

"EASY-BUILD" DERBY LIGHTWEIGHT CLASS 108 DMU ASSEMBLY INSTRUCTIONS.

SAFETY FIRST! CONSTRUCTING THIS KIT REQUIRES THE USE OF VOLATILE SOLVENTS, ALWAYS FOLLOW THE MANUFACTURERS INSTRUCTIONS AND ENSURE ADEQUATE VENTILATION. YOU WILL ALSO REQUIRE SHARP TOOLS AND THE EDGES OF THE ETCHED PARTS CAN BE VERY SHARP SO TAKE CARE WHEN HANDLING. WORK STEADILY AND SAFELY AT ALL TIMES.

INTRODUCTION

In order to get the most from your kit we recommend you read these instructions in full prior to commencing construction making notes as to any assembly options, or changes to the suggested order you think would suit your method of building better. However, we suggest you do follow to the order of construction as we know it works! The general idea for assembly is to construct a box with a removable floor. These are 'honest' instructions inasmuch that are based on our actual experience of building the kit. If we have encountered a problem we will tell you how to get around it and where practical future examples of this kit will be modified. Photo references will be found throughout these instructions and consist of images taken of preserved units. Images of our Cravens units are also used to illustrate a construction idea. To help you find the images they are identified by class and name of photo. You will also find numerous additional prototype and model images to assist you create an outstanding model.

GETTING STARTED

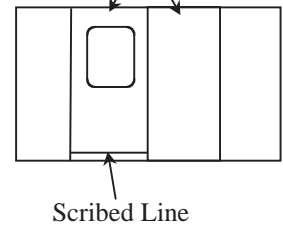
The basic steps are the same for both car types, so unless there is an operation specific to a particular body type the instructions should be applied to both units as required. Let's get started by inspecting the components supplied, there's no point getting involved in construction only to find a damaged part. Start with the large moulded parts (ends, floor, sides, roof and bogie stretchers) checking for severe warping and/or twisting. The floor and roof sections will have a degree of bow along their lengths due to the production process, but you should be able to flatten out the bow without any real effort. Whilst we take great care to weed out sub-standard parts prior to packing, some still slip through occasionally, so remember that any severely mis-shaped parts will be promptly replaced upon return to Easy-Build. Once you're satisfied with the contents, wash all the plastic components with a household detergent to remove oils and contaminants left from the manufacturing process. Now...

PREPARING THE SIDES

- b) Check each side molding against the edge of the end moldings. Whilst we take great care to ensure the ends of the side molding are true and square, take a few moments to check that the ends will make a good joint with the sides. Also, remove a small amount of the moulded rib on the inside of each side at the non-cab ends, i.e. the baggage end of the DMBS and the toilet end of the DMCL - about 3mm is ample. Also check all window openings for cutting burrs and remove as necessary.
- 2) (DMBS) The power car have guard's doors that, on the prototype, open inward. To help

you identify the sides they are marked inside 1DMBS and 2DMBS in marker-pen. The guard's compartment is located in the baggage area, so the guard's door is one of the double (baggage) doors with a window on each side. On the 1DMBS that is the first door with a window at the right hand end; on 2DMBS the first door with a window at the left hand end (as you look at the side flat on the table), see right. To depict the guard's doors simply scribe a line between the two scribed lines that outline the door opening. This horizontal scribe mark should be 1.5mm up from the bottom of the body. DO NOT extend the scribed line past the door opening. See DMBS GUARD'S DOOR CLOSE UP (Cl. 108 prototype).

DOUBLE 'BAGGAGE' DOORS



3) With the exception of the guard's compartment, all doors have externally fitted hinges. Drill through all the holes in the sides 0.7mm dia. for door hinges, handles and door bump-stops (see step 8 before continuing).

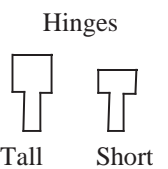
4) (DMBS) Guard's doors also have vertical handrails either side of the door, these too need holes drilling through 0.7mm dia.

5) Check the depth of score lines at the door positions and deepen if you prefer. Carefully remove the raised burr from the door opening scores, work steadily and re-open score marks as necessary until desired effect has been achieved.

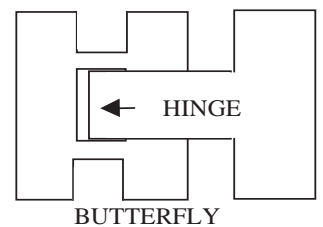
***TIP - Use a gentle scraping action followed by fine wet-n-dry (wet is best) for these two operations. Alternatively, a small chisel can be used to shave off the burrs. Old flat needle files can be ground into chisels and are ideal for this purpose. Be careful not to dig into the surrounding surface of the sides.*

6) Now would be a good time to give the sides a rub down with fine wet & dry to really see what the job looks like. At this stage you can go over any of the previous body prep. operations quite easily until you are fully satisfied with the results. Once the door hinges are in place it is much more difficult to do so.

7) At this stage you will need 12 sets of hinges (2 large and 1 short hinge per door parts E12). Remember that the short hinge goes in the centre with a large hinge top and bottom. On the prototype we used as the basis for this kit the door hinges are of the earlier type without the 'butterfly' mounting (part E11). It is probably unusual for this arrangement



to have survived throughout the unit's working life so, if possible, check photographs of your chosen unit before deciding on this fitment. However, if fitting the butterflies - remove an equal number of 'butterflies' from the etch, 1 for each hinge. The hinge piece is pushed through a butterfly shaped backing piece then glued into the hole in the side trapping the butterfly with the hinge, see right. Remember - the guard's doors open inward so have no visible external hinges.

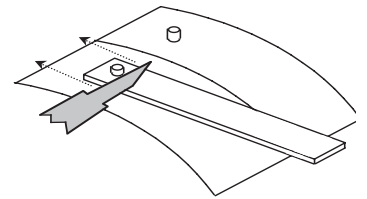


***TIP - You will find that the application nozzle on many brands of superglue will fit neatly over the hinge's spike. Once pushed through the body side push the nozzle over the protruding spike and gently squeeze a small amount of glue into the hole.*

8) Using the 1mm micro rod 'plug' the holes in the door centres and those to the left (and right for baggage doors) of the doors to represent the door stops. Remember that when drilling the holes the size stated for the door bump-stops was 0.7mm, this enables other solutions to be considered

for this detail. If you intend to use micro rod open out the holes accordingly. The stops should be trimmed so that they protrude not more than 1mm from the sides. Note: door stops are not fitted to all doors (e.g. none on the guard's doors because they open inward). Do not fit door handles and grab irons until after painting.

***TIP - To ensure all the bump stops are trimmed to the same length: drill a 1mm dia. hole in a piece of 1mm (40 thou) thick scrap styrene (or other sheet material). Place the scrap styrene over the bump stop so that it protrudes through the hole and gently pare back the excess with a sharp knife, followed by a fine file. Remove the styrene and, once all bump stops have been so treated, give them all a gentle rub over with fine abrasive paper to round the edges slightly.*



That completes the sides for now.

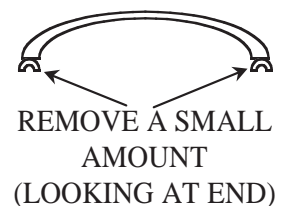
ROOF PREP

You will notice your roof has a curve due to the molding process this is useful when fitted as it ensures the roof is a tight fit in the centre of your coach.

9) Clean off any burrs of plastic then put a strip of masking tape down the centre of the roof onto which you can mark the positions of roof vents etc. from the drawing provided (Drawing 2, p16). Notice that one end of each roof is cut square whilst the other is shaped. The shaped end is the non-cab end (rear) and all measurements are taken from that end at the longest point, i.e. along the centerline.

10) Drill 2.8mm dia. mounting holes for the roof vents at the locations marked and a 1.3mm hole for the water filler casting (DMCL only).

11) Remove a small amount of material (about 5mm in length) from the inner edge of the underside of both side locating channels at the shaped end of each roof (see right). This allows the roof to sit down over the end molding. Do not remove the outer part of the channel as this forms the roof gutter. See photo: Inner roof channel mod (Cl. 105 - model).



Although you can fit the roof details now, leaving them until later can make the blending of the roof section to the cab roof easier.

FLOOR PREP

12) If the floor has not already been marked, the front of the DMCL floor should be identified as that with the bogie pivot CLOSEST to the end of the floor molding. The power car does not need marking because the motor cut-out in the floor makes orientation obvious.

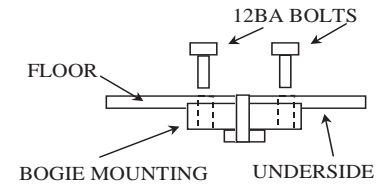
13) Check the floor molding for flatness - if it appears too distorted (some curvature is quite normal) gently bend it in the reverse direction to correct.

14) The floor moldings will need to be reduced in width to obtain the best fit inside the body. Initially, reduce the floor width by about 2 mm (1mm each side) by carefully shaving off small amounts evenly from each side to keep the floor central to the body. This is best done using a scraping action with a sharp blade. This operation may need to be repeated when the body and underframe are assembled for the first time.

15) Locate the two aluminium bogie mounting turnings and prepare them by scoring their upper surface (the spigot faces downward when in use see right). Treat the mounting areas likewise.

Use a strong adhesive fix the two round turned bogie mounts in the holes in the floor.

NOTE: See Modification To Floor on page 21 for details of a small modification necessary to allow the motor bogie to have full movement.



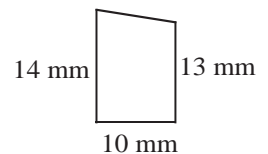
16) (Optional, but strongly recommended) To make a much stronger job of fixing the bogie pivots in place, you might consider a 'belt and braces' approach by adding a mechanical fixing to the mounting. Good results have been achieved by drilling two 1mm holes through the bogie mountings and floor (once the mounting has been fixed in place) either side of the bogie pivot bolt and tap 12BA. Now secure the bogie pivot in place by bolting down through the coach floor with short 12BA bolts (see bogie mounting diagram above right).

