

SER-Kits
Assembly Instructions
19th CENTURY 4-WHEEL CARRIAGES
based on SER/SE&CR prototypes

PLEASE READ TO THE END BEFORE STARTING THE KIT



Introduction

These instructions cover a number of different SERKits carriage kits. The photos are of different carriage types and may not exactly correspond with the kit you have purchased. The general method of assembly is the same.

Our carriage kits use high quality resin that withstands a degree of flexing. It can be drilled and filed with ordinary care without snapping unexpectedly. But take care around thin sections like window frames.

If you follow the instructions and take your time, you should be able to achieve a highly detailed model which will be an asset to your layout.

Saloon coupe carriages only

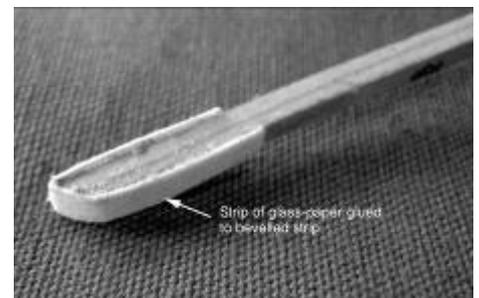
Note that the 'gondola' decorative projections are thin and can break off during assembly. Superglue later if that happens. Once assembled, the buffer stocks protect the projections.

Compensation

if chosen, is by the rocking method. However the rocker is not loose, but controlled by the flexing of the W-iron tie-rods which are of springy nickel silver rod. If you feel that compensation is unnecessary for 7mm Finescale 4-wheelers, either solder the rocking assembly solid, or discard the rocker and pack the axleguard etch with approx 3.5mm thick styrene or wood.

General methods

- The resin castings are made in two part moulds, and it's almost impossible to produce a casting without minor imperfections caused by air bubbles. I reject those that have too many. Look out for tiny gaps in the beading around panels and tiny holes in thin edges such as window frames. Fill with e.g. Squadron putty or Humbrol filler. Hold the casting up to the light, and if you can see an internal air-bubble, consider cutting a small hole in the rear, and pressing filler into the small void.
- I find the homemade tool in the photo very useful for cleaning up inside panelled areas where normal tools would remove detail. The strip wood is 3 or 4mm square.
- Check the tiny detail of cosmetic bolts. If you are bothered by any that have failed to cast, remedy this as follows: drill 0.55mm and superglue tiny protruding lengths of the supplied 0.5mm plastic rod into the holes.
- The whole kit can be assembled using two-part 5minute epoxy resin glue such as Araldite or Devcon, and/or superglue.
- For strength, etched parts are intended to be fixed to the resin body with small dressmakers' pins – 'Lill' pins – as well as glue. Perfectionists will square the heads.
- I recommend 'paint as you go', where suggested in the instructions. Leaving painting until after completion can cause difficulties, especially the interior and underside.
- This resin takes paint easily and primer is not needed (unlike etched brass). However a plain coat of paint is useful to show up flaws and gaps needing attention before you start the paint job proper.



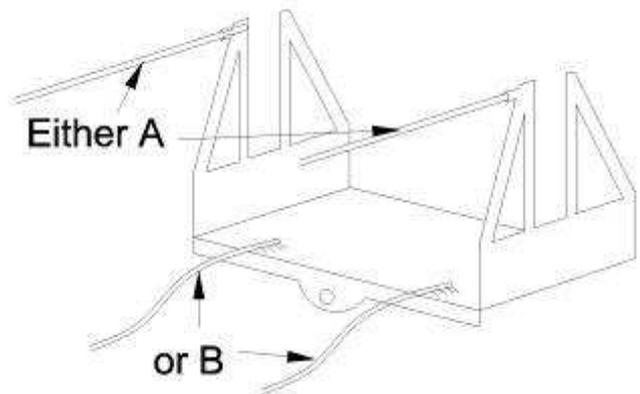
Spring, compensation and road-holding

The carriage and passenger van range are supplied with etched running gear with pivoted compensation. For good running, this must be controlled and there are two methods:

A: the tie bars supplied are 0.7mm N/S rod which is inherently springy and should be soldered or glued as shown. The most recent etches have little tags that can be curled round the wire.

B: alternatively, bend some of the supplied phosphor bronze wire to the S-shapes shown and glue or solder to the pivoted unit. Arrange the springs to bear equally on the floor of the vehicle.

