

## Ruston & Hornsby 20 DL Locomotive Assembly Instructions

The Lincoln based firm of Ruston and Hornsby were one of the most prolific builders of narrow-gauge locomotives in the country. These were produced in a variety of gauges from 18 inches up to standard gauge and their products were arguably the best on the market.



### 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:

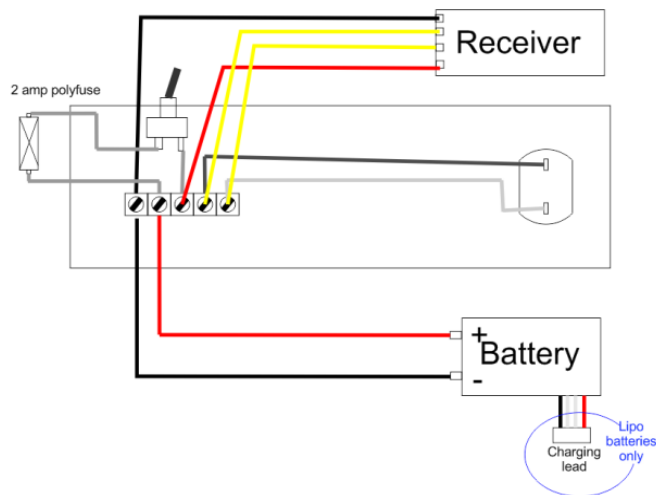
- A sharp modelling knife or scalpel
- 1.5mm and 2 mm drill bits (to clean out various holes)
- A small file, wet and dry paper or an emery board "nail file"
- A pair of side cutters or "snips"
- Small Philips or pozi-drive screw driver

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.



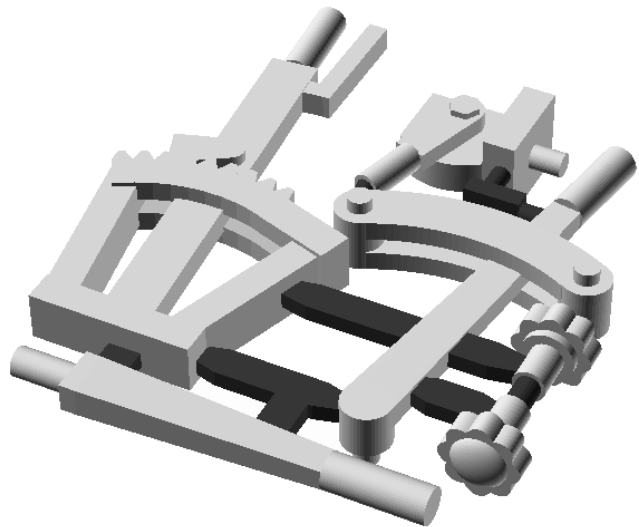
However if you fancy fitting radio control there is sufficient room in the bonnet cavity to accommodate either a 3 cell lipo battery and a Micron Mr603 or a pp3 9v and a Locoremove Mini B (pre wired leads recommended).

### 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.

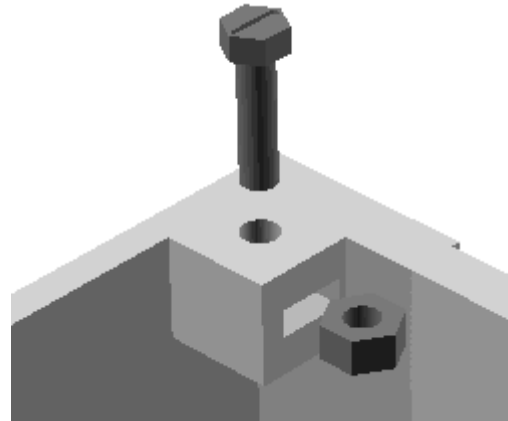
However, some faces (typically those where the printer supports attach) will need a little more sanding to flatten the face off. We have found the enclosed nail files very suitable for this and just a few gentle strokes will soon remove any irregularities.

### Step 3 – Captive Nuts

The bonnet and back sheet 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.