CAB ENDS PREP (SEE NOTES(P18) FOR USING ETCHED WINDOW FRAMES E30)

17) The underside of the roof gutter (where the roof gutter meets the door opening) is slightly angled (a production process aid), carefully file this angle square in order to accurately fit the sides. Check the fit of the sides against the cab ends - make sure you've got the correct end of the side to work with, i.e. the non-baggage, and non-toilet ends. The sides should be level with the bottom edge of the cab.

***TIP- Number the ends and sides on the inner surfaces to ensure each side mates with it's appropriate end later on.*

18) Prototype photographs reveal that not all units carried windscreen wipers on both left and right cab windows (the centre window never has a wiper). Drill two 0.4mm dia. holes in the centre of both, or right hand side window only (your choice) directly above the upper window beading to mount the windscreen wipers later.



19) Cut from scrap styrene 4 desk mountings as shown here (right), fix to the floor of the cab against the cab front with the tallest side forward. See photo: Craven inside cab for example (CI. 105 model).

20) Cut glazing to fit the windscreens now as this is very difficult to do once the body has been assembled. Start with six pieces 15.5mm x 24.5mm and then round the corners sufficiently to clear the moulded inside corners of the glazing recess inside the cab. DO NOT FIT just keep safe for now.

If you intend to illuminate the end lights these should now be drilled out as required. No provision is made for this in the kit and so it is up to the builder to determine how best to achieve the installation.

NON-CAB ENDS PREP

These are our standard BR Mk1 coach ends and so have some details not required on a these units.

21) Remove the moulded on end step mounting pads (raised rectangular details up the left hand side), connector details (the two round 'blobs') and communication cord details flush with the surface of the end.

22) (DMBS only) Remove the pipe retainers at the lower edges of the end.

These operations are best achieved by shaving small amounts off with a sharp blade, followed by a

fine file and finally fine abrasive paper. See photo: End prep (Cl. 105 model).

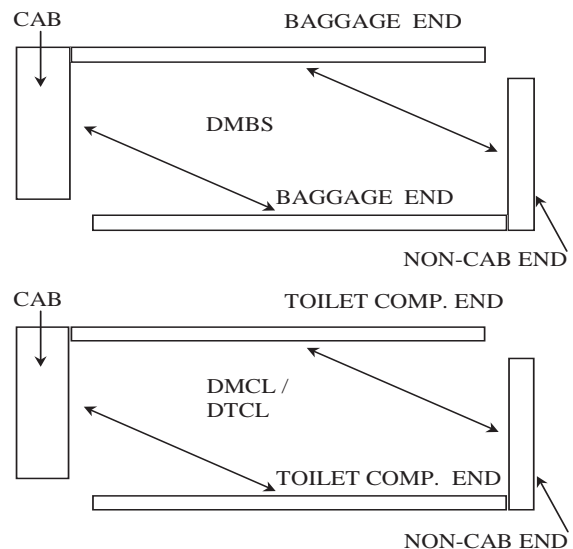
23) With a fine razor saw, cut off the moulded on bufferbeam level with the bottom of the end. Use the underside of the end as a fence to guide the saw blade and finish off with a flat file to remove any burrs.

24) Give the ends a final inspection and rub over with fine abrasive paper before moving on.

BODY ASSEMBLY - NOW FOR THE FUN PART!

Whilst the solvents used to assemble the components evaporate very quickly the joints they produce take considerably longer to achieve maximum strength. DO NOT RUSH THESE NEXT STEPS. Leaving ample time for the joints to harden is essential and you will be rewarded for your patience by not having unsound joints later on.

25) (DMBS) Fix a cab end to one side at the opposite end to the baggage compartment and the non-cab end to the other side adjacent to the baggage compartment to form an 'L' shape half box as shown right.

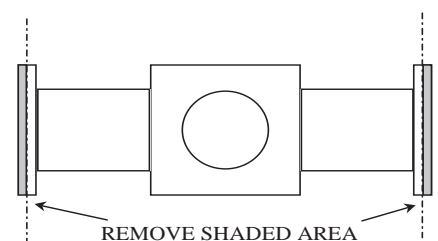


26) (DMCL) Fix a cab end to one side at the opposite end to toilet compartment (with the two small end windows) and the non-cab end to the other side adjacent to the toilet compartment to form an 'L' shape half box as shown right.

Assuming care was taken when preparing the ends and sides your sides will be level at the bottom. Ensure the outside faces of the sides are aligned with the top and bottom of the cab door cut-out. Allow the ends to harden before attempting the next step.

****TIP** - Working on a glass sheet will aid accurate bottom alignment of the sides and ends.

27) Assemble the two half boxes again using a flat surface to aid alignment. The box may twist a little to during this process due to the flexible nature of the materials, but do not worry unduly as the roof will bring everything back in line later.



LEAVE TO SET HARD AND BUILD THE BOGIES

The instructions here initially refer to an un-powered bogie. Note also that the bogie spues contain parts that are not intended for the DMU so please refer to the illustrations to identify the appropriate parts to use.

28.1) Remove three bogie frame stretcher plates from the casting sprues and cut off the ends level with the inside edge of the moulded angle (see right). Clean up and square off as necessary.

28.2) Push brass bearings into the axle holes making sure they are an easy sliding fit, but not sloppy - if necessary clean hole with a 2.5mm drill. Do not fix in position as adjustments will be made later.

28.3) Using a pin, add a tiny drop of oil (NOT WD 40) into the bearing surface.

28.4) Place two non-driving axles in the bearings of one side frame and, ensuring correct orientation of bogie frame stretcher plate (reinforcing cross members down), assemble the side frame to the

frame stretcher.

28.5) Once the first frame is reasonably firm, assemble second side frame onto frame stretcher in the same manner. When the side frames are secure enough to hold themselves in place, make certain all is square and in line, minor adjustments can still be made at this stage by applying more solvent to soften the joints and adjusting as required. Note: wheels should be a loose fit in the bearings at this stage. Leave the bogie to set for at least 1 hour, 2 is better.

With the joints set hard you can now set the axle bearings:

28.6) There is less side-play evident in the DMU bogies than is found in our coach bogies. If care has been taken so far the wheelsets will require only minimal adjustment of the bearings to obtain optimal performance, If adjustment is necessary begin by inserting a thin piece of card between each wheel and the side frame to prevent lateral movement.

NOTE: Do not over-pack the wheelsets as this might cause the sides to spring when you remove the card later resulting in stiff wheel movement.

28.7) Push in the bearings from the outside until the bearings connect with the axle ends.

28.8) When satisfied that the bearings are (just) against the pinpoint ends fill the bearing hole with the 2.5mm sprue supplied, or microrod (not supplied) and fix with liquid solvent from the outside and leave to harden.

28.9) When set, remove spacing card and trim any excess rod flush with axle box face

28.10) Remove the bogie pivot mounting from the casting sprue and remove any flash. Test the bogie pivot bolt is an easy sliding fit in the mounting hole. If tight, open the slightly with a 3.5mm drill to ensure a smooth swivel movement.

28.11) Drop the bogie pivot mounting into its locating holes in the top of the bogie stretcher plate and, using only sufficient glue to attach the plates, fit keeper plates over pivot spindles. Ensure pivot remains free to move until the liquid solvent has evaporated.

You may prefer to use a larger piece of sheet styrene (not supplied) rather than the moulded keeper plates supplied.

28.12) If desired, fit the brake shoes on the inside of the sideframe. They should be positioned just off the wheels with the circle detail on the shoe just visible below the bottom of the side frame.

28.13) Fit the bolster detail (see photo: Bogie Sprue Labelled - Cl. 108 model) centrally to the inside of the sideframe by placing the square beam against the back of the sideframe and butt against the underside of the bogie stretcher.



While the basic bogie assembly sets, identify and remove the bogie front channel, guard irons, speedo drive mount and bogie steps from the etched sheet.

28.14) Fold up the bogie channels E3 (plain) & E3a (with slots for guard irons).

28.15) Locate the guard irons (E7) in the channel with the top of the guard iron firmly against the top of the channel section and passing through the slots and fix in place (these can be glued in place with superglue, or soldered). See Bogie end channel 1 (Cl. 105 model) for clear view of channel. Note that only the front bogie, i.e. the cab end, has guard irons fitted.

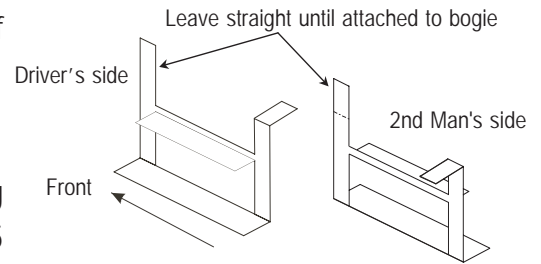
28.16) Glue the bogie channels to the front and rear of each bogie with the bottom of the channel

level with the bottom of the sideframe (superglue is recommended for this). The arrangement of these channels should be:

Front bogie (both units): guard irons (front of bogie) and plain channel (rear of bogie).

Rear bogie (both units): plain channels both front and rear of bogie.

See also Bogie end channel in place (Cl. 105 model).