Whichever method is used, only a little movement is needed, say $\frac{1}{2}$ to $\frac{3}{4}$ mm either side. You may also need to add some weight under the vehicle for road-holding. Of course this is true of any model vehicle. Equally, if your track is well-laid, you may decide not to use compensation and pack styrene or card under the unit to stop it rocking.



Applying detail

There are two main ways of arranging the castings so that they don't stop the rocker moving. The spring or combined spring and axlebox can be located with the wheel bearing and fixed to the W-iron with epoxy glue. It is trimmed if necessary and arranged to move up and down between the spring hanger castings.

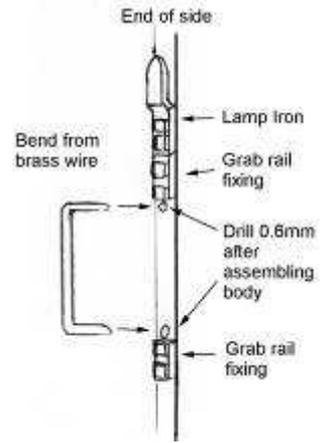
The SER/SECR combination oil or grease box (under the middle of the spring in the photo) has to be cast separately from the spring and in the 1872 horsebox kits the spring and hangers are cast with the solebar. In this case, the axlebox is glued to bearing and W-iron and moves up and down while the spring stays still.

The photo shows possible combinations using different castings from the Parts range, with different keeper plates from the etch.



Getting the resin castings ready

1. Clean up the castings, removing casting sprues from the edges of some castings. NOTE: the sides have 'sticking-out-bits' at the end. These represent lamp-irons and fixings for the end grab-rails as shown in the diagram. Do NOT remove.
2. Cleaning up round windows: use a craft knife and/or triangular needle file. Use a light touch. You can usually see best from the inside where to file to. The windows are the most fragile part of the casting, but are finally strengthened by the glazing. Look out for little resin spheres inside the window frames which will prevent the glazing lying flat. If any, chisel off with a square-edge craft knife.
3. End lamp-irons. See diagram on previous page. These are cast solid. It is possible to carefully saw out between the lamp-iron and body. If you get into trouble or want to use a lamp, order a set of cast lamp-irons and follow the instructions for Brake 2nds.
4. For Brake 2nds where lamps are important to simulate correct practice, cast lamp-irons are supplied as standard. In this case, file off the resin lamp-irons, leaving the upper grab rail fixing. Later, when the body is assembled, drill the ends to take the lamp-iron castings.
5. Take care with cleaning up the roof castings, making sure that you create straight edges.
6. For a snug fit, the partition+seats castings often need the bottom ends of the seats to be bevelled to clear the locating tabs cast on the sides. See diagram:
7. Once sides and ends are cleaned up, offer sides to ends and check the fit. If necessary run a file down the rebates. Parts of the sides are intended to stand proud of the ends to create panelling as in the scale drawing. On 'stage coach' style carriages, this panelling effect is above the waist only.



2nd Class carriages only

For some reason, the ends were tricky to cast, and I have had to make channels for the resin between headstock and the internal seats. These interfere with the floor, so saw a slot in these 'sprues' to achieve a fit. The sprues can't be seen through the windows of the finished carriage.

Brake seconds only

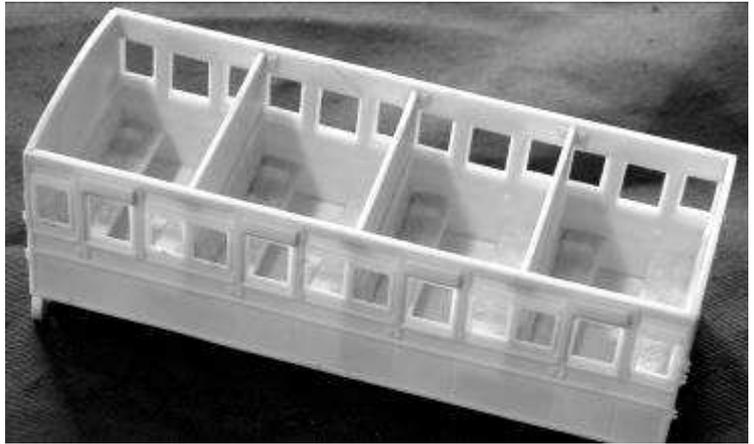
The partition between guard and passengers is from another kit, and although I modify it, please check the fit carefully. The other partition castings result in redundant seats in the luggage cpt. Of course these can't be seen unless you make the doors open...

