COMET MODELS

BUILDING COACHES THE COMET WAY

£1.50

Building Coaches the Comet Way

Comet Models produce a wide range of coach kits for 4mm scale modellers. Each kit contains parts to build an accurate basic model of your chosen prototype. This guide is an attempt to help you in your understanding of the Comet approach to building coaches, enable you to get the most from the Comet range, and provide you with some hints and tips on their construction.

The Comet Models approach is to supply the various components as separate packs, with their own instructions where appropriate. Thus the modeller who only wants to upgrade certain aspects of their RTR stock can do so without having to buy components for which they have no use. When you buy a Comet Models coach kit you get all the necessary packs in one box at a saving over their individual prices.

Most are straightforward to construct, and this guide follows the building of an LMS Stanier Corridor Third to D1899 (order code M37K) which is a typical example. Where the construction of other types of coach differs significantly we have included further explanation.

You will need some tools to complete your model, and in addition to the usual knives, screwdrivers, wire cutters etc., you will need the following:

25W Soldering iron
Standard solder (i.e. not lowmelt) and flux
Superglue or similar
Drills 0.45mm, 0.5mm, 0.6mm, 0.7mm, 1.0mm, 1.5mm, 2.1mm, 2.5mm
Junior hacksaw or piercing saw

Getting Started

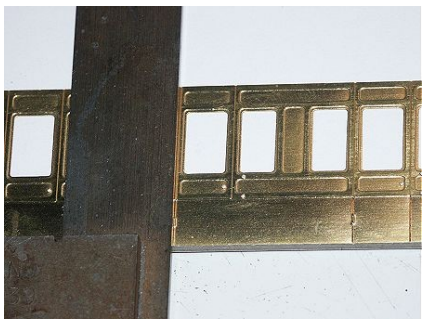
On opening the box you will find a selection of plastic bags containing the various components. There are packs containing sides, ends, underframe and bogies, each with their own instructions. Others will contain whitemetal castings for the detail parts for the roof, underframe and ends, and most types will contain an interior pack. There is also an aluminium roof section (plastic if modeling a Gresley corridor type) and brass wire. It can be tempting to open all these bags to see what your hard earned cash has bought, but resist if you can—it is easy to get confused by having too many items loose on your workbench.

Note that wheels and bearings are no longer included in the kits.

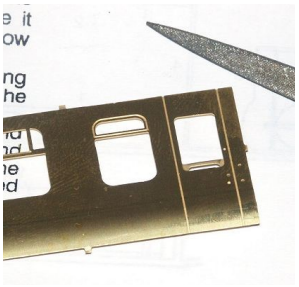
The overall sequence followed by this guide, and the best way to ease construction of the model, is as follows:-

1 Sides, ends and roof
2 Underframe
3 Interior
4 Bogies
5 Painting and lining
6 Finishing touches

Sides, end and roof

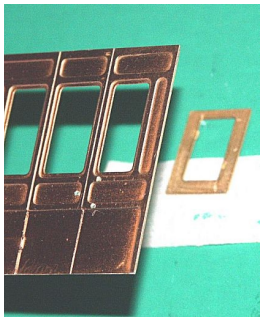


On removing the sides from their packaging you will see that the window apertures are all neatly and precisely etched and the tumblehome (the inward curve of the side below the waist) is usually already formed as well. Not all coaches had this feature, notable exceptions being the GWR Hawksworth types which in 4mm scale are effectively flat sided. Early wooden bodied coaches had raised beading on the sides and are usually referred to as panelled. These are supplied without the curve ready formed. In these cases the first task is to score the door part lines on the lower section of the coach. This should be done using a small engineers square to align the score marks with the door part lines etched in the upper section. The scoring itself should be done with a sharp scriber in two or three gentle passes to avoid distorting the side.



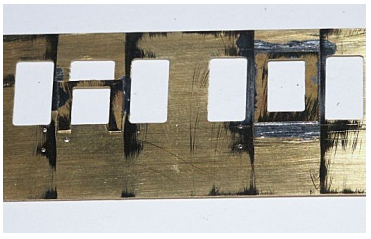
Carefully file off the small holding tabs around the edges that are the remains of the etching process, taking care not to bend the sides. Open up the etched holes with a 0.5 mm drill for the door handles and grab handles. Door buffer dimples are provided on many types but may be ignored unless you wish to represent them with a stub of 0.45mm wire. Comet Models offer an accessory pack (code C26) containing hinges. If you wish to portray these the holes are also best drilled before the coach is assembled.

Separate droplight frames and slatted vents

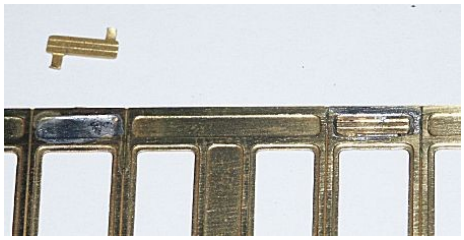


Many of the coaches in the range are provided with separate droplights. These should be fixed before assembling the sides to the ends. LMS Period I coaches also have slatted vents which are fitted at the top of the doors. These and the separate droplights should be fixed before the tumblehome is formed.

Superglue can be used to fit these items but there is then a risk of them coming adrift during subsequent handling so the best solution is to solder them on. The droplight frames can easily be aligned in their voids as follows. After cleaning off the etch tabs, attach a small piece of adhesive tape (masking tape is good) across the lower third of the droplight frame. Place this sticky side up on the work surface and offer up the side to it. The frame can then be sighted through the window void. When satisfied with the alignment, press the side down to fix the tape then turn it over and solder one edge of the frame. Remove the tape and solder the remaining edges.