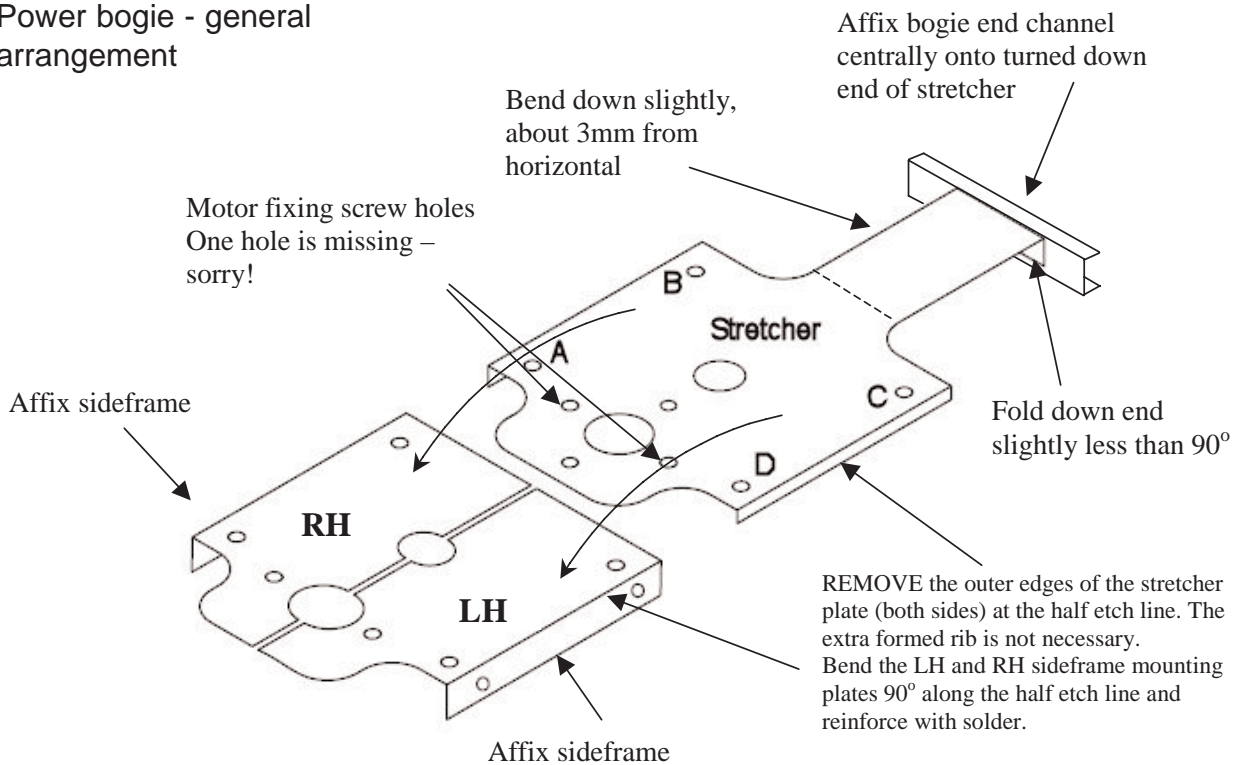


28.17) Fold up the bogie step tread supports and mounting brackets (E2). See Bogie step and speedo drive (Cl. 105 model).

28.18) Glue the speedo drive mounting (E14) to the front left axle box. The spike faces right and down when fitted in place.

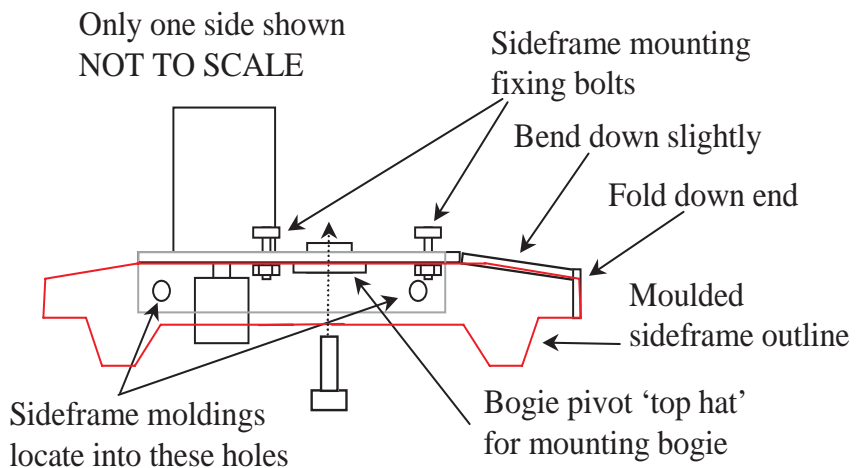
28.19) Glue the bogie step mountings in place. The front mounting is in line with the front spring hanger and the bottom step tread should be (approximately) level with the large spring mounting

Power bogie - general arrangement



bobbin. Ensure the step is kept parallel to the side frame and attach the rear mounting to the top of the side frame. See Bogie step and speedo drive (Cl. 105 model).

***TIP Flattening the front spring hanger 'bobbin' back to the level of the leaf spring greatly simplifies the fitting of the step*



mountings. Although un-prototypical, once painted the flatness is hardly noticeable.

POWER BOGIE

- 29.1) Find the brass power-bogie stretcher-plate, the two sideframe mountings (LH & RH) and axle bearings. Put the bogie pivot 'top hat' to one side (safe!) until required to actually mount the bogie.
- 29.2) Fit axle bearings into the two remaining bogie sideframes as per the un-powered bogies.
- 29.3) Push the two moulded pins of each sideframe through the holes in a sideframe mounting (with the folded sides hanging down) and glue into place.
- 29.4) Fold down the end of the bogie stretcher plate at the half etch and the whole extension about 3mm from the horizontal (this might need further adjustment later on).
- 29.5) Bolt one sideframe assembly to the bogie stretcher plate with 2x 2mm nuts and bolts provided.
- 29.6) Insert the wheelsets into the assembly ensuring the set with the brass gearwheel is at the same end as the motor mounting and that the two sprockets are both on the same side.
- 29.7) Fit the opposite sideframe assembly as before.
- 29.8) Form the bogie end channel with guard irons (E28 & E26) and afix to the folded down end of the stretcher plate. **DO NOT GLUE TO EITHER SIDEFAME.** As before, the bottom of the channel should be level with the bottom of the sideframe end, you might need to adjust the stretcher-plate extension a little to achieve this.
- 29.9) Finish off detailing the bogie assembly as outlined for the DMCL (rear) non-powered bogie, not forgetting the central bolster details, which are superglued to the inside of the sideframe mountings.
- 29.10) The guard's door have additional steps fitted to the rear of the bogie in a similar manner to those at the front. Two extra step mountings are provided for the purpose. Align the steps with the guard's door. Fold the step mounting as for the main step, but fold over the top of both mounting legs. Follow the same construction methods as for the main bogie-mounted steps noted earlier - photo: Bogie Showing Guard Steps.JPG.
- 29.11) Fit the motor to the frame stretcher and glue the pick-ups to the stretcher underside ensuring the wipers have a good contact with the backs of the wheels. Trim back the pick-up wires as necessary.
- 29.12) Align the worm wheel with centerline of the gear and clip the drive chain in place. **DO NOT MAKE THE CHAIN TOO TIGHT AS THIS WILL CAUSE EXCESSIVE GEAR NOISE AND WEAR IN THE COMPONENTS AND THUS PREMATURE FAILURE.**
- 29.13) Lightly lubricate all moving parts and test.
- 29.14) There are two different types of axle box covers supplied in the kit, use the slightly domed Timken covers. Fit covers to all remaining axle boxes - photo: Bogie speedo drive.jpg.
- 29.15) Cut 8 (or 12 if fitting guard door bogie steps) 15mm x 5mm x 0.7mm (30 thou) step treads and fix to the step supports as required.

BODY ASSEMBLY CONTINUED...

NOTE: BEFORE PROCEEDING MAKE SURE YOU HAVE GOT THE CORRECT ROOF AND BODY PAIRED TOGETHER. DMBS WITHOUT WATER FILLER DETAILS TO THE REAR, DMCL AND THE ROOF WITH THE WATER FILLER.

- 30a) An alternative method of securing the body to underframe is described in step 53. Read

that step now before proceeding and decide which method you wish to adopt

30b) Fit the floor fixing captive nuts into the moulded channel on the underside of the roof. Slightly reducing of the width of the captive nuts will make their fitment easier, however don't overdo it as you don't want them sliding about when trying to screw the floor in place, nor have them dropping out! A third captive nut is included as an alternative method of preventing the floor from sagging in the middle once all the underframe castings are in place, .

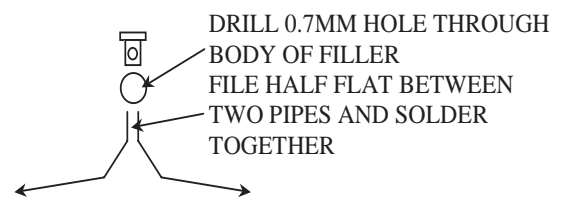
31) Assuming everything has been assembled accurately the roof should fit neatly against the cab molding at the front with the rear overhanging the end. When the roof is in place the top of the sides will locate in the groove under the gutter. You may find the central moulded channel on the underside of the roof needs trimming back to enable to roof to fit between the cab and the rear end moulding. Fix the roof in place by initially applying solvent from the inside along the joint of the cab/roof moulding then along the joint between the roof and the side molding, again from the inside. Be very generous with the solvent here as the ABS can be reluctant to soften.

32) To make a very secure job, reinforce the sides/roof joint with 30thou (0.7mm) micro rod again with liberal amounts of solvent. This method can also be applied to the non-cab ends to great effect.

LEAVE BODY TO HARDEN

33) Once the roof has firmly set, take time now to inspect the fit of the roof outline against the end molding. Due to the different means by which the roof and ends are produced, it will be found that the alignment of the roof line and the ends requires blending with an appropriate car body, or modelling filler. Likewise, there is a gap between the underside of the roof and the top of the non-cab ends which also requires filling as necessary.

Once again, do take your time with these steps not least because the roof and end joints will be very visible on the finished model.



34) If the roof vents were not fitted earlier now is the time to do so. The roof vents will also offer the body some extra stability when it is placed upside-down for the following steps.

35) (DMCL) Form and fit the water pipes to the filler casting (unfortunately not shown on the castings photo, but looks like a small top hat!) on the roof and down to the brackets moulded onto the end. Use 0.7mm brass wire for the pipes, file the ends of the two halves flat, solder together, drill a hole through the body of the filler and insert the pipe end. See photos for shape of pipe run (DMBS GUARDS DOOR - Cl. 108 prototype). Cut off the pipes about 2.5mm below the retainers.

