

Chosen Scale eTch ceTera



Da Locomotive Kit Assembly Instructions

Andrew Wells – February 2001

Introduction

The building of a “brass” kit is not a trivial exercise, and this kit will take several hours to complete. (Note that we refer to the kit as “Brass” throughout, although the etched parts are actually Nickel-Silver. Don’t worry, the same instructions apply). Don’t be intimidated however; if you have never built anything from brass before. As long as you can solder and bend things you too should have no trouble.

These instructions cover the complete assembly. If you have purchased a ‘partially assembled kit’ then you will find that a number of the steps will have already been done. However, you will get a better understanding of the remaining steps if you work through the instructions and match each step to the partially completed assemblies.

Tools

The following tools are mandatory

?? Soldering iron - I use a non-variable Weller unit (which is temperature controlled, but at a fixed temperature so that I can leave it on without having to worry) but if you have or can afford a variable unit then this is helpful. While it might seem strange, go for a high wattage unit (with a fine tip) rather than the small electronics type irons. This will be explained later.

- ?? Large fine flat file - you need this for cleaning up the parts prior to assembly
- ?? Small flat file (you can get a set of six or so fine files of different shapes which are not too expensive - make sure you get fine toothed version)
- ?? Some small metal clamps (or lots of plastic ones which you don’t mind melting a bit). Asian variety stores have wide-opening pegs called Pole Pegs that are ideal. A more expensive version is sold through gardening shops to hold saplings to stakes.
- ?? A small pair of smooth jawed pliers. Mine have jaws that are about ¼” wide and are called “Duckbill Pliers”. These are invaluable when bending small parts.
- ?? a 6” ruler or straight edge (used for bending parts and cutting).
- ?? some pieces of DAR 2 by 1 (for bending parts)
- ?? flux (see below)
- ?? solder (see below)
- ?? sandpaper - 600grit or finer, wet and dry for finishing off external solder joints

The following are useful but not essential

- ?? Weller Pyropen, or small gastorch
- ?? Resistance soldering unit. With this unit you connect one of each electrode to each part to be joined, then pass a low voltage high current (e.g. 2 Volts @ 70 Amps) through the joint. The current heats up the point of highest resistance which happens to be the solder and the solder flows and the joint is made.
- ?? Dremel Mototool. This is used in a number of different areas:
 - ?? with a cut-off wheel to remove parts from the trees
 - ?? with a sanding disk to do the initial clean up of joints prior to hand sanding with wet and dry sandpaper and painting
 - ?? with various burrs to tidy up smaller parts

Flux and Solder

Unlike electronic soldering, you cannot rely on the flux in the core of the solder to clean the joint for you. You must use a separate liquid flux of some sort. I use CARR's Red Flux, which is designed to both clean the joint and then neutralise with the heat of the solder to stop it corroding the joint later (This is what is in the small vial in the kit - the amount included should be plenty for the one kit). Other commonly available flux (e.g. Duzall, or Bakers) don't self-neutralise and are probably too strong for modelling. However if you can't get anything else they will work (I have used them), as long as you make sure that you thoroughly wash and dry your work after completing each session to get rid of any excess flux. If you don't do this you will get a lovely verdigris effect which looks nice on church steeples but won't help your attempts to paint later. You should wash and air-dry your work at the end of each session anyway - even with the Carr's flux - wash in warm soapy water and rinse thoroughly.

I use standard electronic solder (60/40 mix) but once I have put a bit on the soldering iron tip I let the flux in the core boil off (i.e. wait for the fumes to stop) before I apply it to the work. To solder the joints in the kit, use the following technique:

- ?? Fold your parts etc. and test fit.
- ?? Using a small paint brush, paint the Flux on each part where the joint is to be made. The solder will only stick where the flux has cleaned the brass. A tip to ensure that you get solder only where you want is it this: outline the area to be tinned with a pencil. Paint on the flux inside the pencil outline and then solder ; the solder will not stick to the pencil and hence will be contained within the area. You can then wipe off the pencil.
- ?? Tin each part by tipping your iron with a little solder and "painting" it onto the fluxed area. You should get a thin even coat rather than a thick or lumpy build-up. A thicker solder joint is weaker than a thin one, as the real solder joint is only made in the top layer of molecules on each part of the two pieces and a thick solder joint just leaves extra soft solder between the parts.
- ?? Fit the tinned pieces together, with another coat of flux between the tinned surfaces. (clamp if necessary)
- ?? Heat the joint until the solder 'flashes' (you will see it change to a liquid state). I use a Weller Pyropen for a lot of this work, as it directs hot air at the parts without having to touch them and hence maybe move them. You may find you have to use a pointer (a small wooden skewer works well) to hold the small parts down if you are using an iron, otherwise the iron tends to pick up the smaller parts when you take the iron away. Alternatively you could try using one of the small gas torches and direct heat at the joint this way.