Droplights may be modelled as partly open. However, avoid too much overlap on the lower section, particularly on panelled coaches (or cut off the lower part of the frame) or distortion will occur when forming the tumblehome. Also remember that too many open droplights is prototypically unlikely and will make it more time consuming to glaze the coach. After fitting the droplights re-drill the handle holes and clean any excess solder from the surface and edges of the frames, particularly where adjacent glazing will come very close to them.

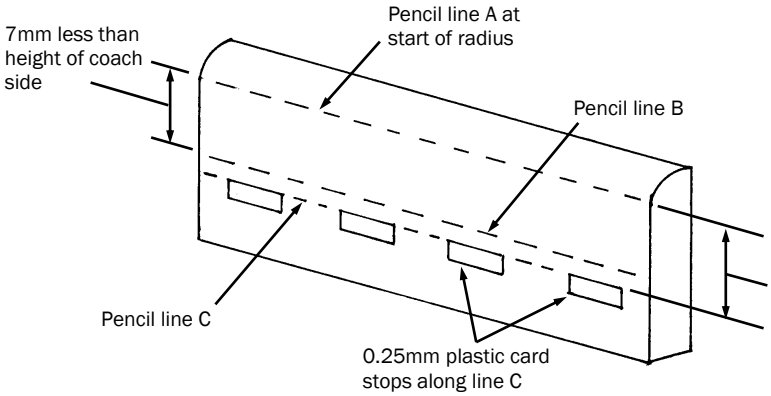


Slatted vents should have the etch tabs filed off then be lightly tinned (apply a thin film of solder to the back). The half-etched oval recess at the top of the door should also be tinned with a minimum of solder. The vent is then held in position with the tip of a needle file or similar object. Ensure that the tip of the soldering iron is as clear as possible of solder then apply heat to the vent until you see the solder under it melt. Wait a few moments for the solder to set before releasing your hold. Some kits are not supplied with etched vents. Make them instead from 30thou plasticard, and glue them in place.

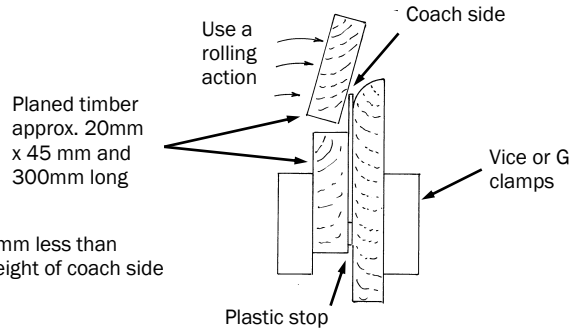
Forming the tumblehome on panelled coaches

The characteristic curve (tumblehome) which is a feature of most coaches is ready formed for you except in the case of panelled types. Having scored the door lines, fitted droplight frames and slatted vents (and soldered together the upper and lower panels in the case of Gresleys) the next job is to form this curve. Our tried and tested method is shown below. If you possess rolling bars they can be used but a piece of paper should be put over the panelled side to protect it during the operation.

Use a 300mm long piece of quadrant, bullnose or pencil round skirting board with the radius smoothed off to remove any ridges and mark 3 pencil lines as shown.



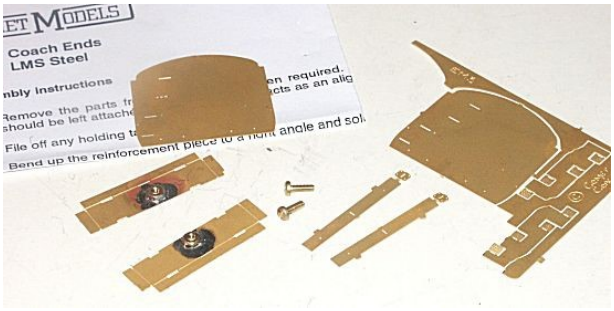
Use a vice or G clamps to clamp the coach side between the skirting board and a second piece of timber, with the top of the side resting on the plastic stops along line C. Use a third piece of timber to roll the start of the curve.

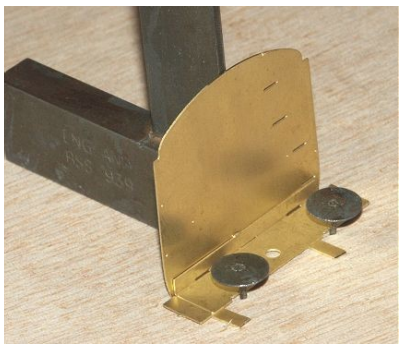


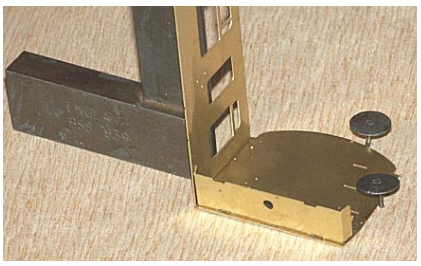
Once the start of the curve has been formed move the side up level with line B and repeat. It is best to overdo the curve then relax it with gentle finger pressure until it is a close match to the profile of the end etch.