36) (DMCL) Fit the small roof box (C33) detail on the centerline between the second pair of vents (from the rear).

UNDERFLOOR ASSEMBLY

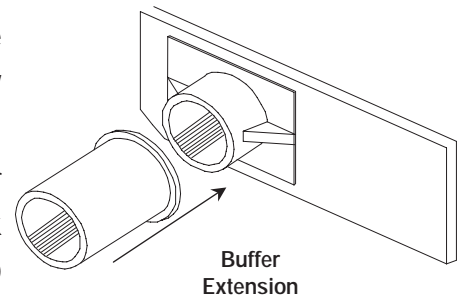
NOTE: The molded ribs on the floor molding determine the underside of the floor molding!

37) Check the floors will fit within the sides and end molding. It is likely that you will have to adjust the floor width to gain the best fit. Do this carefully removing the minimum amount evenly from each side to keep the floor central to the body. This is best done using a scraping action with a sharp blade.

38) To improve the visual appearance of the underframe, cut the two lengths of 5mm wide 0.5mm styrene to 391mm and affix to the outside face of the molded solebars. Align the strips to the rear 9

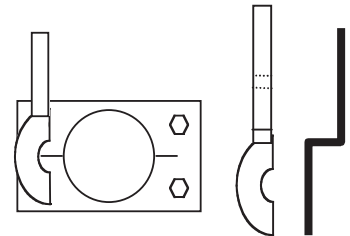
edge of the underfloor so that they protrude at the front (take care when handling so as not to break the ends). Keep the strip firmly butted against the underside of the floor lip.

39) Remove the four bufferbeams from their sprues together with their associated extension collars, clean flash, etc. and check the fit of the buffer shanks into the holes. Use a 3mm drill bit to carefully open any tight holes to allow the buffers to slide easily. Use a buffer to align the buffer stock extension collar to the end of the buffer housing - affix with solvent and remove the buffer immediately. Once the joints have hardened run the 3mm drill through again to ensure the holes are clean.



40) Install the floor into the body and temporarily secure into position. Now fit the bufferbeams to the underside of the cab ends, aligned centrally across the cab and butted against the ends of the extended solebars to ensure vertical squareness. **DO NOT GLUE THE BUFFERBEAM TO THE SOLEBAR EXTENSIONS BECAUSE IF YOU DO, YOU WILL NOT BE ABLE TO REMOVE THE FLOOR AGAIN!**

***TIP - Adding fillets of scrap styrene between the underside of the cab and the bufferbeam will greatly increase the security of the assembly. Aligning the fillets with the underframe ribs will ensure they will not interfere with fitting other details, or the couplings later.*



41) The rear bufferbeams should be fitted directly to the floor moulding. Take care as it is quite difficult to achieve this without also gluing the floor to the end of the body. Initially tack the bufferbeam in place then remove the floor from the body and finish off the job, reinforcing the joint as appropriate.

You may wish to leave the bufferbeam details until later as they are quite vulnerable otherwise proceed as follows for both front and rear:

42) Lamp irons (E17) are fitted to the outer edge of the buffer stocks. First remove the outer two molded bolt heads from the face of the buffer stock. Bend the lamp iron to form a joggle using the half etchs as a guide and glue to the face of the buffer stock, see right. Superglue is recommended for this.

MU PLUGS

The MU plugs and sockets need a little explaining: the cabs have closed sockets and stowed cables, which are represented by C1c and C1d respectively. The rear has sockets with plugs inserted and cables in use (i.e. non-stowed), which are represented by C1a and C1b respectively.

What is required to prepare the MU sockets depends on your preferences. If you want to connect the two unit together with MU 'cables' some method of attaching cables is necessary, if not the castings can simply be fitted as is, with the exception of C1d which should always be prepared as described.



43.1) After cleaning up the castings square off the ends of the cable plugs (C1a, b and d) and make a pop mark in the ends.

43.2) Drill a small hole in the castings (0.6mm) just deep enough to secure a short length of wire. Insert short pieces of wire leaving about 3mm protruding onto which the cable sleeve will be fixed. On part C1d there are four holes to be drilled because the cables are depicted as stowed so form a pair of loops.

43.3) Fit the castings to the underside of the bufferbeams centrally under each buffer as follows when looking end on: C1d cab left, C1c cab right, C1b non-cab left, C1a non-cab right. Remember you'll be working upside down so it's easy to get the order wrong! Since the rear bufferbeam is attached to the underfloor you might wish to leave them until you're adding those details, but if you do don't forget about them.



The floor molding can now be removed from the body and the remaining details fitted to the body and underframe.

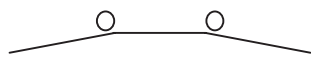
CAB BUFFERBEAM ADDITIONAL DETAILS

44.1) The vac pipes (casting C5) emerge from the bufferbeam at approximately buffer centre height and about 6mm either side of the coupling hook. Bend the 'flexible' part of the pipe so that it twists towards the adjacent buffer stock and glue the mounting bracket to the rear of the bufferbeam. The position of the vac pipes changed over time so if possible check photographs before fitting.

44.2) The air horns (castings C2) go to the driver's side on the inside of the solebar and are angled downwards. However, it's getting a bit crowded in there and they can also foul the bogie on tighter radius curves. We suggest fitting the horn to the bogie front against the guard iron. If you opt to do this, reduce the length of the mounting bar to just above the first horn and butt it up to the bottom of the front channel.

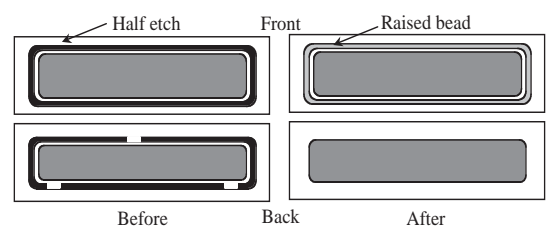
ADDING THE REMAINING BODY DETAILS

45) Now would be a good time to assemble the control desk details as per the diagram and check for fit inside the cab. Solder a 14BA cheesehead bolt (or a short pin) into the central hole of the brake wheel E18 to mount it onto the desk and a short length of thin wire (about 2.5mm long) through the hole in the wheel spoke to form a turning handle.

46) On the driver's side of the cab you will need to drill three 0.7mm dia. holes through the seam between the cab end and the body side moulding.  These should be positioned to align with the other door hinges (approx. 4mm, 20mm and 28.5mm as measured from the bottom of the body). Also, open drill the holes for the long handrails E22 (approx. 4mm 21mm and 38mm as measured from the bottom of the body and 1.5mm from the right hand edge of the door). Check these measurements against the pilot holes provided in other locations to ensure accurate alignment on your particular model. These long cab handrails were painted body colour, so fitting now is appropriate.

***Note - Door hinges are always on the left of the door.*

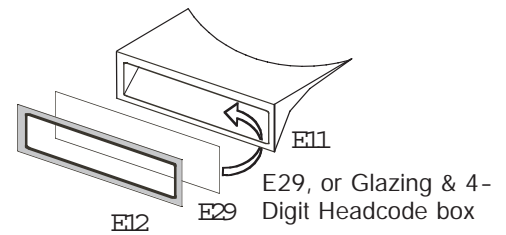
47) Prepare the exhaust stacks C21 and mount on the rear of each unit. Position each stack to clear the rear windows (DMBS) and to clear the corridor connection, the final position being approximately as shown right. The bottom mounting bracket should be 17mm from the bottom of the end.



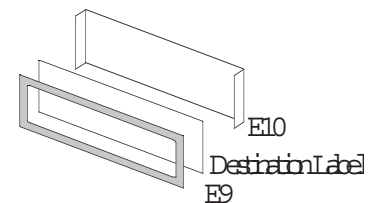
48) Decide whether to fit the small destination box (C6),

or the larger headcode box (E15 & E16). Casting C6 (destination box) simply sits directly onto the cab roof gutter. Some trimming will be required to achieve a good fit of the boxes around the complex curves of the cab roof.

49.1) LARGE HEADCODE ONLY: Fold E15 to form the box ensuring the corners are square and solder the joints. Offer the unit to the cab so that the bottom of the front is about 2mm above the gutter. Some filing and filling will be required to achieve a fit that makes the box appear to be an integral part of the cab roofline. Patience is the key here.



49.2) For the 4-digit headcode box Use the etched parts of the small 'Extras' sheet. Fold E11 up using the half-etched lines as guides (to the inside). Ensure the folds produce neat square edges and use solder, or adhesive to secure shape. If you wish to illuminate the headcode fix a piece of clear styrene (not supplied) behind the opening using E29 as a guide for size. Otherwise fix E29 inside the opening. The completed box sits about 1.5 - 2mm up from the gutter on the front of the cab with the front face vertical. Some minor trimming of the edges of the folded box might be required to achieve the best fit possible. You might also need to file the front of the cab roof a little flatter to allow the bottom of the headcode box to sit neatly against the cab roof (the cab front bows outward slightly). Part E12 is the front of the headcode box and should be fitted with a glazing panel in front of E29 once the unit is finished.



49.3) If the large headcode is used a destination display made from E27 & E28 is supplied for fitting behind centre cab window at the top. Simply trim to a size that will fit between the central window pillars, paint and sandwich a suitable destination into the opening. Afix inside the top of the centre window.

CREATING THE INTERIOR PARTITIONS

See Drawing 1 for layout of the interior of the two cars including the partitions as described in the following steps. Some of the ideas described here for fitting the interior details are actually more challenging to describe than those for the main structure, since they necessitate the modification of some components to achieve a different end to that for which they were designed. It is therefore essential that the photographs on the disc are referenced to clarify what I am trying to write!

Study the photos of the interior details (Seats 1 to 6 - Cl. 108 model) to get a clearer idea of what is now being described.

50.1) Carefully remove 2 cab partitions E6 from the fret and check the width of the cab partitions inside your body and trim as necessary to achieve a sensible fit. The partition should be able to sit between the moulded ribs at the base of the body sides. The half-etched door opening lines should show inside the cab.