8. Checking against the scale drawing, drill out 0.55mm holes for lill pins to fix etched parts such as steps and handrails as follows
 - a. horizontal commode-rails to left of 2nd class doors on the Compo, and beneath windows on Seconds and Brake seconds.
 - b. vertical commode-rails left of 1st class doors
 - c. grab handles on solebars
 - d. **on one end only:** drill for steps around buffer stocks, on panelling and for coachman's footrest. (Use the etched parts as templates for marking and 'pipping' the holes – don't trust the cast 'pips'.) Some carriages have steps at the other end, on the line where solebar joins body. Check with the drawing, so that you can drill for these now.
 - e. **Note:** drill for end grab rails after assembling the body but before painting.
9. Drill out 0.8mm for door handles. (On some carriages, these holes already exist).
10. On headstocks (buffer beams), clear buffer-stock holes with a 3.5mm drill, and the draw-hook slot with a fine needle file or 1.2mm drill.
11. If desired, drill 0.8mm for safety chain eyes 7mm either side of drawhook. These are on the etch along with the hooks. They improve the look of early vehicles but can get in the way of coupling up.

12. Make a trial assembly of the body 'box' using clamps, sticky tape or rubber bands. The floor may need a small amount of trimming so that corners fit snugly.

PRE-ASSEMBLY PAINTING

13. Paint inside of coach castings. See livery notes at the end of these instructions.
14. Also at this point, paint the wheel sets (not included): 'teak' centres, white tyres, blue axles.
15. Paint the floor. Ashford mixed up all their paint leftovers for this purpose and called it 'smudge' – a kind of mucky brown-grey. Printed card 'carpets' are supplied for 1st Class compartments.



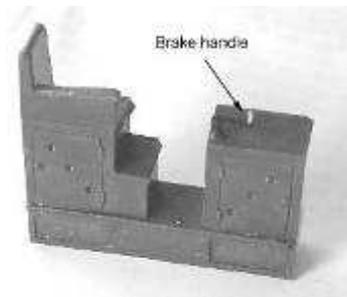
ASSEMBLING THE BODY

Recommended order of assembly:

16. Glue the two ends to one side.
17. When dry, glue the floor at the ends, but not the sides, holding the body down on a truly flat surface (preferably plate glass) until the glue has set.
18. Glue second side at ends, but not to floor. The reason for not gluing sides to floor is so that the partitions can be 'sprung' in between the locators.
19. Trial seat partitions with the body still on a truly flat surface. (1st/2nd Compo only: make sure you get the partitions the right way round to create 2nd class compartments with benches and 1st class compartments with seat dividers). Glue when satisfied with fit. I recommend leaving out carpets and saloon benches (1st class carriages only) until just before fitting the roof.
20. Drill ends 0.55mm x 1.5mm deep for grab-rails. (See scale drawing for position) Take care the drill does not wander and come out through the side.

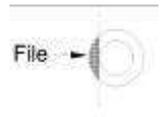
Brake seconds only

After painting, trial fit the guard seat/dogboxes casting, being careful not to force it in. Check with the scale drawing, drill and fit a short piece of 0.5mm rod to form a bearing for the brake handle. Paint the 'wood' and seat before gluing in place.



UNDERFRAMES

21. Buffer Stocks: Clean up the buffer stocks and using a round file open out the holes in the headstocks until the buffers fit snugly without forcing. File back the spigot to match the inside slot, or it will foul the solebars.

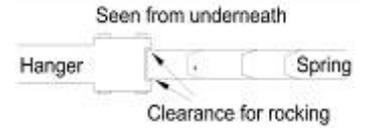


When gluing in place, it's worth passing a long 1/16 in. rod through opposite stocks to ensure the holes are in true alignment as the glue sets. Finally, clean up drawhook hole with fine needle file.

22. The photo shows what you're aiming for in the next stages.



How the cosmetic springs on the rockers are intended to work:



The springs will move up and down about 3/4mm through the gaps in the hanger ends.

23. Sight along the cast metal solebars, gently bending them straight if necessary (the alloy is pliable) and running a file over the top edge. Trial fit. I usually make the castings a little too long, so trim and bevel the ends so as not to force the end slots. (It's better than having solebars that are too short...) NOTE: As far as possible, trim so that the spring hangers are at the same distances from the ends. (Later on, the springs are trimmed to fit, so this is not crucial). **Do not glue yet.** (Why? – see instructions 26 onwards...)