Ends

Remove them from the fret and open up the holes for any grab handles to 0.5mm, 1mm for the jumper cables and open out the holes for the buffer spigots, usually to 1.5mm). If fitting corridor connection suspension units from detailing pack C26 the holes for these should also be drilled now. You will see that on the fret you still have left the buffer beams, the coupling pocket plates, and two other items which are the fold up brackets used to secure the underframe to the body. Solder the supplied nuts over the holes in these brackets on the same side as the half-etched fold line (Note all bends are made with the half-etched line to the inside unless specifically stated otherwise). To ensure that the nut is located accurately over the hole, put a little oil on the threads of a screw and then thread the screw through the hole, through the nut, and then tighten. The oil will stop any solder securing the screw to the nut. Fold up the three sides of the mounting bracket and reinforce the long fold with a small fillet of solder. The brackets are then soldered to the insides of the ends, positioned centrally and so that their base is the thickness of the underframe up from the bottom of the end. It is best to use a piece of scrap about 40mm long taken from the end of the underframe fret as a spacing piece. With the bracket sitting on these, hold the end vertically against the bracket and tack solder in place. Check that the bracket is central on the end and that the end is 90º to the bracket. When all is well, complete the solder joint.

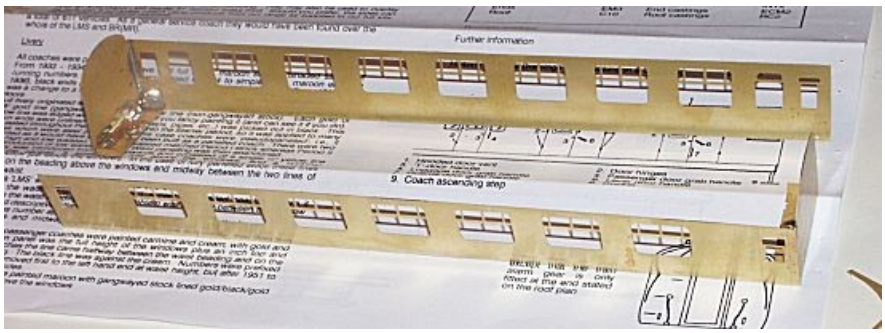


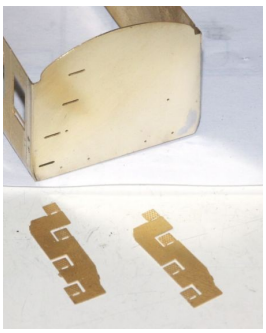


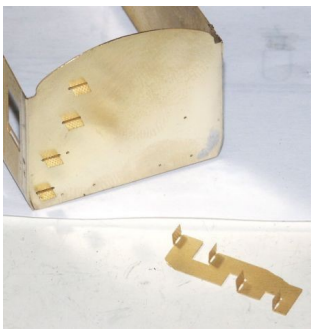


You now have to fit the sides to the ends. It is important that these joints are neat and accurate, so it is well worth making some sort of a jig to help you. Fit each side outside the end, with the edge of the side flush with the outer face of the end, ensuring that the curve of the tumblehome (if appropriate) matches the profile of the end.

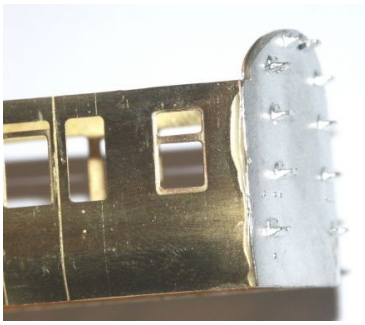
Repeat for the other side and end, ensuring that they are both the right way round, and then solder your two 'L' shaped pieces together. Now fold up the end steps (if present) to 90º, feed them through the slots in the end, and solder in place.



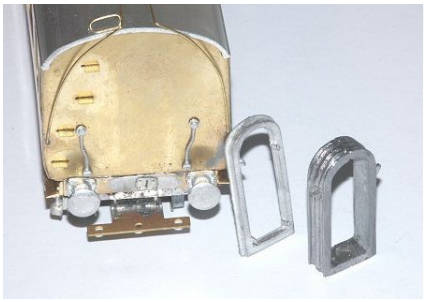




Bow ended coaches

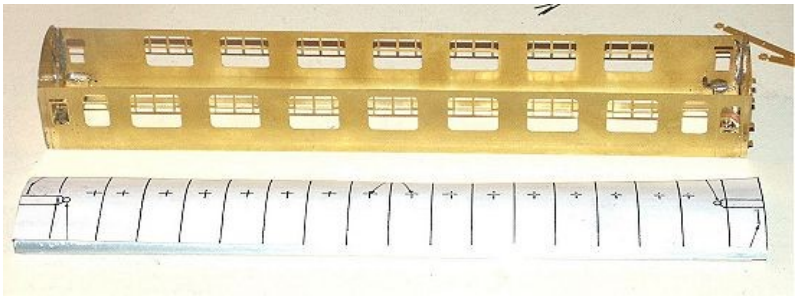


Many coach types had a curved or bow end, the purpose of which was to allow adjoining coaches to be coupled closer together, shortening the gangways and easing the passengers' ordeal in having to walk through them with the train in motion. These include many GWR ones and almost all LNER, SR and BR MkIs. For these coaches the starting point is the four sided box; the ends in this case are false, being simply the base for a white metal casting. Before fixing the casting check that it will fit flush against the false end, and if it does not, place it flat down on a sheet of emery paper and gently rub it down until it fits flush. However don't worry if the casting is slightly wider than the end, it has been designed this way. The best method for fitting these castings is to use a two pack epoxy resin adhesive such as Araldite and apply sufficient so that it squeezes out around the casting, thus filling in any gaps. When you are happy with the alignment it can be held in place with an elastic band along the length of the coach, but take care not to distort the shell as you apply the band. When set, simply file smooth the excess adhesive and any overlapping part of the casting, including at the roof line.