50.2) Fold the bottom three sections along the half etched lines, making each fold towards the half etch. You should now have two short tabs and long central tab folded at 90o in opposite directions and have a partition that can be stood up, if not you've folded it up wrong! See photos: Cab Partition Bends & Cab Partition Bottom (Cl. 108 model) - these are of the original components, but show the principle of what to do.

50.3) Take four E5, fold 90o and fix (solder/glue) into the half-etch pads in the rear cab walls

so that the folded projection forms a slot with the fold at the bottom of the cab partition. See photo: Partition with floor supports (Cl. 108 model) again using the original components.

50.4) Cut two styrene cab floors 14mm x 55.5mm (approx) and fit to the longer central folded base of the cab partitions to form a cab floor. Fit into position adjusting the various items as appropriate.

50.5) To support the front of the cab floors (where it meets the cab molding) add some styrene to the inside centre of the cab floor (between the desk supports). This support needs to place the bottom of the cab floor approximately level with the bottom of the rib molded into the body sides; we raised the support by 1mm to achieve this. To fix the cab floor into position we used short 8BA countersunk bolts (not supplied).

50.6) Clean and fit the cab seat (casting C10) to the short cab floor positioned to roughly align with the curved recess in the cab desk and its back just clear of the partition. See photo: Cab Partition (Cl. 108 model).

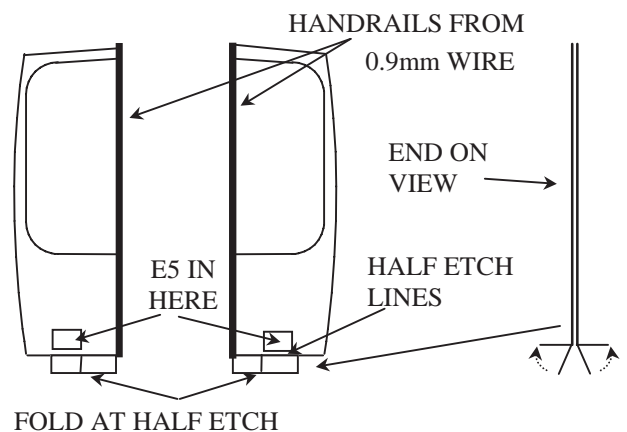
51.1) Carefully remove 2 more partitions E6 from the fret and check the width of the partitions inside your body and trim as necessary to achieve a sensible fit.

51.2) Fold the bottom three sections along the half etched lines as for the partition. See photo: Partition with floor supports (Cl. 108 model).

51.3) Take four E5, fold 90° and fix (solder/glue) into the half-etch pads in the partitions walls so that the folded projection forms a slot with the folds at the bottom of the partition. (See photo: Partition with floor supports) These partitions will be fitted at the first passenger door to form an enclosed saloon behind the driver's cab.

52.1) Also inside the body are the saloon partitions E4, you will need 10 (5 each lefthand and righthand) preparing as follows:

52.2) Add a vertical handrail to the edge of the partition lower wall as shown above using 0.9mm brass wire to all 10 half partitions.



52.3) Fold the bottom of each partition 90° in opposite directions, again this will produce a partition that will stand upright. See photo: Seats2 (Cl. 108 model)

52.4) Take 10 E5, fold 90° and fix (solder/glue) into the half-etch pads in the partitions walls so that the folded projection forms a slot with the fold in the bottom.

53) Cut four pieces of 1mm (40 thou) styrene 18mm wide to fit between the body sides immediately above the moulded rib (they should be about 58mm, but cut longer and trim back). Fix inside the body on top of the moulded rib and aligned centrally with the passenger doors - reinforce as necessary. These will be used to mount the partitions in place. These internal stretchers can also be used to support to the underfloor (which can sag under the weight of the metal castings) by drilling through the fuel tank, floor and stretcher and securing together with a screw. However, if used as the primary method of securing the floor (as in our demo units) the stretchers will need beefing up either by laminating two pieces together, or by replacing the 1mm styrene with 1.6mm (at least). The benefit of doing this is that the floor mountings are now not easily visible through the windows. See photo:

mid body strengthener and cab walls (Cl. 129 model) for this additional (much wider) support as used on the Cravens Class 129.

54) Cut a piece of 1mm (40 thou) styrene 15mm wide to fit between the molded rib on the body sides. Add two small tabs to the top to support the false floors and fix to the body sides and the against the rear molding with the tabs upper-most. See photo: Rear support tabs (Cl. 108 model).

55) (DMBS) The final partition is created from the moulded ABS divider. This will need trimming as necessary to fit immediately behind the last passenger door. Once prepared this partition can be permanently glued into position against the relevant body stretcher.

That just about covers the body at this stage.

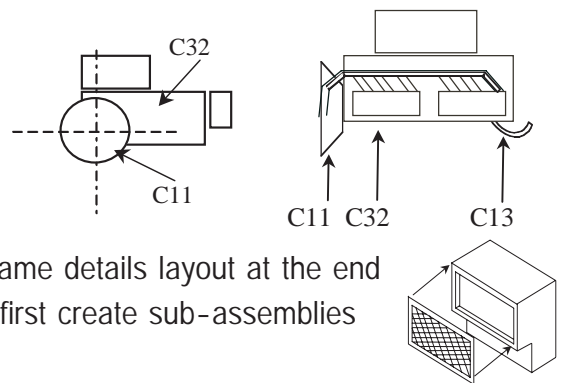
UNDERFRAME DETAILS

Both underframes are the same, so only one description is given

56.1) Temporarily place the underframe into the body and mark the solebars to show where the doors are (both right and left hand edges of the openings)

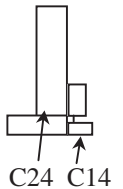
- remove floor.

Working with the front pointing to the right and with the underframe upside-down the solebar nearest to you is the driver's side. See photo: Drivers side and Second Man side and the diagrams dmbs/dmcl underframe details layout at the end of these instructions. You will probably find it easier to first create sub-assemblies of parts before fitting the parts to the underfloor



56.2) Assemble the two diesel engines C32 by attaching C11 as shown right. Also attach the oil filler pipe C13.

56.3) Add the two etched grills E8 to the rectangular opening of the two radiator blocks C29.



56.4) Fix 2x C22 onto their mounting C25 starting from the thin end (the thick end is the top).

56.5) Assemble the large vac tank from C28a, b & c - you can't put this together wrongly! just remember to keep the mountings square to each other, or it will be difficult to attach to the floor.

56.6) Attach a C14 to each of the exhaust flexibles C24 (there are two different exhaust flexibles castings, a left and right with the same number - sorry!). With the flexible stood on its 'foot' C14 stands on the other side of the foot with the button box clear of the floor - see right.

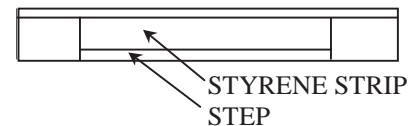
56.7) Using the photos attach a fuel filler pipe to the rear of each battery box (don't forget you're working upside down so the fillers need to be angled downwards).

56.8) Clean up the remaining castings the four petched parts E9 and with reference to the photos and drawings create the underfloor detail arrangement. Etched part E10 is only fitted to the outside of the solebar on the DMCL - at the first passenger door, driver's side. Part E26 can be used to create a sub assembly of C25, C10 and C17. Leave the exhaust flexible assemblies until the other fittings are in place but leave room for them! The two fuel tanks and assembled diesel engines are

mounted between the two molded ribs - all other details to the left and right as required. Take time to have a trial run of detail placement because it gets a bit tight under there, also keep bogie movement in mind.

Note: once the diesel engines and exhaust flexible assemblies have been mounted the exhaust stub on the diesel engines can be soldered, or glued to the rear of the exhaust flexible canister (the round cylindrical bit) to give extra support to the exhaust assembly.

56.9) Probably the trickiest part is creating the exhaust pipes. Anneal the 1.5mm brass supplied to form the pipes. Study photos to get a feel for where the exhausts run around the various underbody components. The basic run is illustrated on the DMBS/DMCL Underframe Details Layout diagrams as thick dotted lines. To enable the floors to be removed make the short pipes up to the silencers attached to holes in the rear bufferbeam. Drill 2x1.5mm holes centrally in the bufferbeam 1mm from the inside edge of the buffer stocks and affix the short pipes with superglue. DO NOT solder these pipes to the silencer just butt them neatly up to the underside of the silencer (see photos) Once the pipes have been formed, carefully solder to the exhaust pipe stub cast onto the diesel engine and glue the other end to the floor. See photo: EXHAUST PIPE STUBS (Cl. 108 model).



56.10) Mount the completed exhaust assemblies.

56.11) Finally mount the remaining two fuel fillers in line with the fuel tank. On the demo we simply used the space heater and an exhaust pipe as conveniently placed items to hold the fillers in the appropriate positions.

56.12) Fit the speedo drive backing E13 and casting C3 to the driver's side solebar about 47mm from the front of the extended solebar.

57) Cut 12 off 18mm x 5mm, 2 off 30mm x 5mm of 1mm (40 thou) styrene as step treads. NOTE: the steps are not aligned to the bottom of the solebars, but about 1mm above the. The actual vertical positioning can be determined by casting C23 (DMCL) because the step tread for that door sits inside the opening in the casting. Mount all other step treads at the same height (both units) at the positions marked on the solebars previously (step 56.1). Use the 18mm steps for the passenger and cab doors and the 30mm steps for the baggage/guard's door. Additional strength can be gained by adding a strip of styrene to the front of the solebar in line with the step, once painted it is hardly noticeable, see right.

***TIP - The outer edges of the steps should not be left too square cut, i.e. round off the upper edges and slightly round the corners. The steps were made of wood and soon became worn.*

ETCHED WINDOW FRAMES. READ ALL THE STEPS BEFORE PROCEEDING.

The window frames do not have an etch number. There are 3 types of frame: large, small and toilet so there shouldn't be too much confusion there. It has been suggested by a customer to leave the fitting of the window frames until the basics of the construction have been completed as the central ventilator bars may get damaged whilst handling. Whilst this is a possibility our demo model was built with the frames in place without a problem, but it is certainly worth considering this option before continuing.