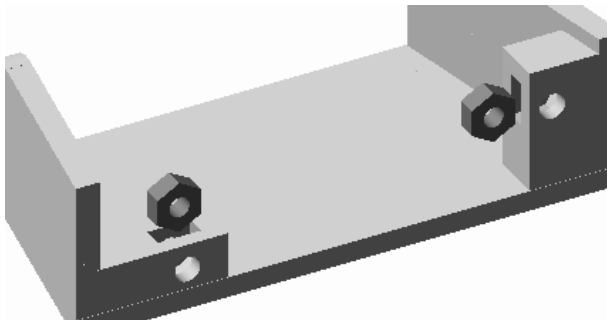
Gently push a M2 nut into the cage’s slot. If necessary clean the slot opening with the point of a sharp scalpel blade. The idea is for the nut to push in easily without being so loose it can fall out.



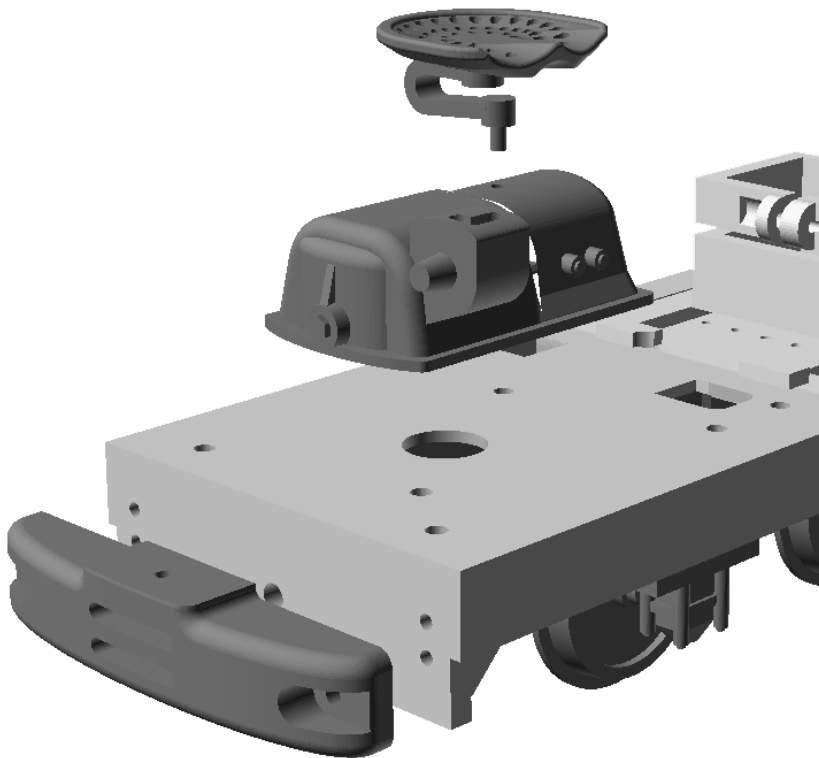
Temporarily thread a M2 bolt through the cage’s bolt hole into the nut so that the nut is perfectly aligned. This greatly assists the fitting of the cab and bonnet later!

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 5 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. They can be fixed to the chassis at two heights. The lower pair of holes provide a typical scale height whilst the upper pair of holes provide a “standard” 24mm above rail level.

Note the chassis has a pair of centre holes if you rather fit your own choice of centre buffer.