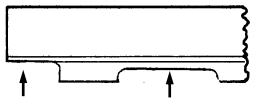


Corridor connections are provided as whitemetal castings. The bellows parts are soldered or glued together then fixed to the base. The assembly is then fitted to the end of the coach with the base against the coach end. In the case of bow ended coaches the base is not used, the bellows section being attached directly to the coach ends. Wash the body thoroughly to remove all solder flux residues.

Fitting the roof

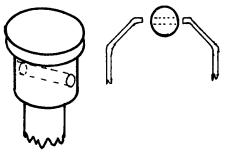


We now turn our attention to the roof which, when fitted, will give the body its rigidity. The aluminium extrusion will first need cutting to length. In most cases the overhang at the ends of the roof is no more than 0.75mm or so in 4mm scale, so using your sides and ends box, mark off the length you require. File the cut end smooth and to shape in the case of a bowed end. Before the roof will fit the sides it needs to have approximately 5mm of the rebate removed at each of the four corners of the roof in order to sit down onto the top of the sides. Once that is done, try the roof for fit on your sides and ends box, and note the extra rigidity that it now has.



File to clear end and any high windows if required

When test fitting the roof it is important to ensure that the tops of the coach sides are flush under the section of the extrusion representing the gutter. Initially this may not be the case, and the reason is almost always because at some point along the curved top of each end there is a high spot. Having cut the roof roughly to length, DO NOT throw away the piece of scrap. Clean up the cut and file away a section of the rebate so that it will fit over the end. You can now use this as a gauge. Slide it up to the end and you will be able to see where the high spots are and file them away. When you can slide it cleanly over the end you can be reasonably sure that the roof will fit down snugly onto the shell.



The roof must next be drilled for the various vents and fittings. The simplest way is probably to take the roof plan provided in the sides pack, cut it out and then secure it to the roof with something like double sided tape. It then serves the dual purpose of being a marking out template and a non-skid surface for drilling. Drill the holes smaller than required at first, say 1.0mm, and then open them up to the final size. Fit the vents and toilet fillers, drilling these first for the filler pipes which you will fit later. Some fittings, such as water tank tops are made from pieces of plastic sheet. To make gluing easier and avoid too much cleaning up, drill holes through the roof within the footprint of the fitting, hold it in place with an elastic band then apply the glue from underneath.

The roof can now be secured to the sides and ends box. Impact adhesive (used wet) or superglue can be used for this job. It is essential to clean the brass and the aluminium with emery or a glass fibre brush, and dry wipe immediately prior to fixing. If using superglue, hold the roof in place with rubber bands at each end, gently flex the side away from the roof and apply the superglue. Press the sides against the roof rebate and cantrail for the required 10 seconds and when the glue has stuck, remove the rubber bands. The end/roof joint may be further reinforced with Araldite if you want to ensure a solid, permanent joint. You should note that superglue can crack and the joint separate if the coach shell is subjected to shocks such as being dropped, or involved in a major 4mm scale railway disaster. Some builders prefer to use an impact glue such as Evostick for the roof/coach side joint. If so it is applied wet and the roof put in place immediately, then held with rubber bands until the adhesive cures. This can be more messy and involve more cleaning up of any excess adhesive before painting, but the resulting bond has a certain resilience which is less susceptible to shock failure.

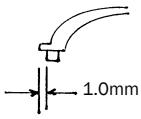
Non-standard coach shells

Gresley teak coaches

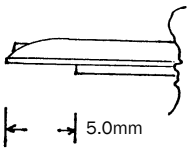
The panelling on these coaches has three levels. To achieve this effect in model form the sides come as top and bottom panels. Their construction begins by overlapping the top half onto the bottom along the waist line. When satisfied that the upper and lower portions are aligned when seen from the front, tape them together. Turn the side over then, starting from the centre, solder outwards towards the ends, checking every so often that all is well.

The brake end or luggage compartment on Gresley designs was slightly inset. To produce this in model form the passenger and brake end sections are assembled separately as two sides and an end. At the inboard end of the passenger section on gangwayed coaches there is a partial bulkhead which has slots into which the brake end section is located. For non-gangwayed stock there is a full false end instead of the partial bulkhead and the coach is assembled from this four-sided box in the same fashion.

The roofs on Gresley gangwayed coaches are dome ended. These are supplied as a plastic moulding and require some modifications in order to fit



them properly. Firstly, all the moulding pips should be removed from the underside of the gutter. To act as a location, lengths of 1mm square styrene strip (micro-strip) are lightly tacked about 1mm inside the edge of the moulding. This is then temporarily fitted to the coach shell and the strips adjusted until the sides are straight, resting against it and with the edge of the roof slightly overhanging the sides. When satisfied, the strip may be finally glued in place and the roof attached to the shell, after detailing of course.



BR MkI Pullmans

The MkI Pullman coach shell differs from the standard one in having a short section of the ends, which contain the doors, inset. This end section is made up as a sub-assembly then attached to the saloon section of the coach. In all other respects the remaining construction follows a standard Comet BR MkI.