58) Carefully cut the window frames from the etch and file the tags smooth taking care not to file into the frame itself. Fit the toilet window vent centrally on its backing prior to frame fitment. DO NOT fold out the central ventilator opening tabs of the main windows until the window frames are fitted.

59) Check that the frames fit the openings (dry run) - the openings should be very slightly 15

larger than the locating lip on the reverse of the window frame.

Before installing the etched window frames check the fit of the window glazing within the openings. Carefully file the edges of the glazing panels until they fit snugly, but not sloppy nor tight.

Using a slower acting superglue may be preferable when fitting the window frames as it would allow you more time to align the window frame before the glue sets.

60) Apply a small amount of superglue directly to the rear frame at the top only. Position the top of the frame into the opening and allow to set. Now, using a small piece of flat material roughly the width of the window frame, gently press the bottom into place and apply glue to the frame/window opening joint from the inside (this is most easily achieved with an old craft knife blade dipped in glue). Once the frame is secure apply more glue to the side joints as appropriate.

61) Remove any excess glue after glue has set using a glass fibre pen, or fine abrasive paper (glass fibre pen found to be best for this).

62) Once all is set and clean of excess glue fold the central ventilator tabs outward. This is best done with small pliers both at the same time in a squashing action. You may prefer to leave this until the sides have been assembled, but before painting.

FINISHING

With the main construction now complete it is time to prepare the model for painting. Whilst this consists of mainly cleaning and washing of all the parts, it also gives you another opportunity to check the security of the various fittings. Anything that cannot stand cleaning will probably not withstand long-term use, so it's better to have bits falling off now than later - refit as required!

INTERNAL DETAILS

63.1) Remove the appropriate number of seats from the sprues and prepare them by removing the ejection pin marks (small round marks on seat back) and moulding feed joints.

63.2) To form the seat, flex the moulding until the joint between the base and seat back shows a thin white line. Apply solvent, or superglue to the joint holding together briefly to prevent the back from initially springing apart.

63.3) The arm rests can be added to create first class type seats if required.

63.4) You will also require a single seat creating by cutting a twin seat in half. Re-model the seat back to make it more realistic as a single seat rather than a cut-down double seat.

64) To mount the seats cut a set of false floors onto which to mount the seats. It is better for you to determine the exact dimensions required in your model, but the following dimensions are an appropriate starting point:

20mm wide for twin seats - 3x 80mm (front saloons both units); 2x 140mm (centre saloons both units); 1x 95mm (rear saloon DMCL).

26mm wide for triple seats - 1x 80mm (front saloon DMBS); 2x 140mm (centre saloons both units); 1x 95mm (rear saloon DMCL).

Use the seating plan to create the following floors:

65) Fix a half partition to each end of the centre saloon floors ensuring both handrails are towards the inside of the carriage.

66) Fix two half partitions to one end of each rear saloon floor, again keep the handrails towards the inside of the carriage.

- 67) Paint the seating and attach to the floors
- 68) Fold the toilet compartment (E29) to form an 'L' shape such that the short wall has its top angled downwards to clear the underside of the roof. Check the cubicle will fit in place and still allow the floor to be fitted. Paint and fit toilet cubicle as appropriate.

FINAL ASSEMBLY

69) Find the windscreens you put in a safe place some time ago and fit using small amounts of adhesive. If you have some RC Modellers Glue (canopy glue) to hand, dilute a small amount with water and apply from the inside with a small brush to the edge of the glazing allowing capillary action to draw the liquid into the joint. Also fit the completed small destination box if you have used the large headcode box on the cab roof. There is a front (with an opening) and a rear create a sandwich with a destination label showing through the opening. Affix at the top of the centre window.

NOTE: Read both steps 70.1 and 70.2 before continuing.

70.1) Install the glazing into the window openings from inside the body, remember to 'frost' the toilet window by rubbing the inside face with 800 grit abrasive paper. Fit dry and secure in place by running dilute canopy glue around the edges with a small brush. Dilute the canopy glue to the consistency of milk and add a single drop of detergent to aid the flow of the glue into crevices.

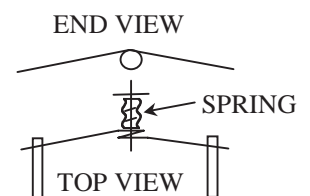
70.2) If the glazing is fitted 'as is' you will find a small gap between the ventilator bar and the glass, not terribly noticeable, but nevertheless it's there. Alternatively score each panel at 7.8mm from the top and crease away from the score - it may break in two. With either a single creased panel, or two smaller panels to hand the window can now be glazed with the panes flat against the etched frame. This is not as difficult as it may appear from the description, nor very time consuming. We have devised a simple measuring jig to make this even easier (contact Shawn at Camelford for details).

71) If required, fit the destination board inside the centre window.

72) Fit the door windows and brake compartment windows

74) Fit the control desks on to the desk supports with two part epoxy.

NOTE: The standard links used on model couplings are too short to couple these units together and still be able to negotiate model curves. You might wish to add an additional link, or replace the stock links on one unit with a longer example,



75) Check the fit of the buffers in the stocks once again for a sliding fit, adjust as necessary. Fit the buffers into the stocks. To spring the buffers create a loop of the spring wire (supplied), pass each end of the loop through the hole in the buffer shank. Secure the spring in place by passing the coupling shank through the hole in the loop and trap with the coupling mounting spring and split pin, see right. If you didn't fit the vac pipes earlier, now is the time to do so.

76) Fit the cab partitions in place (you may wish to install a driver in one end at this stage) and the other partitions with doors making sure they are stood vertical.

77) Carefully negotiate the false floors into position and secure - we used tape to hold things together until the floor is in position.

78) Slot the centre and rear saloon floors into place and secure as before.

79) Assemble the underframes onto the appropriate bodies and secure in place.

80) Mount the bogies and ensure they are free to rotate. The speedo drives can be connected to the solebar units using the outer sheathing from thin electrical signal wire, or thin silicon tubing. Do not make the link too short as it will restrict bogie movement, however too long and it may snag on track side components. Start with about 35mm and work back from there until it looks right.

81) Bend the wiper 'blades' 90° to the arms (E1) so that they present a blade edge to the windscreen ensuring you create left and right handed wipers (should you decide to fit wipers to both screens). A small dimple on the rear near the blade will assist bending without distorting arm. Solder a piece of 0.4mm wire through the mounting holes in the arms, paint black and fix into the holes previously drilled above the upper edges of the windscreen beading. The wipers are intended to be in the parked positions, which is up against the outer edges of the windscreens.

82) Fit all door 'T' handles and grab handles E21. It should also be noted the guard's door has a special etched cranked door handle (E32) and the baggage doors (DMBS) E31.

83) Fix the corridor connections to the rear of the units.

84) If required, fit the headcode front cover to the headcode box.

We hope you have enjoyed building this kit and welcome your comments.