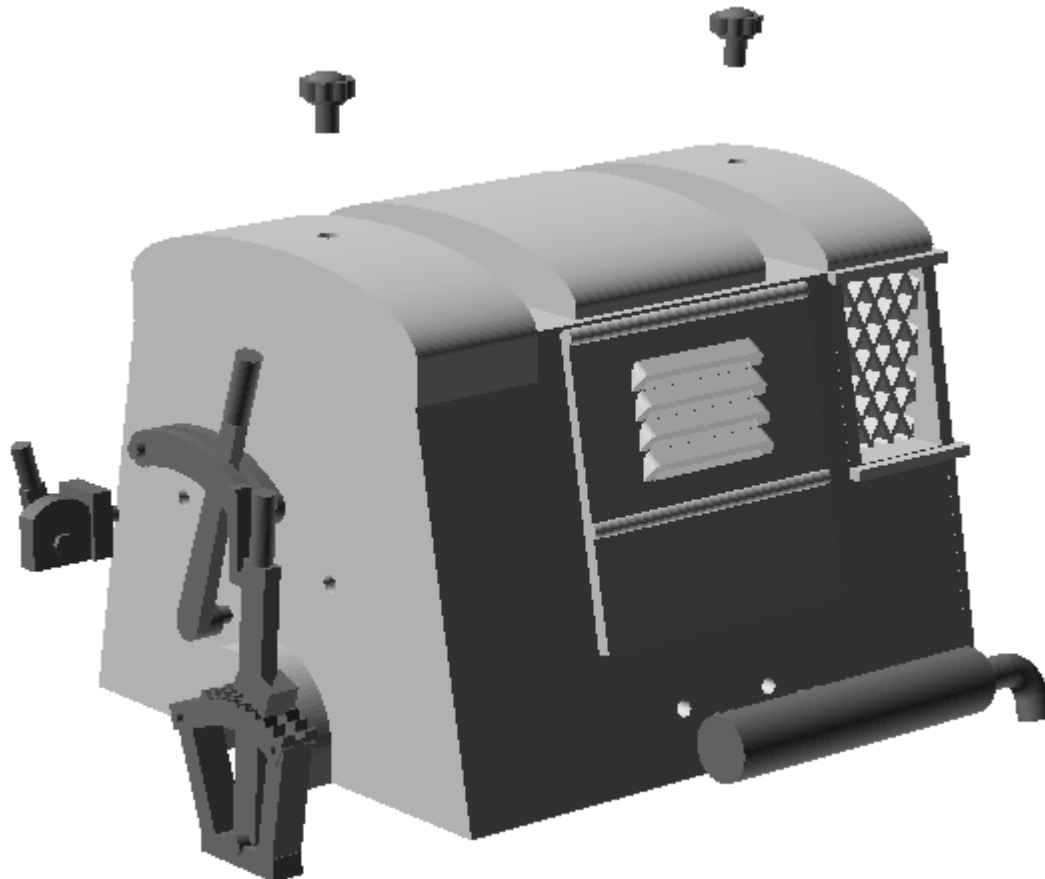
If using a PP3 battery, place it in its clamp (terminals upper most) and tighten the 10mm self-tapper to hold the battery in place.

You should be able to test the chassis on your track at this point

## Step 5 – Bonnet

The bonnet comes as a 3D printed, one piece resin “casting”. Only its bottom edges may need a bit of filing with the supplied emery board to ensure it sits cleanly on the chassis.

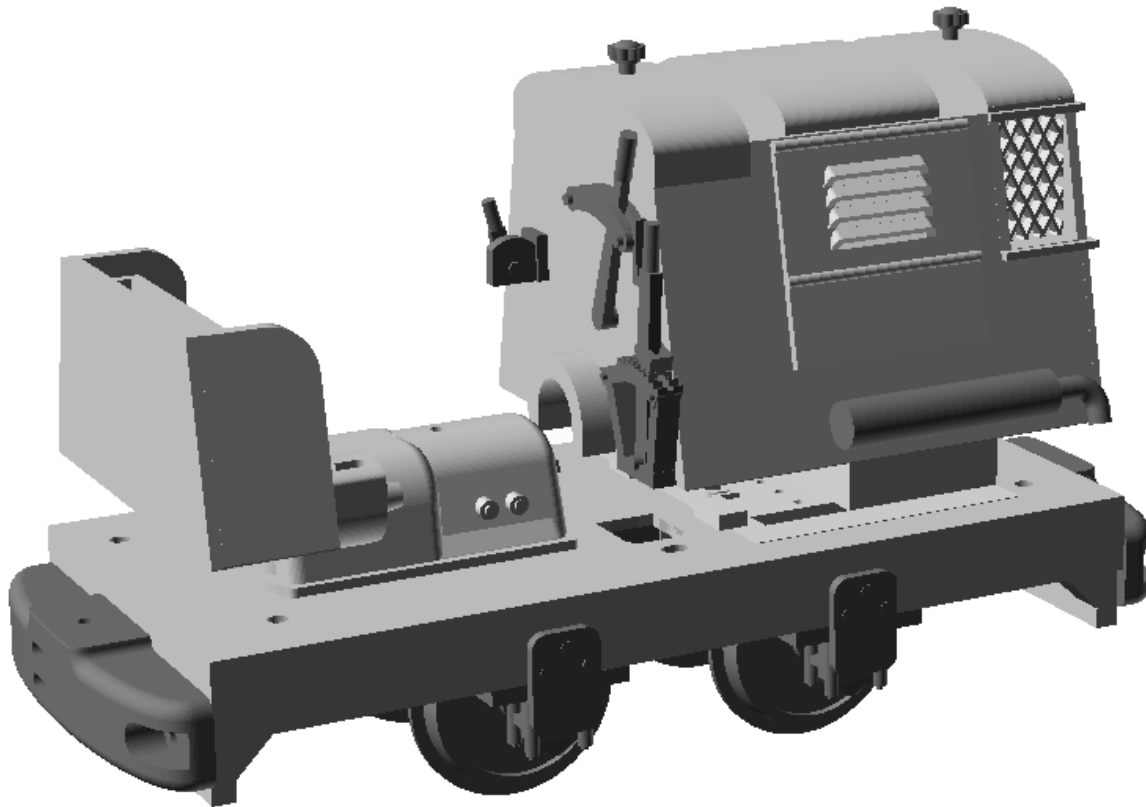
*We suggest you paint bonnet at this stage.*