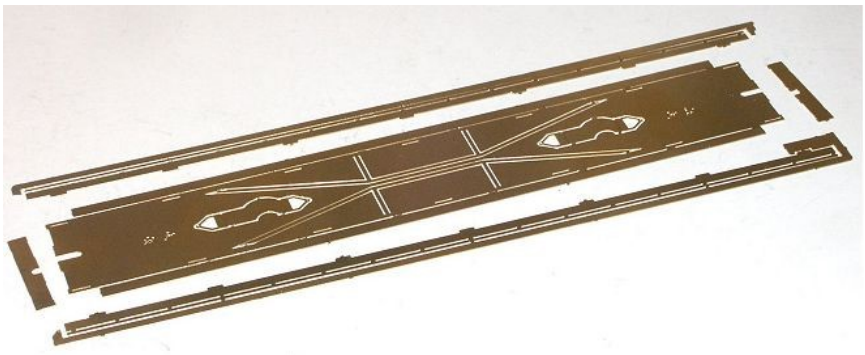
GWR Centenaries and Super Saloons

Due to the extreme width of the prototype coaches the intermediate doors on the Centenary brakes and restaurant firsts were inset. These sections are provided as separate etches which are soldered behind the voids in the coach sides. To aid location 0.45mm wire is passed through holes in small tabs below each position which are removed after the inset pieces have been soldered in place.

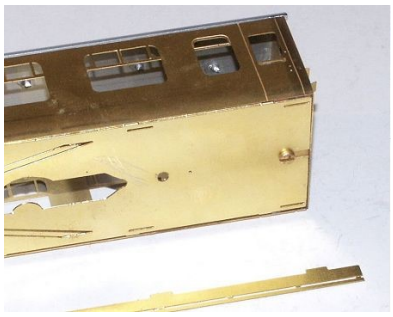
Centenary Stock and Super Saloons also featured angled inset ends. On the models these are assembled separately from the shell. The end assemblies are then bolted to the partly made up floor pan and the coach sides offered up. When correctly aligned the sides are tack soldered to the ends. The shell can then be removed from the floor pan and the soldered joints completed. The gap between the door and end sections and the sides themselves is filled with an appropriate model filler. In order to give a clean line to the filler, on the inset section there is a half etched line just outside the door part line. This can be used to guide the tip of a craft knife to clean away excess filler. Note also that the roof fits inside the gutter strip on the top of the coach side and between the end castings.

The Underframe

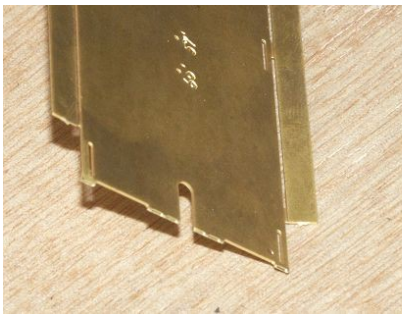
All Comet underframes have certain characteristics in common. There is a central part (the floor pan), parts for the solebar channels, cross trusses (except on some GWR types) and brake vee-hangers. BR MkI and LMS articulated coaches have inset trusses with cast or etched cantilever brackets.



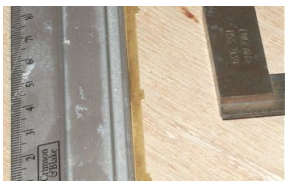
Many of the underframes serve for more than one coach length and also for more than one bogie centre distance. You will know the length of the coach you are producing, so using the half-etched guide lines at each end of the etch trim the underframe to length if required. There should be about 0.5mm clearance when it fits inside the coach body you have just built.

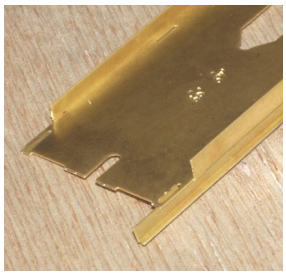


The bogie centre holes you require are part of the information in the sides pack. Whilst the underframe is still in the flat state drill the bogie centres clearance size for the 2.5mm fixing screw (in the bogie pack). Now bend up to 90° the two side flanges that run the length of the underframe. Form these by pressing the upstand against the work surface until it is nearly at a right angle, and then adjust the various sections until you are satisfied that the floor pan is flat.

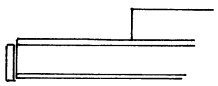


The next step is to bend up the flange to form the bottom of the solebar channel. To form this bend, press the flange against the work surface to bend it to about 45°, then place it against the edge of a rule and gently tap until the flange is at a right angle. When this is complete, solder can be run in from the back at the ends as reinforcement. The channel has now taken the form of a banana, but do not panic, nor try to straighten it. The next stage will do this for you.



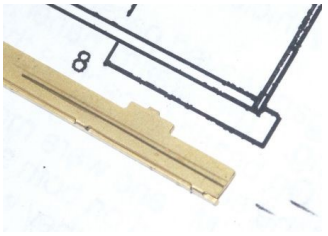


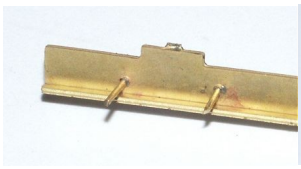
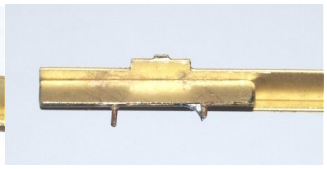
Turn the underframe upside down so that it is resting on the side supports you have bent up from the floor pan and you will see slots which correspond to the tabs on the solebar channel. Put the tabs in the slots, making sure the channel is upright (and facing outwards!). This action takes the bend out of the solebar because, with the side supports turned upwards, the floor pan cannot bend. It is only necessary to solder in the area of the tabs. File off the excess tab projecting above the floor pan. This will ensure the body and interior will seat correctly. The buffer beam is set so that its front surface is almost flush with the coach end, so file the ends of the solebars, but not the floor pan, until you achieve the right position. Make sure it is central and vertical and solder in position.