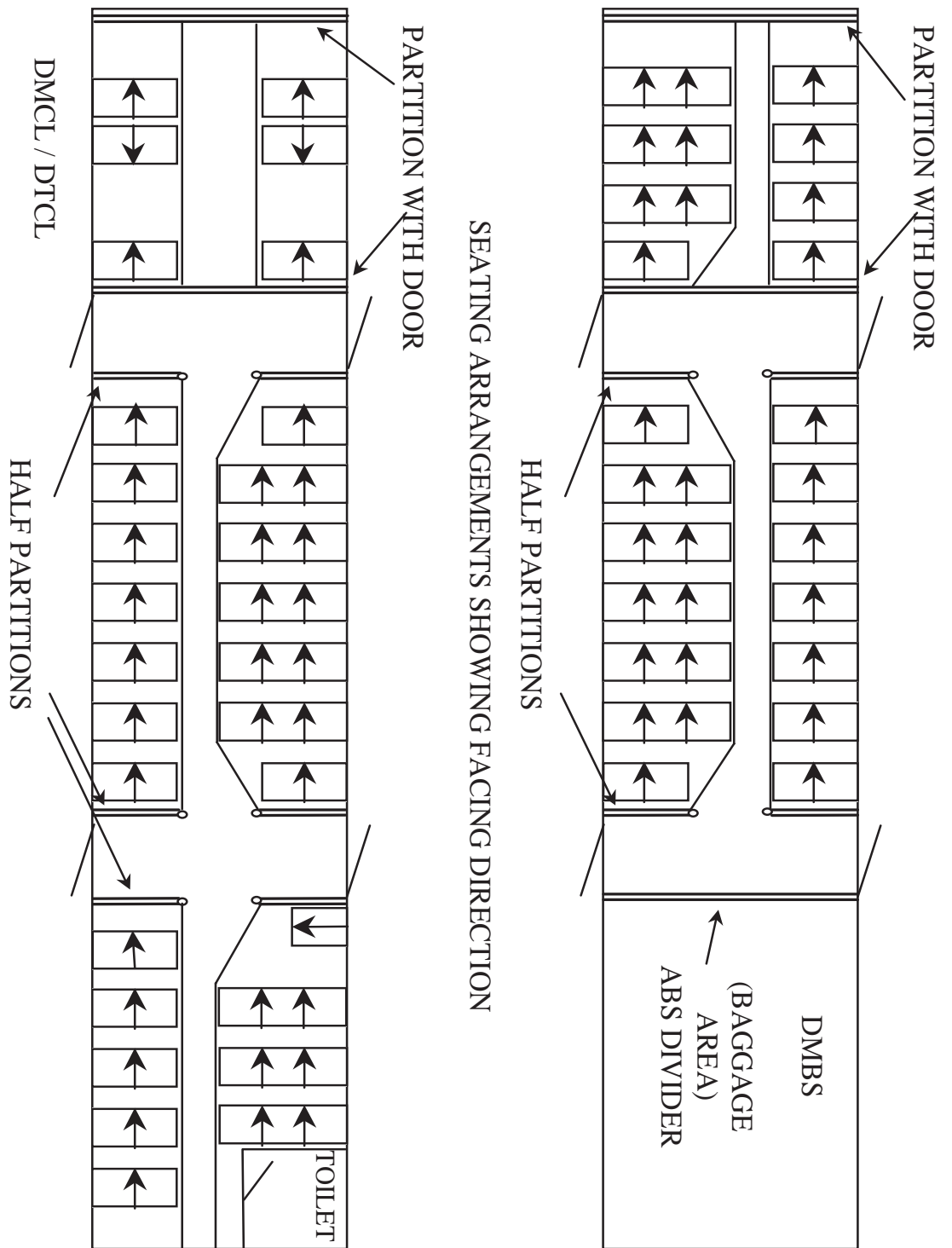
SHAWN KAY OCTOBER 2009

NOTES

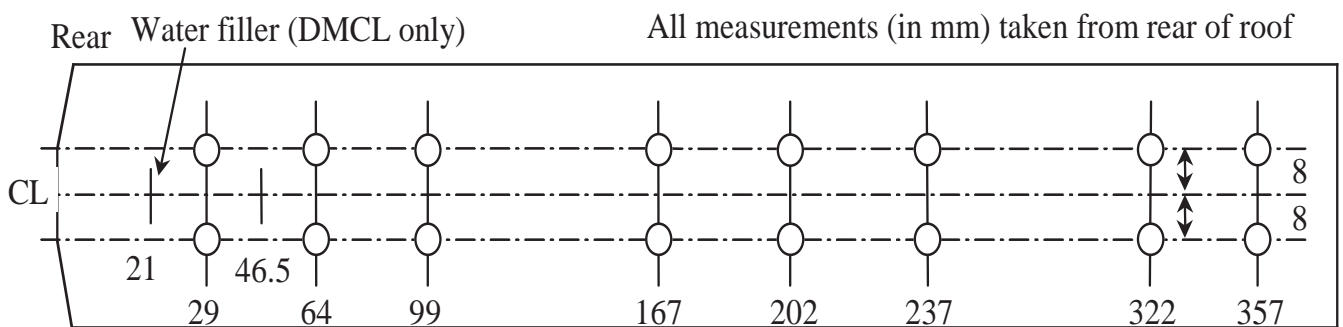
Notes on using etched cab front window frames.

You will find a set of etched window frames on the small sheet of etched details. These can be used as replacements to the moulded cab window frames. They are slightly shorter in height so some care needs to be exercised when fitting. Basically, carefully file the moulded window frames flush with the cab front surface and finish with fine abrasive paper. Looking at the rear of the etched frames you will notice the etched rebate is wider at one end - THIS END IS THE BOTTOM. Use superglue to fix the frames into the openings using the bottom rebate to align the frames. The top of the etched frame just reaches the top of the opening, but does not overlap onto it. It sounds a bit hit and miss, but it does work!

DRAWING1

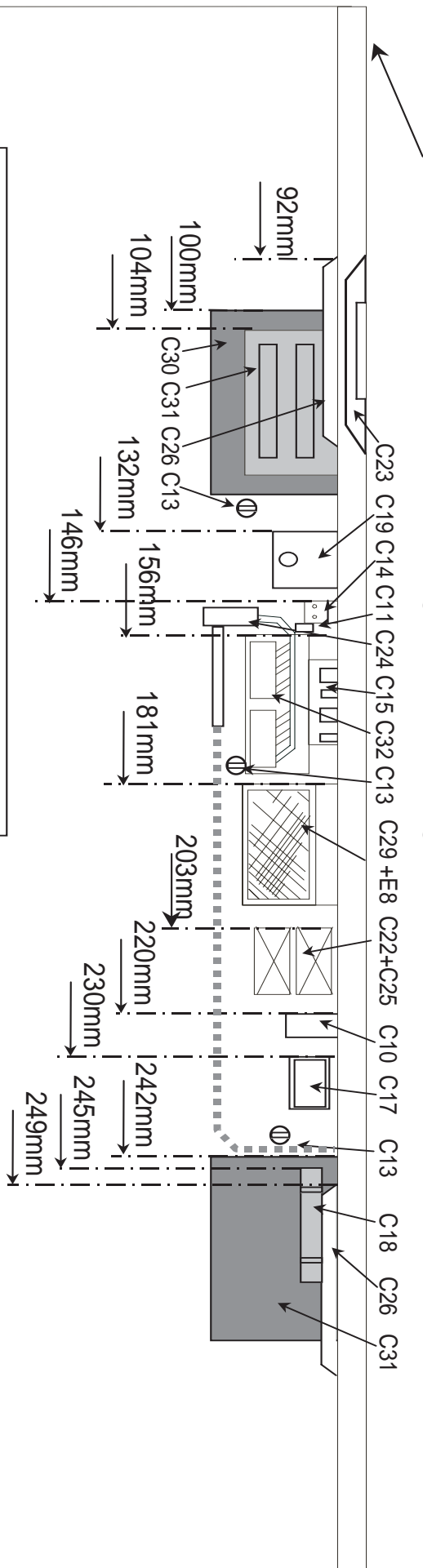


DRAWING2



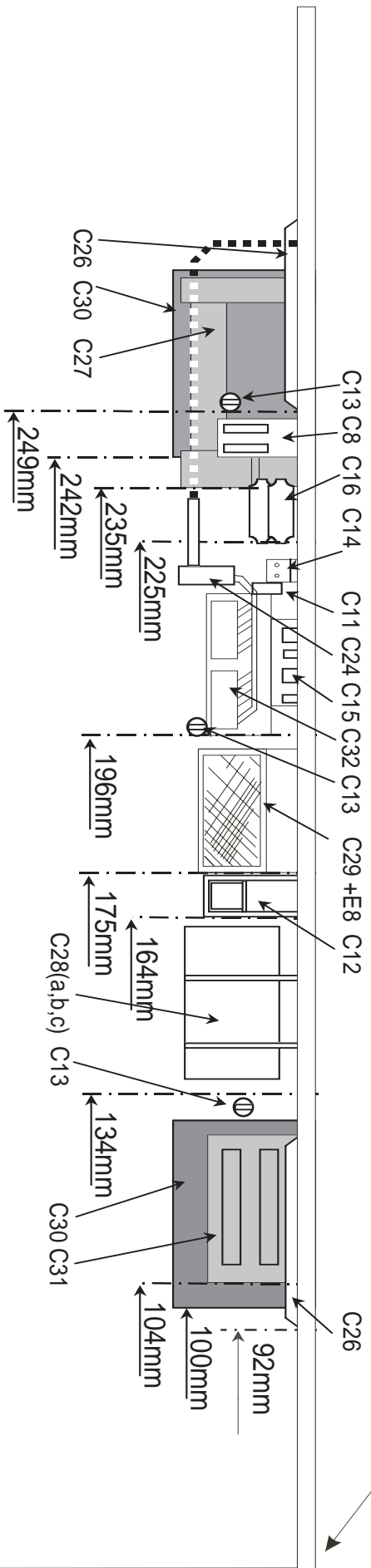
DMBS/DMCL UNDERFRAME DETAILS LAYOUT

Front (Driver's side) →
 Dimensions taken from front edge of floor molding (cab end)