Glue the filler caps, control levers and exhaust silencer to the bonnet. A good quality super glue or aero modellers canopy glue may be best for this step if you have already painted the bodywork as “plastic weld” will take the paint off!

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

## Step 6 – Main Assembly



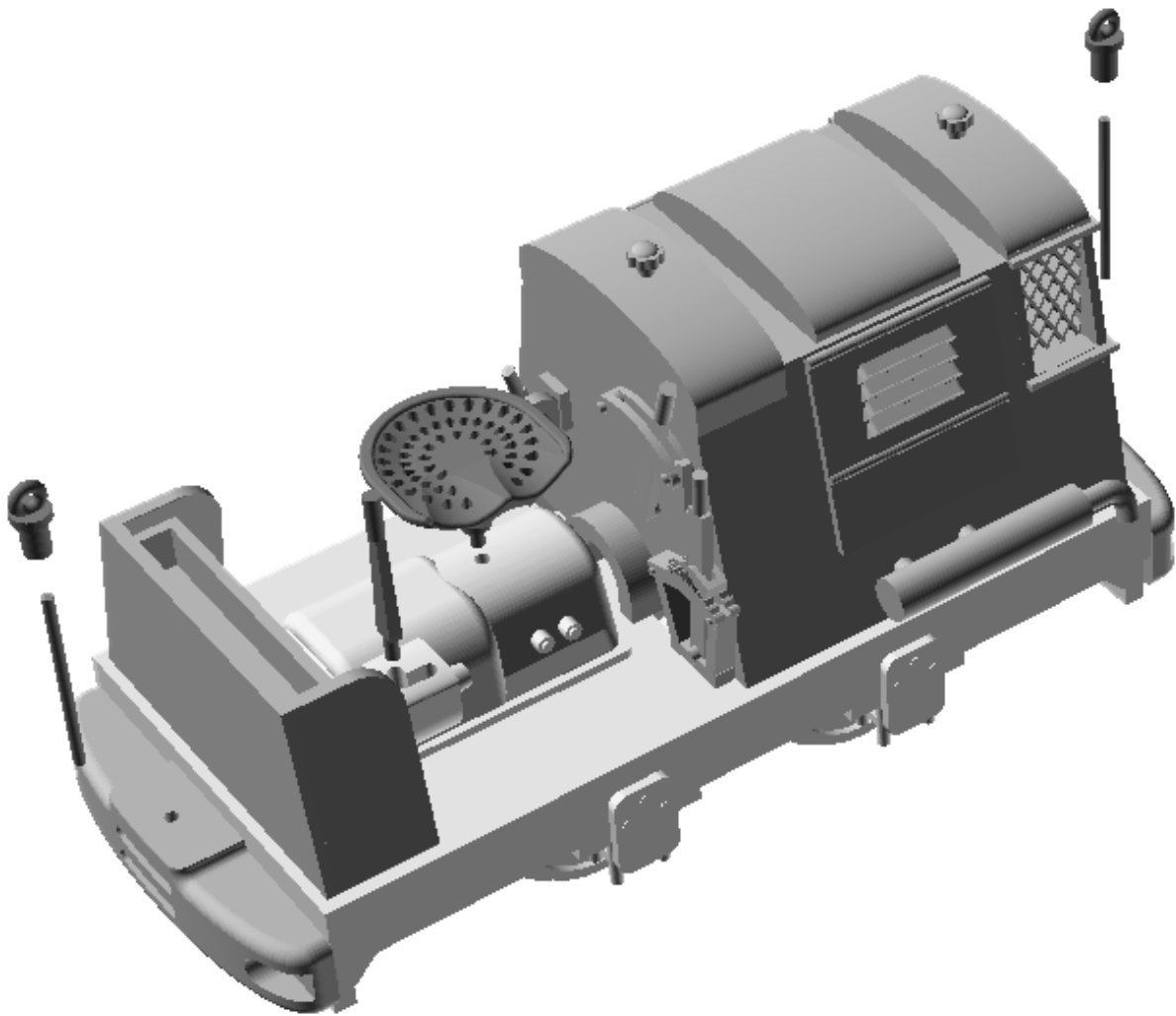
Bolt the bonnet to the footplate with three M2 bolts up into the captive nuts. N.B. a “Jewellers pick-up tool” is very handy for gripping the M2 bolt head and getting the thread engaged in their nuts.