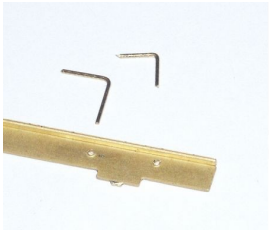
Solebar stepboards

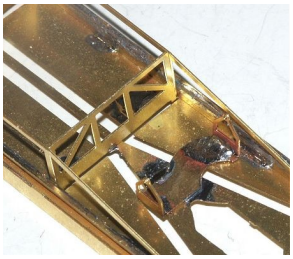
Older coaches had solebar stepboards along the length of the coach. More modern ones had steps only directly under the access doors, whereas some brake ended coaches had an extended step along part of or the whole of the luggage section. This information is provided on the prototype sheet enclosed with the sides. The stepboards are cut to length from the frame surrounding the underframe etch. They may be fixed in position with a simple butt joint but this is somewhat flimsy. We suggest that, using the bodyshell as a guide, the positions of the stepboards are marked on the solebar (do ensure you get the body the right way round with respect to the underframe). Drill 0.5mm holes 1mm above the bottom of the solebar inside the marks and in the case of continuous or extended ones at about 30mm intervals. Avoid placing any of the holes where the queen posts or angled trusses will be



located when folded up. Assemble the underframe as per the instructions but do not fold down the angled trusses. Some end stepboards extend beyond the buffer beams, in particular on LMS coaches. In this case make a small notch 2mm in from the outer end of the stepboard to clear the buffer beam. From 0.45mm brass wire form a set of 'L' shaped supports, each leg being about 5mm long. Push them through each of the previously drilled holes in the solebar and solder one leg against the back of it, again avoiding the locations for the trusses. The stepboards are then soldered on top of the leg protruding through the solebar.

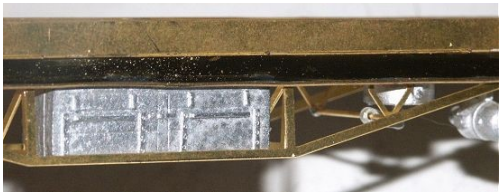




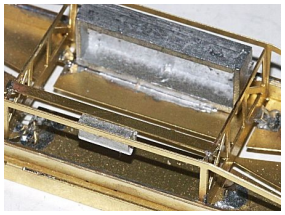
Part the outer ends of the diagonal trusses, but not the top of the queen posts. Now fold down the truss rods, and lo and behold, they are vertical when fastened against the back of the solebar, and in the exact lateral position. Check in the instructions to see if you need to alter the angle of the diagonals at all to represent your chosen prototype, then solder the outer ends to the back of the solebar. The cross trusses, if present, are fitted next by soldering them to the queen posts, ensuring they are in line across the coach and vertical. You may find it helpful to turn up the tabs on the cross truss, which are set at a height to enable them to be soldered to the floor pan, before fixing them to the queen posts.

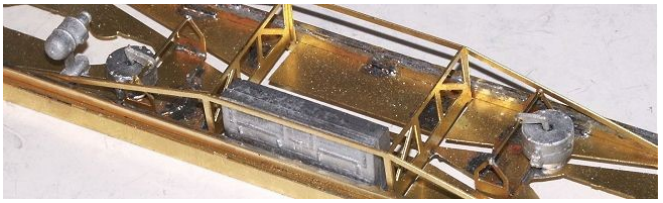
Next fit the brake vee-hangers. First drill the holes to 0.7mm then bend the ends to a right angle and reinforce the bends with solder. Fix them to the floor pan with reference to the plan in the sides pack. This completes the majority of the solder work on the underframe. However, if you intend to solder rather than glue the detail castings then lightly tin their locations at this stage. Some coaches, notably BR MkI catering stock, are provided with etched underframe detail components. These should be soldered in place before adding any whitemetal castings.

The detail castings that complete the underframe can now be fixed. Drill out the hole in the cast brake cylinder operating arm to 0.75mm and shorten the round section rod to about 5mm. Thread a piece of 0.7mm wire through one end of the V hanger, through the operating arm, ensuring that it is pointing in the right direction, then through the other end of the V hanger. Secure the wire with a blob of solder. Next fit the vacuum cylinder with the shortened end of the operating arm pushed into the hole in its centre.



The remaining castings can now be soldered or glued in place in accordance with the underframe plan. These are, or may be, battery boxes, regulator boxes, vacuum reserve cylinders, gas tanks and buffers. In the case of BR Mk I coaches there will also be a set of cast cantilever trusses and other small details such as electrical boxes and vacuum release valves. On LMS coaches a support must be arranged between the cross trusses to support the regulator box. This can be made from a length of brass angle or square rod.

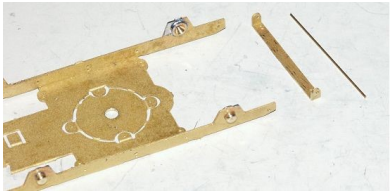


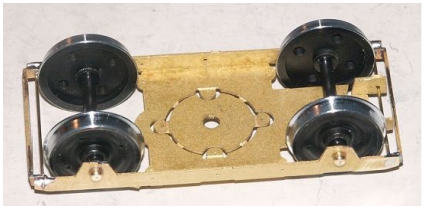


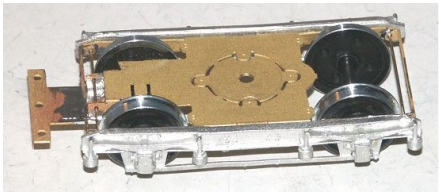
The dynamo is fitted to the underframe in accordance with the diagram- take care not to fit it too near the end of the underframe, or it will prevent the free movement of the bogie. You will find it easier on LMS coaches to fit the regulator box before the battery box, as there is more room to hold it in place with a screwdriver or other suitable instrument without the battery box in the way.