Once you start putting together the subassemblies you have to be careful that you don't put too much heat into the built-up unit otherwise other joints will fall apart while you are putting new ones together! There are a couple of ways to get around this problem:

- ?? Put a wet piece of cloth on the body between the joint you are working on and the other joints. The water should take up the heat.
- ?? Use the resistive soldering technique as this keeps the heat within the joint you are working on.
- ?? Use a high wattage iron. This way you can get a lot of heat into your joint quickly and if it is tinned and fluxed correctly it should take a very little time to flash, thus not giving the rest of the work time to heat up. With a small iron you tend to find that it takes a longer time to heat up the joint to the solder flow temperature and because brass is such a good conductor the whole job goes to the same heat (which not only loosens the other joints but also hurts like hell if you happen to be holding it). I favour this third method.
- ?? Use low melt solder for the final joints. This special solder melts at a much lower temperature than normal solder and hence you can work with less risk of loosening other joints. The downside of low melt solder is that it contains Cadmium and hence it is both expensive and very poisonous.
- ?? Use CA glue (superglue). I am not a fan of this for most purposes, as once it takes the joint is permanently in that position. With solder you can free the joint and try again. However, there are some places where you can use it - fixing the roof vents on as the last step in assembling the Fm Van kit is an example. Theoretically you could build the whole kit with CA glue but I haven't tried this approach so I won't offer any suggestions. There are some areas where the folded joints really do need some support and hence the instructions indicate a fillet of solder should be added, and some of the joints need filling with solder and sanding to get a good finish.

Standard Operations

In the instructions for each set I have not spelled out the initial process of removing the parts from the trees and tidying them up. The best way to do this is

1. for large parts: cut (with a jewellers saw or a cut-off wheel in a Dremel mototool) through the tree well away from the part, then use the large flat file to remove the excess tree. The trees have been placed where possible either on long flat sides where you can file down to the general line of the side, or on parts which are hidden (e.g. on tabs) and hence don't have to be perfect.

2. for the handrails, use a Stanley knife on a hard surface while pressing the part down firmly to the board with your other hand.

Further Help

If you have any further problems, please contact us. If you damage or lose a small part don't be afraid to call; we may well have a spare bit that we can send for the cost of postage. Don't forget...we are all fellow modellers who are here to build the interest in NZ120 while covering our costs, not to make a huge amount of money from you.

Don't Worry, Be Happy

Don't forget, this kit is designed to let you build a model for an NZ120 layout. This means that a well built model will 'look the part' when viewed as part of a larger tableaux. This kit is not intended as a craftsman's kit (although with care you can create a very sharp looking model), so do the best job you can and then enjoy running it. Don't get frustrated because it seems too difficult, or put it back into the box and hide it under the bed if you bend a piece over. Brass is pretty forgiving and you can probably bend it back. If you look at the prototype most cars have a few dents and ripples on them, and vans are particularly prone - bent handrails, scratched doors, even dents in the roof have their prototype examples.

A broken piece will solder back together fine, and once reassembled you can fill the break with solder and sand back to a smooth surface. Once painted it will be fine.

By all means feel free to superdetail it, add interiors etc, but for most of us the basic unit will look just fine as is. So let's get started!

Parts List

In the kit you should have the following:

1. an envelope containing a few sheets of brass parts, joined to trees
2. a small vial of Carrs Red Flux

3. some 60/40 solder
4. two brass castings for the number boards
5. two white metal castings
6. Two small white metal castings for the horns.
7. these instructions.

