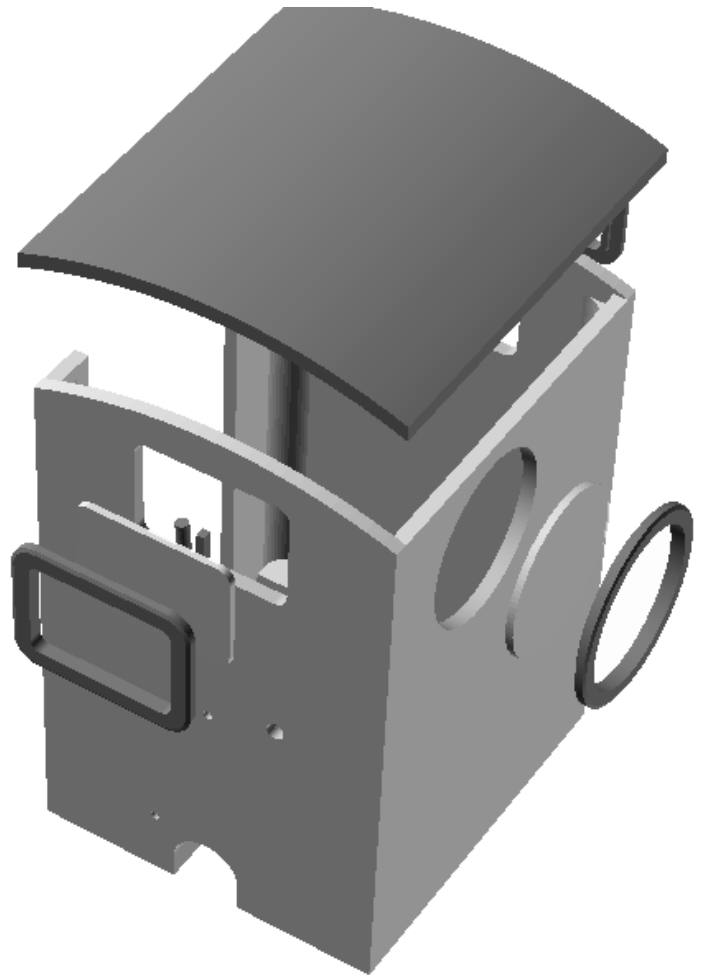
Note the rear opening has a pair of substantial printing supports (black arrows in picture). If you are fitting radio control and need all the space; snip these out with a pair of sharp side cutters. If you don’t need the space, then leave them be; they add to the bonnet’s strength!

## Step 6 – Cab

Glue the roof to the cab sides.

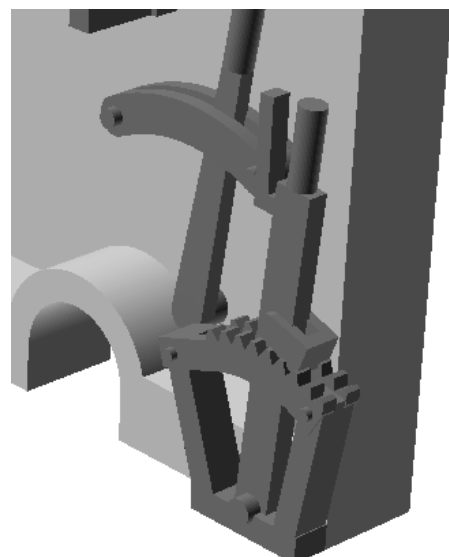
Glue the three window frames in place and then carefully glue (aero modellers canopy glue recommended) the window panes from inside the cab.

Glue the little regulator lever into the top 1.5 mm diameter hole. (The 3 mm diameter hole is for you to route any remote controls receiver aerial into the cab).