Coupé only

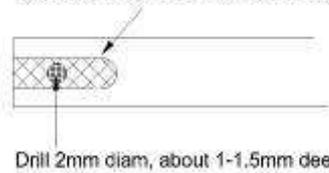
Note that the solebars are handed. Match with drawing before fitting.

24. When you come to fitting the buffer spring-wire, you will find it easier if at this stage you drill shallow holes near the inside ends of the solebars:

There are rear holes for the glue which will hold the lill-pins for the steps in place. Drill 1.2mm any that are blocked – careful, not too deep!

Cut or file to improve the clearance for the rocking cosmetic springs cast into the projecting spring hangers, as shown in the diagram at Instruction 22 above.

Clearance depression for buffer shank



Brake seconds only

The same casting is used for both solebars. As the actual solebars are not symmetrical about the centre-line (as they would be with a full 2nd) not all the holes are needed on both sides. These can be filled after fitting the steps. At this stage, offer one solebar to the drawing, and note that one cast bolt+washer interferes with a step hanger. File off and drill for the lill-pin fixing.

/Continued

W-IRONS AND WHEELS

25. Folds indicated by half-etched lines. Half-etch should end up *inside* fold. Do not solder the fold or you won't be able to spring in the wheels.

Brake Seconds only

Before bending, locator holes must be drilled in the W-irons for the slide brake cross-slide. See separate instructions later on. Historically, these vehicles may have been fitted later on with clasp brakes. If you choose this version, return the castings in their bag and the W-iron etch and ask for a W-iron and clasp brake combined etch.

26. Choose appropriate keeper plates, punch rivets and solder to bottom of W-irons. (For better appearance, drill out keeper plates, and fix with lill pins after squaring the heads.) Referring to the photo, fold up W-iron and trunnion assemblies, using 3/64" brass rod to pivot the rocking W-iron. Note that the rear of the W-irons have little etched slots to locate the tie-rods. Tin these with solder now. Later, when you fix the axleguards, make sure that the slots face the middle of the vehicle!

Trial fit the W-iron assemblies between the solebars. The rear of the solebars may need a little filing away, particularly so as not to bind against the rocker.

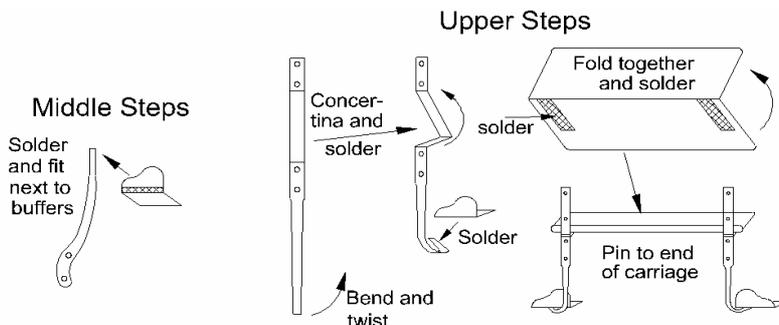
27. Spring wheels and bearings into the W-irons, then rest the carriage on W-irons on track, as in the photo. DON'T glue anything yet! Check that the buffer height is correct (23.33mm pre c1890) or to your own standard buffer height. Some packing between W-irons and floor may be necessary and can be glued to the floor now. Note that the exact height of the rocking W-iron depends on how you've folded the parts. I've found that there can be as much as 1/2mm variation between different attempts. (Etched kits rarely mention the variability of folds...) For packing use paper, styrene or cardboard.

28. Remove wheels and bearings from W-irons. Fit the solebars and W-irons, lining up W-irons with the bolt heads cast in the solebars. Recheck the rocker is free to move, and glue them all place.

29. I recommend that you now fit the end steps, side steps and step hangers (as follows below) before completing wheels and underframe. This is to help avoid painting problems.