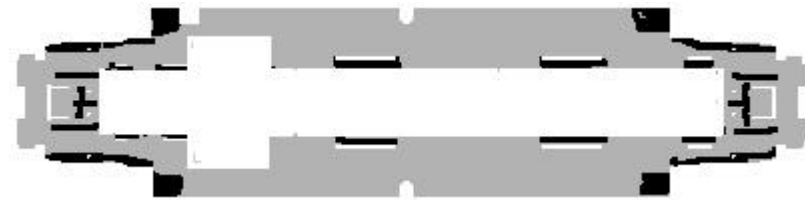
If you are missing anything please let us know immediately...don't send anything back until we have had a chance to discuss it with you - it's cheaper for both of us to send you a small part than to send the whole kit backwards and forwards.

At this stage, run in the chassis. Doing this now avoids unnecessary removal of the completed body later to solve running problems.

Assembly.....

Part #2 – Frame

Tin on the underside (i.e. the side which doesn't have the decking pattern) as shown in the diagram below. Make sure that you don't get solder in the fold lines – draw a line with a lead pencil along each fold first – this will keep the solder from these areas.



Fold down the sides of the frame. You will need to clamp the part to ensure a clean fold

Fold the ends down to a right angle – do not fold the shunters' footplate up at this stage.

Take the four steps (Parts #3). Two of the parts are identified on one side to help you determine to which corner they attach. Carefully fold the steps to match the angle of the front walkway - the steps fit under the walkway: see photo.

Photo 1: Folding the Front and Rear Steps



The steps are fragile, so make the inwards fold (the one further away from the steps) and immediately strengthen with a fillet of solder. Then make the outwards fold.

After folding and test fitting, tin the back edges of the steps, and the edge of the part where it will fit behind the side of the frame.

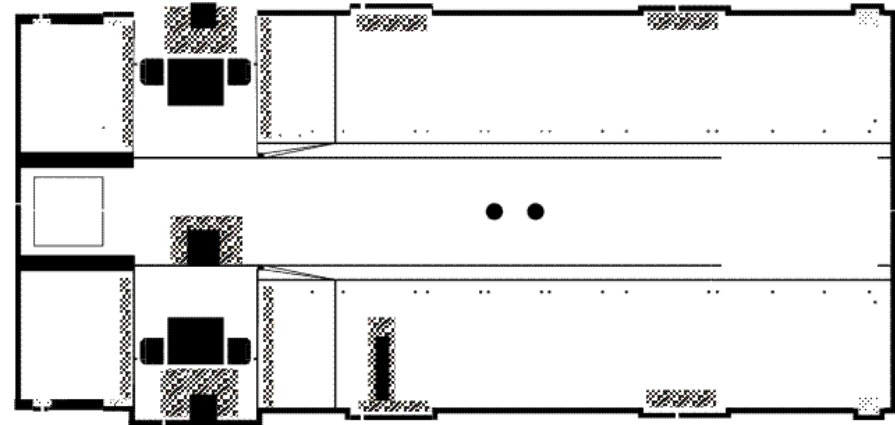
Now solder each step into place, ensuring that the right angle of the ends is maintained

Break out (remove) the flap over the coupler pockets.

Set aside the sub-assembly for later.

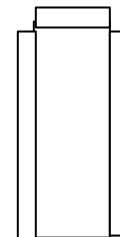
Part #1. Main Body – Long Hood

1. Tin the main body in all the areas shown in the diagram below.



Once again it is important not to get solder into any of the fold lines, or into any of the half-etched areas on the edges of the noses.

3. Now make the long folds along the long hood. These need to be 45 degree angles. It is important to fold these using an appropriate jig, otherwise you could bend the body along the line of the top of the engine access doors. The jig is made by glueing strips of .040" styrene to a block of pine previously cut to .525" thick, e.g.



Attention needs to be paid to the folds at the rear end of the long hood, along the top radiator opening. Gently use a piece of softwood to work the brass to the correct angle as shown in the following photo.

Photo 2: Ensuring that the Long Hood Fold is Neat



4. Next make the folds in the short hood. The folds need to be curved around a suitable drillbit or around the white metal nose casting, rather than bent in a sharp angle. Don't worry if the shape isn't perfect, as you can adjust it slightly later. Use the white metal casting to check on the evenness of your bends.
5. Now the cab sides need to be curved. Take care not to stress the fold line where the cab sides meet the roof, as this can be easily broken .