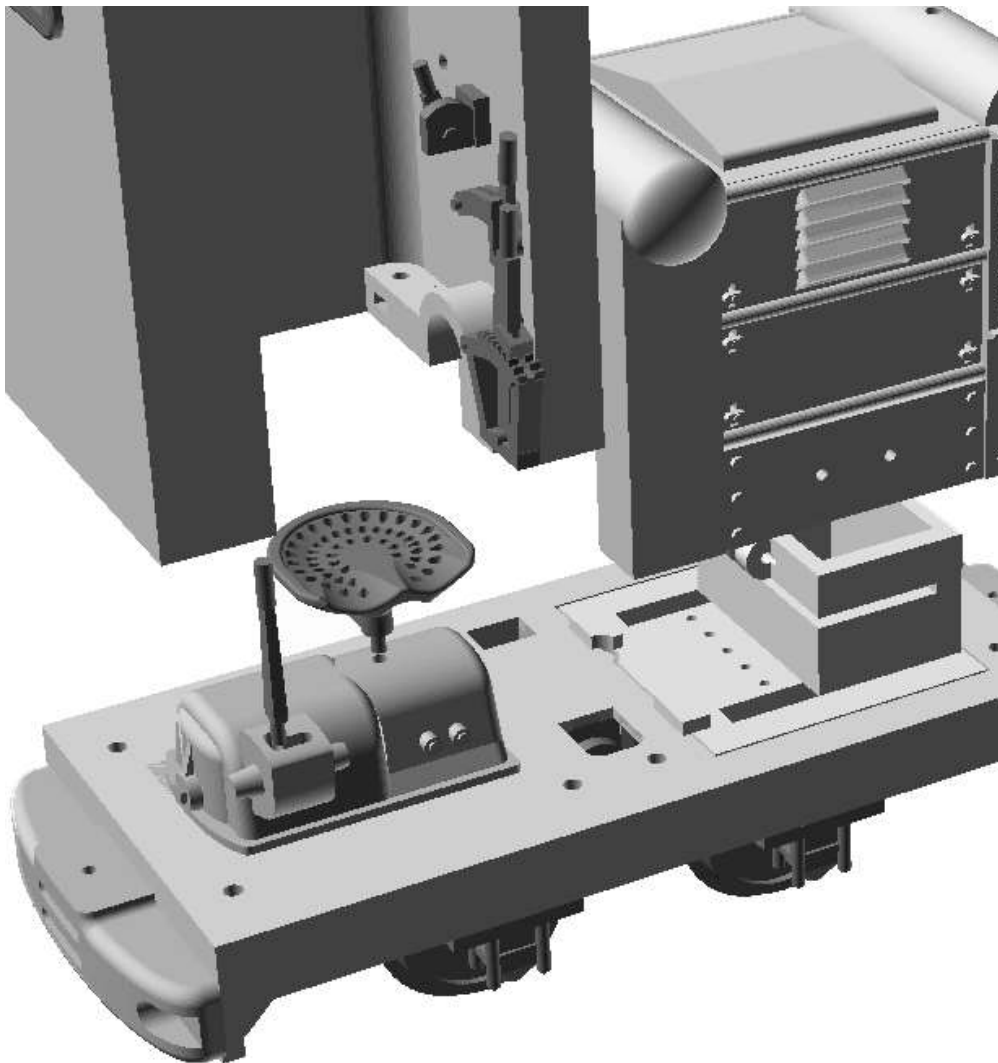
Glue the reversing lever into the bottom 1.5mm diameter hole.

Glue the brake lever to the nut cage as shown below





## Step 7 – Main Assembly



Bolt the bonnet to the footplate with three M2 bolts up into the captive nuts. NB a “Jewellers pick-up tool” is very handy for gripping the M” bolt head and getting the thread engaged in their nuts.