Bolt the back sheet with two M2 bolts up into the captive nuts.

*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 7 – Finishing touches



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.

Glue the seat and gear selector arm in place.

**Job Done!**

## Charging

Your RTR model locomotive comes fitted with Lipo rechargeable battery that is charged with a “micro-USB” phone/gadget charger (supplied). The necessary electronic circuitry to ensure the battery is correctly charged is built into the battery itself-

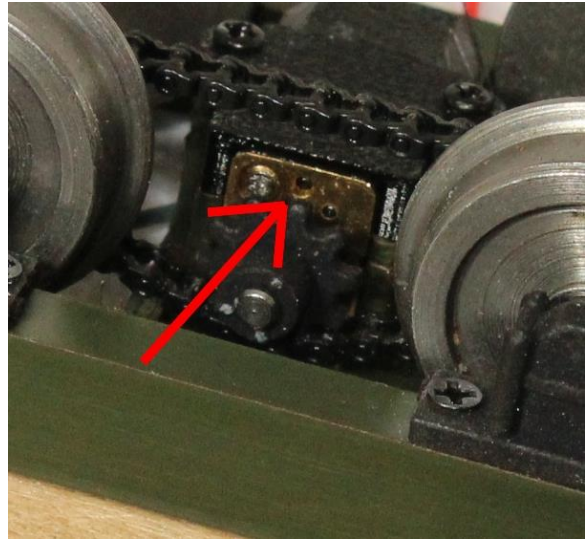
To charge the locomotive, turn it upside down and locate the micro-USB socket in the batteries base. Connect a micro-USB lead to your USB charger and to the battery. A little red LED will light in the batteries base while the battery charges. When the battery is charged the red light will turn blue or blue.

Disconnect the charger when done by gently pulling the charging lead from batteries base and replace the lid.

## Lubrication

We suggest you occasional lubricate the following with a few drops of light lubricating oil such as “3in1”.

- Gears in the micro motors gear box.  
There is a small hole in the brass end plate of the gear box.; drip some oil into this from a fine tubed “oiler pen”



- Axles where they run in the axle-boxes

Note the chain is made of “Delrin” and should not need oiling



## Parts List

| Part                       | Quantity |  |
|----------------------------|----------|--|
| Chassis                    | 1        |  |
|                            |          |  |
| <i>Resin parts</i>         |          |  |
| Bonnet Assembly            | 1        |  |
| Back sheet                 | 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        |  |
| Exhaust                    | 1        |  |
| M2 nut and bolt            | 5        |  |
| M2 self tapper             | 6        |  |
|                            |          |  |
| <i>Other Bits</i>          |          |  |
| Nail File                  | 1        |  |
| Tyre weight Strip          | 1        |  |