Wash the underframe thoroughly to remove all solder flux residues and put it in a safe place to dry prior to painting.

Bogies







The instructions included in both the four- and six- wheeled bogie packs are comprehensive, but we have some tips. Drill out the holes to size with the bogie stretcher still in its frame. The holes for the wires locating the cross bearers should be drilled to 0.5mm.

Bogie packs are supplied with M2.5 screws, so drill or ream the hole for the pivot to 2.5mm and open out until clearance is achieved, but without introducing too much slop. The axle bearing holes should be opened up to 2.1mm so that the bearings are a snug fit. Hold them in place with a small flat file whilst soldering in position. Make sure that when you do solder in the bearings, the bearing surface will be to the inside when you fold down the sideframes. There should be minimal sideplay in the axles if the pinpoints are to work. The sideframe castings may need attention before they can be fitted snugly over the pinpoint bearings. Fix them to the bogie with impact adhesive, and then with the bogies fitted to the coach adjust them until they are horizontal. If required to give adequate clearance for the bogies to turn, add washers between the underframe and the rubbing plate. The crosswires need to be bent clear of the wheel flanges.

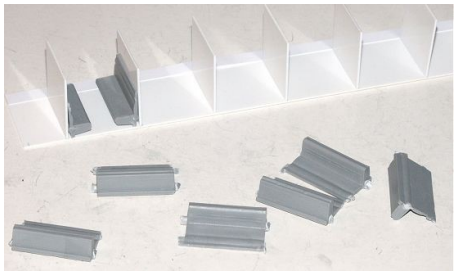
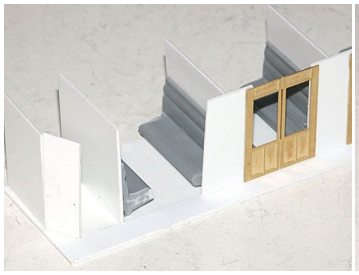
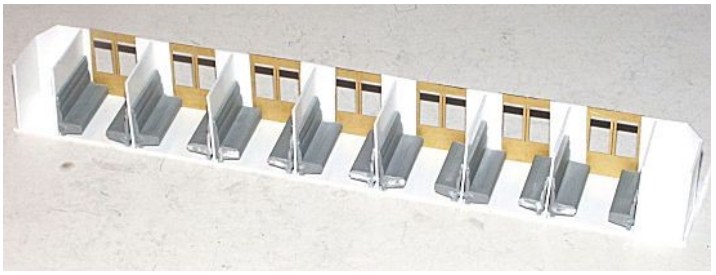
Interior

The instructions in the interior pack are comprehensive, but here are some tips.

The floor of the interior must be shorter than the floor of the underframe at each end by the length of the angled bracket fixed to the end or you will not be able to fit the coach body to the underframe. You should also provide clearance for the heads of the screws securing the bogies in place.

Whilst the interior details are given in the sides pack, the reproduction may not always be to the exact size, so we suggest that you use the coach sides as a gauge to ensure the most accurate placing for compartment division walls, tables, toilets etc. This is particularly important for coaches with narrow divisions between compartments, notably non-corridor or suburbans.

When you have marked out the positions for those divisions and you have checked they are correct then check again. Make sure if the interior is handed, and most are, that you have got the correct hand. It is perfectly possible to get the corridor on the wrong side relative to first and thirds in a composite, for example, so that either the corridor is on the wrong side of the coach, or the firsts are at the end where the thirds should be and vice

versa.

Compartment doors can be modelled in an open condition by separating the door(s) and fixing them in an open position.
For painting interiors there is no set scheme, but blue for firsts, dark red for thirds, various browns for wood and grey for floors will cover most eventualities.

If modelling a non corridor coach the end seats will need to be fastened to the end of the coach, because at that point there is no floor, only the body fixing bracket. Make sure the underside of the seat is cut away to clear the fixing screw.

Painting and Lining

The first stage is to ensure the coach is scrupulously clean. We use Jif (now called Cif) and an old toothbrush. This also finds out the bits that are going to fall off later if you don't fix them now. Washing in a weak vinegar solution will then remove any alkaline residues from whatever detergent you have used. Rinse well and put somewhere to dry.

The next stage is to prime. If you are using a single livery colour then you may find a car primer from an aerosol spray can would do. They are, however, quite thick and will reduce the prominence of fine etched detail such as door lines. This will be less successful if two-tone livery is required, since the lighter of the colours will need to be masked. Brass is notoriously difficult for paint to adhere to, and for best results a two-part self-etch primer is recommended. Ideally it should be sprayed on, but it can be brush painted without leaving brush marks. A very thin coat is all that is required. If sprayed it will dry in less than five minutes, a little longer if brushed. It is well worth trying to master the art of airbrushing and simple airbrushes and cans of propellant are relatively inexpensive. Before spraying, put kitchen roll inside the body of the coach to prevent spray carry through onto the other side.

In respect of the finish colours, cellulose paints have a lot of advantages. They dry very quickly (less than 5 mins) and so they require little protection from dust. If using enamels, or if you are going to be applying masking or lining to cellulose, they are best left to harden for a couple of days. When you have masked for the second colour remove the masking tape as soon as the second coat has been applied, whilst the paint is still wet. Do not wait for it to dry. This makes for a better edge between colours, and reduces the risk of the masking tape getting stuck to the coach. Allow to dry.