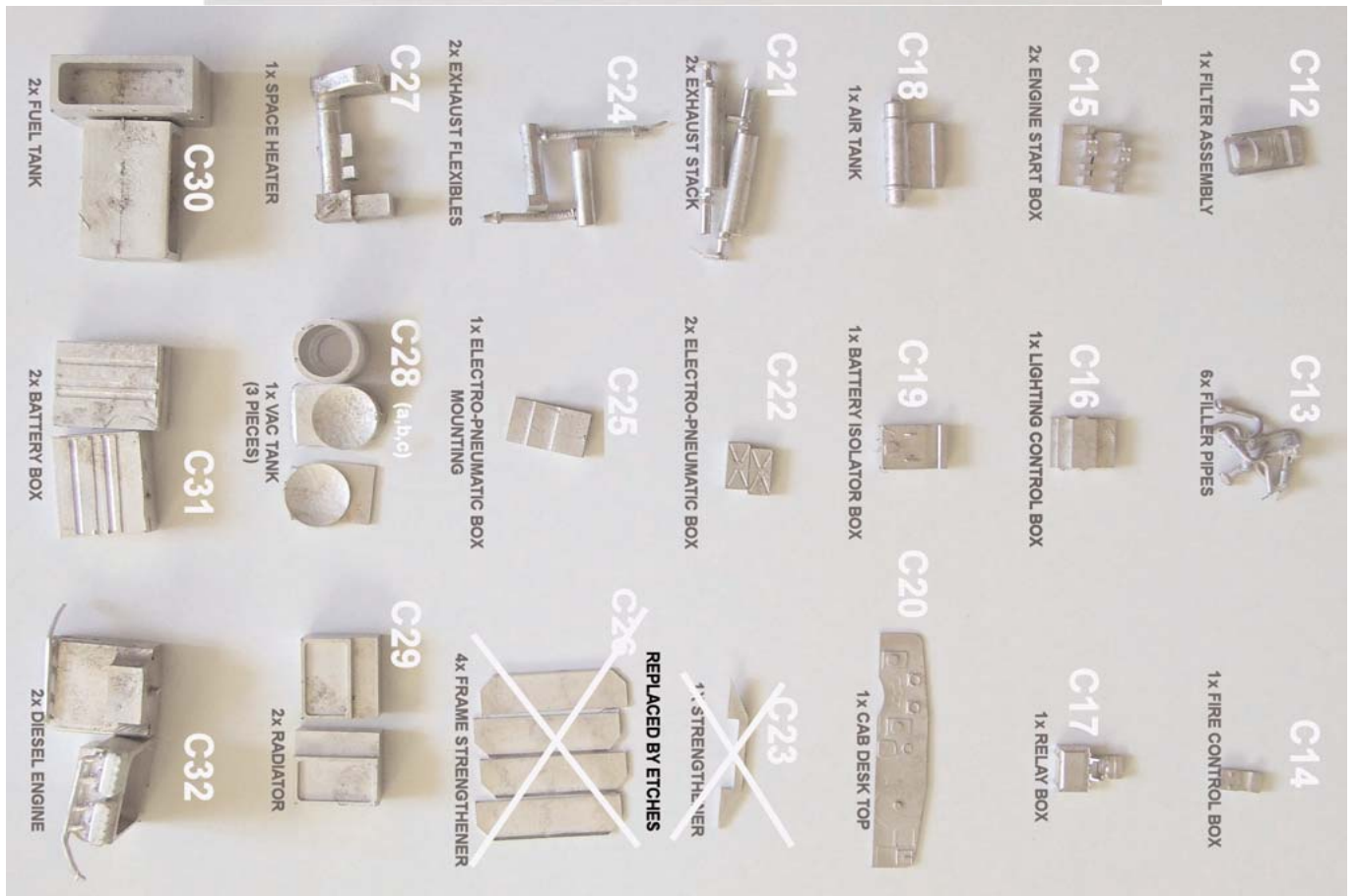
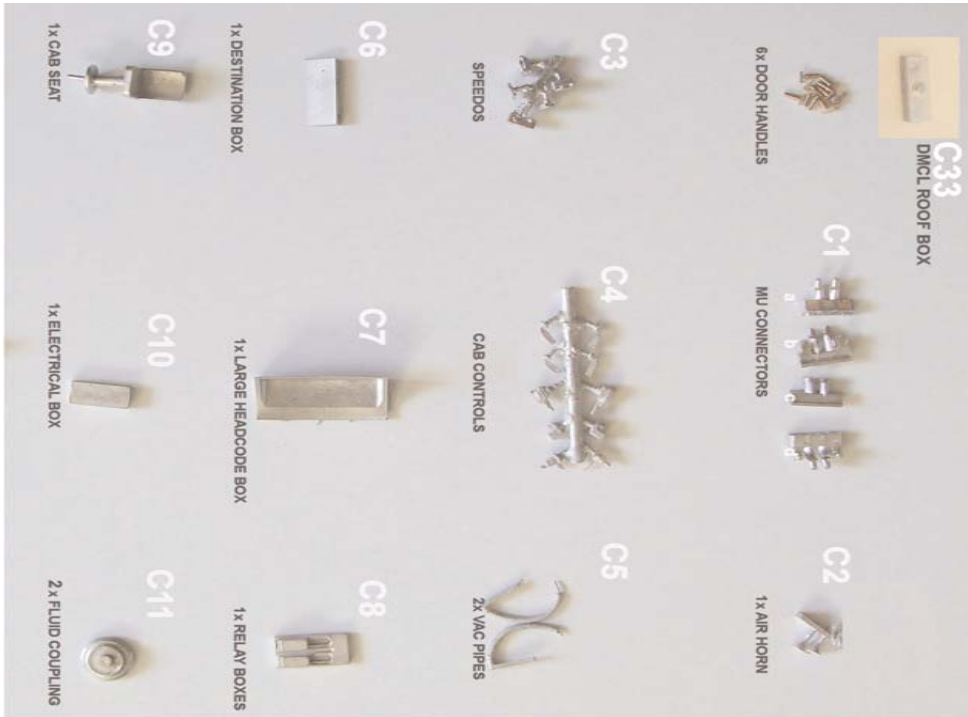


Shaded components used to illustrate the relative layered effect (un-shaded: front, light grey: behind white, dark grey behind light grey). Fuel tanks (dark grey) fit between molded rails on floor.

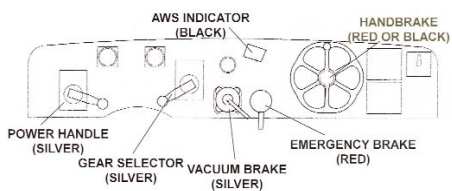
Dimensions taken from front edge of floor molding (cab end)



DMBS/DMCL CASTINGS



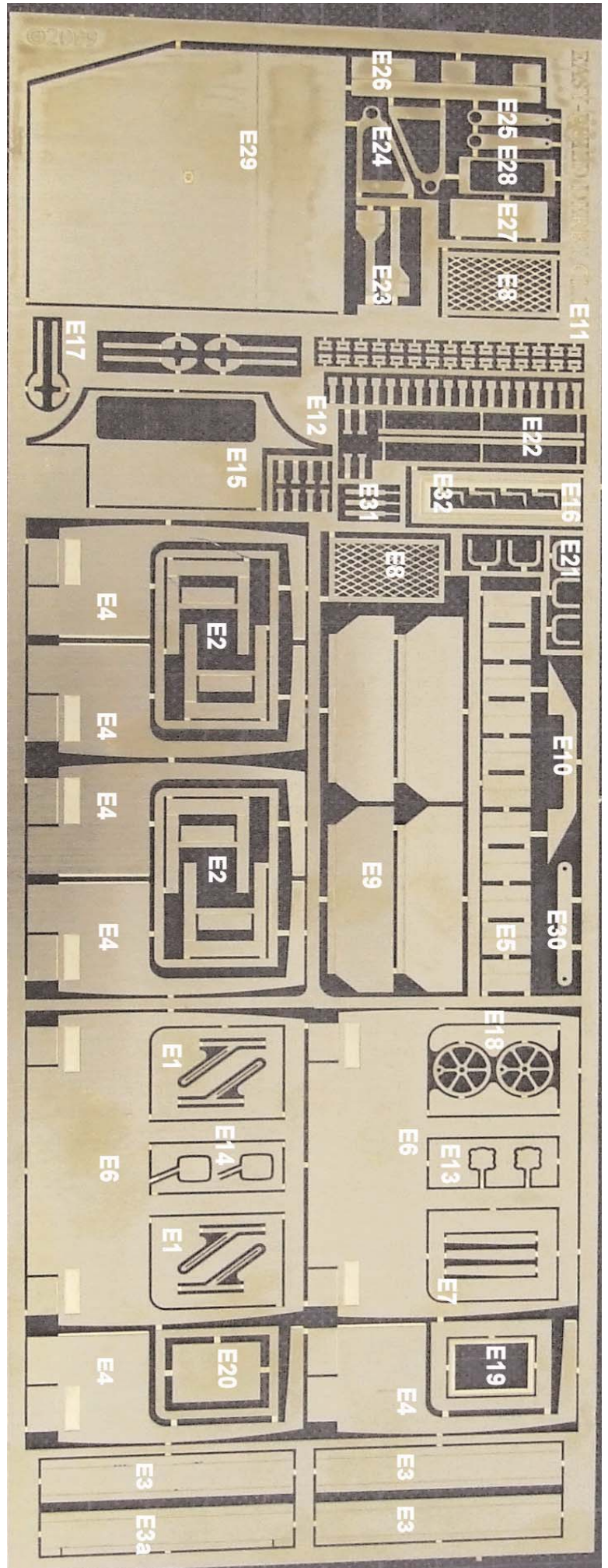
CONTROL DESK DETAILS



ETCHED PARTS

Key:

- E1) WINDSCREEN WIPERS
- E2) BOGIE STEP SUPPORTS
- E3) BOGIE FRONT CHANNEL
- E3a) BOGIE CHANNEL (with cutouts)
- E4) SALOON DIVIDERS (left and right)
- E5) FALSE FLOOR SUPPORTS
- E6) CAB PARTITION
- E7) GUARD IRONS
- E8) RADIATOR GRILL
- E9) INNER FRAME STRENGTHENERS
- E10) OUTER FRAME STRENGTHENER
- E11) DOOR HINGE BUTTERFLIES
- E12) HINGE PINS (short and tall)
- E13) SPEEDO RECEIVER BACKING
(for small casting C6)
- E14) SPEEDO SENDER BACKING
(for large casting C6)
- E15) LARGE HEADCODE BOX
- E16) LARGE HEADCODE BOX FRONT
- E17) LAMP IRONS
- E18) BRAKE WHEELS
- E19) 2 DIGIT HEADCODE FRAME
- E20) HEADCODE BLANKING PLATE
- E21) DOOR GRAB HANDLES
- E22) CAB HANDRAILS
- E23) CAB CORNER STEPS
- E24) BRAKE PIVOT BRACKET
- E25) BRAKE LEVERS
- E26) UNDERFRAME DETAILS
MOUNTING
- E27) DESTINATION BOARD BACKING
- E28) DESTINATION BOARD FRONT
- E29) TOILET COMPARTMENT
- E30) DYNAMO MOUNTING BRACKET
(DTCL & SL only)
- E31) BAGGAGE DOOR HANDLES
- E32) GUARDS DOOR HANDLES



KEY TO ETCHED SMALL SHEET OF EXTRAS PARTS

E11: ROOF HEADCODE BOX -USE INSTEAD OF E15 ON MAIN SHEET

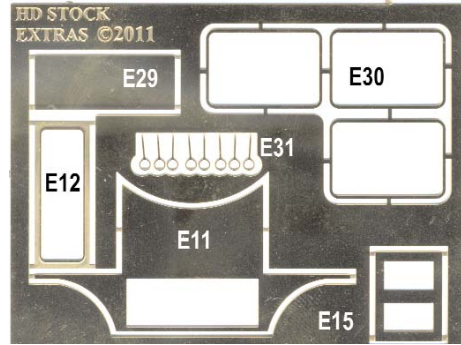
E12: HEADCODE BOX FRONT

E15: 2-DIGIT HEADCODE FRAME

E29: HEADCODE BOX FRONT BACKING PLATE

E30: REPLACEMENT CAB WINDOW FRAMES

E31: EXHAUST STACK MOUNTING RINGS



MODIFICATION TO FLOOR

Since the floor of the power car was designed we've had to obtain our gearsets from a different supplier. This change meant we had to alter the position of the motor, which in turn created a problem with the aluminium bogie mounting. If fitted as described the motor will foul the edge of the round bogie mounting. So, with the round aluminium mounting is securely in place as described in the main text, file, or cut off the edge of the floor motor opening and mounting sufficiently to allow the motor to move through its full range. See diagram below.