6. Now fit the top into the frame sub-assembly, and tack solder the tabs from the underside of the frame, making sure that the tabs go against the outside of the slots and that the hood sides are sitting down flush on the walkways. Now is the time to get the hood sides square to the walkways

Fitting the Cab bulkheads (parts #4)

Now the cab bulkheads need to go in. These hold the whole model in square and are critical to the distinctive look of the Da.

1. A thin line of tinning is required on the front (detail side) of the cab bulkheads. To ensure that the solder doesn't stray into the etched detail lines of the door openings, use a sharp pencil to draw a line 1.5mm from the inside rectangular opening of the bulkhead. Now flux and tin a strip along the thin top of the bulkhead, and down the inside of each door.
2. You also need to tin a thin strip along the bottom of the back of each door.
3. Now test fit the front bulkhead. Fit the bottom edge onto the top of the walkway, and angle the top up the fit up under the roof. At this stage solder the back of the doors to the walkway, ensuring that the outside edge of the door is flush with the outside of the walkway.
4. Now fit the rear bulkhead in the same way. Bend in the tapering doors on the long hood first. You will have to bend the small top angle down slightly to get the tapering doors to bend in far enough. They should just allow the doors on the rear bulkhead to be seen. Solder the bottom of the bulkhead to the walkway, again ensuring that the outer edges are flush.
4. You should now be able to gently move the top of the short and long hoods from side to side to find the exact centre of the bulkhead. Use the cab sides to get a symmetrical position. The cab sides fit neatly inside the cab bulkheads. Don't worry that the cab sides are not perfectly in line along the whole length of the side. Once you are happy that the hoods are centred and symmetrical, solder the roof to the top of the bulkheads.
5. Now move the cab sides into position and butt solder the bottom to the frame sill side. This should be an exact fit. Use the Cab Window Frame

6. Now you can lay a fillet of solder along the edges of the cab side and the back of the cab doors. There should be minimal gap along the whole edge of the bulkhead.
7. You should now find that the bulkhead is slight proud of the cab sides out the outside. With successively finer files and sandpaper, remove the excess material to create a neat joint.
8. Next fit the cab window frame (parts #5). Solder these to the inside of the frame sill and cabside, making sure that the frame is centred in the hole, and that the tablet handle detail is centred on the lower hole. Note that the smaller window goes towards the short hood. Once in place, tack solder the top to the inside of the cab side. I have found that it is better not to try and solder the gap between the cabside opening and the window frame – it look neater to leave this open than to have an untidy solder joint.
9. Now solder the tapering doors to the back of the cab bulkhead from the inside, and fill the two way taper at the top. You will need to fill and file this opening to a neat finish. Make sure that you use the pencil lead trick to keep the solder out of the hood door and rivet detail.

Hood Ends

The hood ends are supplied as white metal castings. Basically the white metal is the same composition as solder, so you need to be careful when attaching. Use the castings to make the final adjustments to the shape of the hoods.

Note that we supply an etched Dynamic Brake Fan Grill (Part #A). If you wish to use this rather than the less detailed casting, then you need to

- drill out the raised grill casting in the short hood casting using a ¼” drill.
- Remove the ‘flaps’ from around the edges of Part A.
- File the edges until it fits inside the whole in part A, then press in.

Next using 600-1200 grit sandpaper, followed by Brasso, polish the visible parts of the castings to get a bright metallic finish. Now attach. If you are careful you can use normal solder and a standard temperature iron to solder along the inside edges. However, to get a neat fit you might prefer to use low melt solder, or glue the castings in. Use epoxy (Araldite). Try not to use 5 minute Araldite as it can soften when you go to solder further details on.

Next fit the number board castings. These should be buffed with Brasso polish and washed thoroughly with soapy water first. Again you can use low melt solder, or glue (this time use CA, as it is less messy).