Now for the lining. We admit that this will probably be the most daunting prospect, but it need not be. Let us take the simplest case of straight lines - LMS simple livery, for example, which has two yellow lines above the window and a yellow/black/yellow triple at the waistline. For this job you will need a bow pen or lining pen. As to the paint for lining, we use either acrylic or enamel when lining on cellulose. Acrylics are water based and enamel can be removed with white spirit, neither of which will dissolve cellulose. So if you make a mistake, you can remove the lining and start again. Practise on scrap material before trying it on your painted coach.

If lining between two colours, it is advisable to rub very gently the line between the two colours with 1200 or 2400 grade wet and dry. This removes the slight jaggedness produced when the masking tape is removed. Always use fresh paint, and warm it in your hands before use (or carry it round in your pocket for 10mins. or so) and stir thoroughly. Mechanical mixing, i.e. a mini-drill and bent wire is also very desirable. All this will increase the 'flowability' of the paint.

Fully lined livery on panelled coaches is more of a challenge but the principle remains the same. Again, practise on scrap. When you are satisfied with the above, add the coach insignia using your preferred transfers, and then varnish for protection. We can recommend Ronseal Mattcote polyurethane (thinned 3:1 with white spirit if spraying) as it gives the eggshell finish that suits model coaches. A small tin from your local DIY shop will probably last several lifetimes.

Underframes and bogies are black, other than BR Mk1 's in blue/grey body livery which are brown. Ends are also black, except where stated in the sides pack, but only ex-works vehicles would look like this. We use a 3:2:1 mixture of Humbrol matt black, matt dark earth and matt brick red for underframes, and a 50/50 mixture of Humbrol matt black and matt dark earth for ends. This would be weathered with a lighter colour using the dry brush technique to finish off. We suggest the roof is painted last and tips regarding this are found in the next section.

One final comment on painting - if you're modelling the early BR blood & custard period, please use a "crimson" matching the photo on the title page, and not that horrible "maroon" that the RTR manufacturers insist on!

The Finishing Touches

The biggest job left is probably the glazing. It is fiddly if there are large numbers of separate droplights, or quick if there are no droplights and a clear coach side. Cut the glazing strip provided in the interior pack to an appropriate size. We use Evostick or Thixofix to fasten the glazing, on the inside of the coach side and the top and bottom edge of the glazing, and apply whilst it is still wet. Glaze all the windows, including toilets. Remember to leave a gap at the top of open droplights!

There are three types of glazing in common use for toilets. This can be done on a separate piece of material which will be stuck to the back of the existing glazing or fitted shiny side out.

Type A. This is the hammered pattern used by LMS Period I, for example. Use coarse sand paper or emery and pull this across the glazing to scratch it to the pattern. Do this at 60° to the horizontal from both directions. Do not overdo it, the pattern should be visible.

Type B. This is translucent but without a discernible pattern (at least in our scale). You can rub some glazing strip with fine emery until a translucent appearance is produced or you can use tracing film.

Type C. This is a white toilet window, made using white plastikard or scraps of white paper from a laminated document.

Stones vents for LMS Period I coaches are made by scribing lines 1mm apart on some scrap glazing, and cutting to the correct size. This allows them to be placed in from the front, on top of the glazing. Fasten them in place with a dab of superglue. Curtains for firsts and blinds for sleepers can be produced by painting glazing or thin plastikard an appropriate colour and attaching with Thixofix.

Window insignia can now be affixed where applicable. Corridor handrails are made from the wire included in the interior pack, painted if required, and fastened to the glazing with a small blob of Thixofix. This does not run, and has the added advantage of holding the rail just off the glazing. Make sure you do not run corridor handrails across door droplights!

'T'-door handles and, where appropriate, GWR 'early' grab handles are provided in all kits. Paint may well have obscured the holes for the door and grab handles so check them and re-drill if necessary. For the GWR early handles put them in straight, superglue from the inside, and only bend them at the half-etched line when they are in position. Any projection on the inside can be removed with angled cutters. Grab rails are made from 0.45mm brass wire, flattened if you so wish and bent to shape.

Roof panel lines and rain strips can be represented with self adhesive tape such as our pack C20. Roofs are variously described as white or grey. White roofs would not stay that way for long so for variety you could vary the colour from coach to coach. For most grey-roofed coaches Humbrol matt 67, tank grey, is a good starting point, which can be adjusted with black or white. If you do this it might be a good idea to keep a note of the recipe used (you did use a recipe, didn't you?) in case there is a need to do a little judicious touching in here and there. A self-adhesive label stuck to the underframe would do. If you want your coach to have an ex-works condition, stop here. If you want to weather your coach, concentrate on the underframe and ends, i.e. the parts not cleaned by the carriage washing plant.

We suggest you use a lighter colour than the underframe, grey or matt dark earth for example. Dip your brush in the paint and 'paint' a length of kitchen roll or similar, until you appear to have no more paint on the brush. Now brush very lightly that part being weathered and you will see highlights being generated. Continue until you are happy with the result.

Now comes the moment of truth. Place the interior on the floor pan and secure with impact adhesive once you are happy with the alignment between the window apertures and the compartments or seating. Put the coach body over it and over one side of the underframe upstand. With a sharp knife blade, gently ease the body over the underframe upstand on the other side. When it is in the correct position, screw it in place. Next add the bogies, putting a dab of paint on the retaining nuts to hold them in position, but not so firmly that the bogies won't pivot.

Place it on the track behind your favourite locomotive and admire.

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