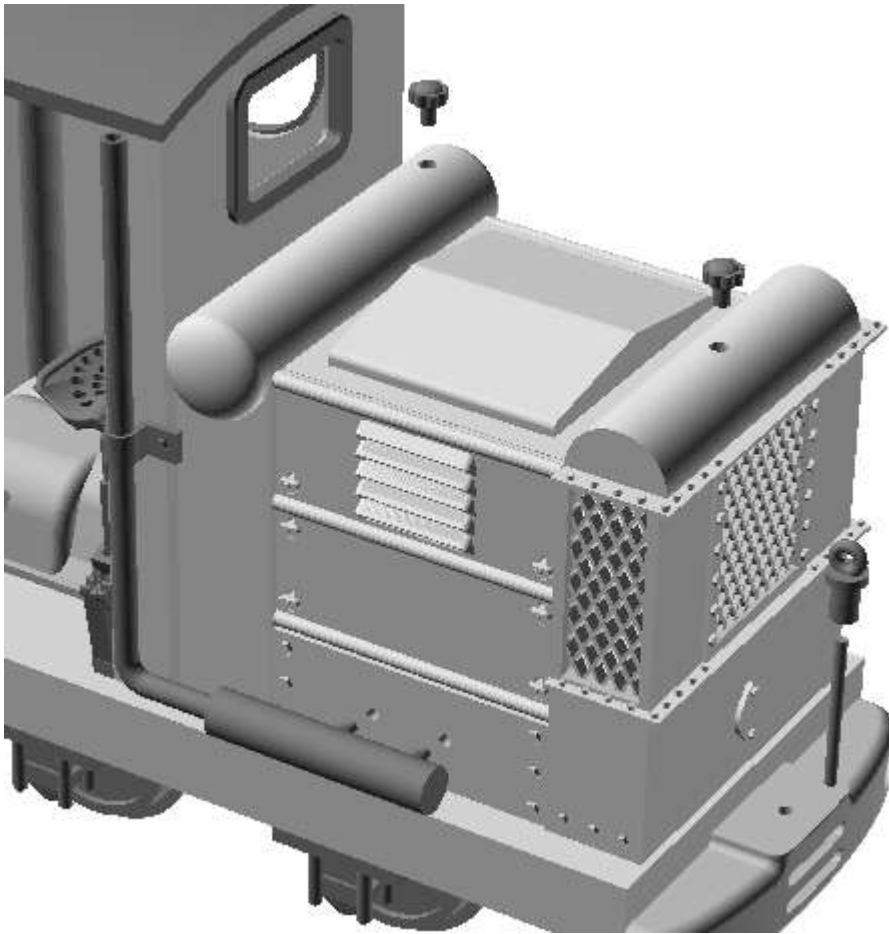
Glue the seat and gear selector arm in place.

Bolt the cab to the footplate with four M2 bolts up into the captive nuts.

If using a PP3 battery, place in its clamp (terminals upper most) and tighten the 10mm self-tapper to hold the battery in place.

*N.B. A strip of tyre weights is provided in the kit for you to squeeze into various nooks and crannies if you want additional weight in your locomotive*

## Step 11 - Finishing touches



Glue the radiator filler cap and fuel tank cap in place.

Glue the exhaust to the cab front and bonnet side if required

*Originally the exhaust was a simple tube pointing straight down at the track (allowing the fumes to drift back and rise into the cab). It is noticeable when studying almost all in service locomotives that the owners soon added their own (often very crude) exhausts silencers. We have copied one of the neater examples so your driver doesn't complain to your H.R. department!*

Clean out the holes in the coupler eyes with a 1.5 mm drill and glue in the 1.5mm diameter coupling pins. Push the pins into their holes in the buffer beam.

**Job Done!**



## Parts List

<b>Part</b>	<b>Quantity</b>	
Chassis	1	
<i>Resin parts</i>		
Bonnet Sides/Front	1	
Bonnet Top	1	
Cab Sides	1	
Cab Roof	1	
Radiator Top	1	
Fuel Tank	1	
Gearbox Cover	1	
<i>Buffers Bag</i>		
Buffer Beams	2	
Coupling Pin Heads	2	
1.5mm dia Rod (24 mm long)	2	
Coupling chain	2	
<i>Details Bag</i>		
Control lever set	1	
Seat	1	
Window frame set	1	
M2 nut and bolt	7	
M2 self tapper	6	
<i>Other Bits</i>		
Nail File	1	
Tyre weight Strip	1	