Dynamic Brake Radiators (parts #6)

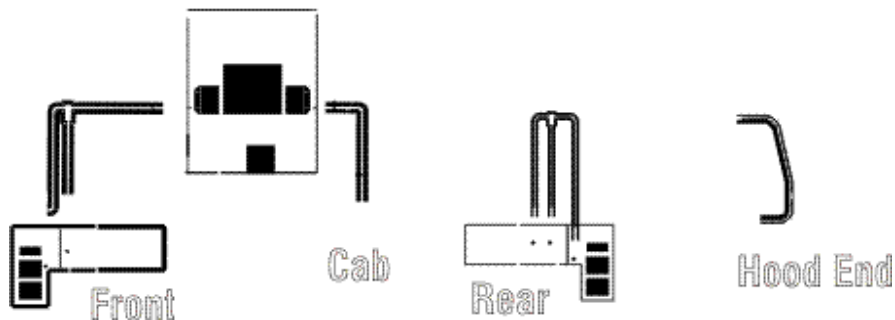
Fold the ends of these to a right angle, and create a curved top fold by gently folding along the two fold lines. Next fill the back of these fully with solder, and file the backs flat. This now creates a solid part that can be soldered or glued in place.

Shunters Steps (parts #7)

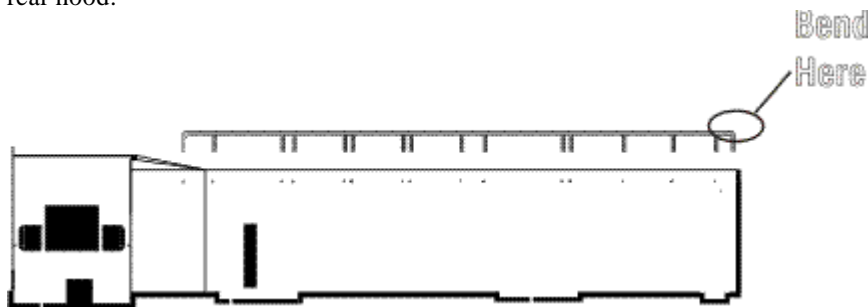
Now fold up the shunters step, and fit the angled ‘pilot’ coupler support. Make sure that the coupler you want is going to fit. We recommend using Microtrains N Scale 1015/1016 couplers, with a short mount and long shank (not supplied). The coupler is screwed to the fold up tab in the front of the pilot. Note that this is the last step, as the top wont fit onto the chassis with the couplers fitted.

Handrails

Each handrail has a bendpoint at the correct distance so that the handrail can be inserted into the pre-etched hole. Carefully remove each handrail allowing for extra length after the bend point (the handrails are fine and can easily break at the bend point – spares are provided to allow for this). Bend and reinforce with a small amount of solder. Then insert into the appropriate hole. The handrails can be glued from inside the body on after painting.



The long hood handrail is best glue on after painting. A right angle bend is required on the last section so that the pin aligns with the one offset hole near the rear hood.



Details

All that remains now is the attachment of the details:

- ?? Handrails. The long handrails on the long hood need bending at the rear end.
- ?? Horns (two castings included). You will need to file a depression in the back edge of the dynamic brake (as per the prototype) to get the front horn to fit.
- ?? Cab Roof Vent (part #8): Fit the plate from the inside of the cab roof to create the recess and fit a piece of scrap brass as the vent.

- ?? Handbrake (parts #B). Fit the plate from the inside of the long hood and attach the handbrake level into the slot in the plate.
- ?? Raised walkway on right hand side (parts #9). Glue or solder these in front of the cab door

Painting

In preparation to paint you need to ensure that the brass is clean. The ideal method is to lightly sandblast the whole surface to give the paint something to key into. The Badger Model 260 Hobby Abrasive Gun is good for this. Alternatively, prepare the surface chemically by 'pickling' it. Submerge the unit in white vinegar (the cheapest home brand is fine!) for a few hours. Don't remove until you are ready to paint. Rinse the unit under clean running water then dry (in a warm oven or with a hairdryer. Once it is dry, paint immediately (e.g. within 30 minutes).

Final Assembly

Everyone has their own method for fitting to the chassis. I favour using the mounting plastics of the N-Scale loco chassis. Pull the N-Scale body into separate pieces. Take the 'running board' piece and carefully cut off the steps. Glue on styrene spacers (40 thou thickness worked for me) until the body sits at the correct height above the track. Remove the Lifelike weights. Fit the completed top to the chassis. You can attach it with Blutack, or drill up through the epoxy casting into the hood castings and tap and screw.

Screw or glue in the couplers.