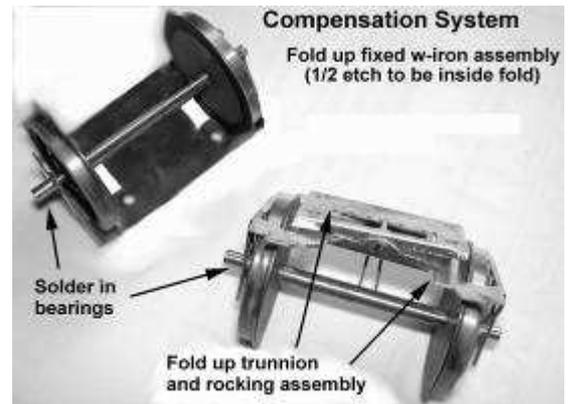
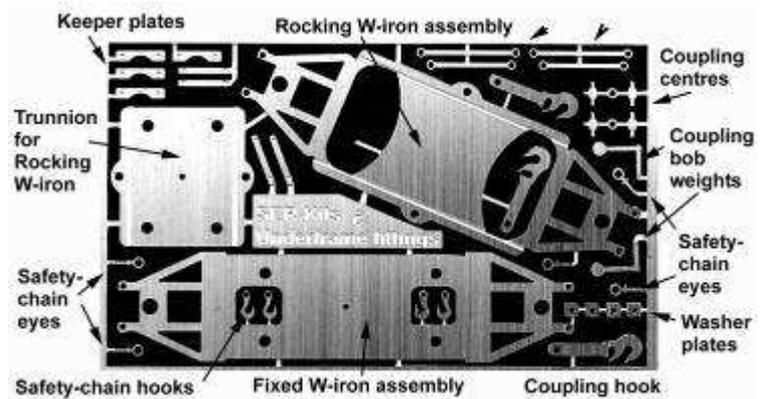
STEP DETAILING

30. Remove the appropriate end steps from the etch, bend and solder as in diagram. If the upper steps are done as a pair, it's easier to make them identical – see photo. Fix in place with Lill pins and superglue.

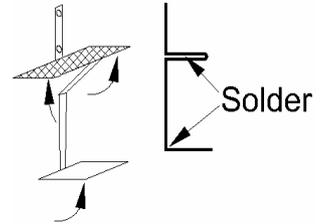


Brake seconds only

The irons for the upper steps have to be closer than the 1/2-etched slots in the folded 'board'. Align by eye, or replace the 'board' with styrene.



31. Remove underframe steps and running-board hangers from etch. There are three different sorts: single steps, single hangers and combined steps and hangers. Fold single steps and the end bottom steps (next to the buffers) – *the latter are folded away from the half-etch* so that the gridding is uppermost. Strengthen the folds with a little solder. Fold and solder the combined upper steps and running board hangers, as in the diagram. (With most carriages, there is only one each side at the end with the steps.)



32. Also at this stage remove the four safety chain eyes and square washers from the etch. Solder the eyes into the washers.

33. Referring to the scale drawing, glue steps and hangers in position with lill pins. Be careful to get the positioning correct – it's easy to be mistaken. (I know..!) Consider leaving them until after the body is painted/varnished. There are advantages both ways.

34. Solder the etched safety chain eyes into the square washers and glue into the headstocks, either side of the drawhook.

35. The photo shows how the detailing should look. In this photo, I had already added door-handles and wheels. I've subsequently changed the suggested order of assembly ...



36. Bend end and solebar grab-handles from 26 SWG brass wire and superglue into the holes drilled earlier.



37. At this stage, I recommend painting all the brass-work with etch primer. When dry, paint the whole carriage underframe black – solebars, headstocks, steps, W irons etc - inside and out. It's worth reading the following instructions and then considering whether to paint and varnish the body as well at this point.

38. When dry scrape off the paint behind the W-irons where you tinned them earlier for the tie-rods.

39. Spring in the wheels with their bearings. Centre and hold the bearings with a drop of superglue.

40. Form the W-iron tie-rods from lengths of 0.7mm N/S rod (chemically blacken if possible). Tin the ends, and sweat onto the tinned areas behind the axlebox keeper plates, after wedging the rocker unit level. The tie-rods also act as springs to control the rocker.

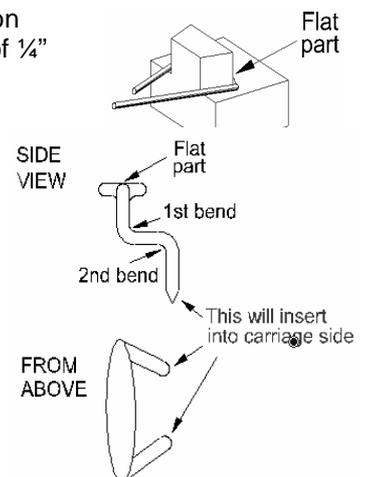
FURTHER DETAILING (Consider painting the body before this stage)

1st Class commode rails

41. These are a complicated shape and can simply be bent as U shapes. For more accuracy, There are two approaches. When available I supply etches to replace the first step. When not available, I suggest the following: First, cut 50mm lengths of 26 SWG brass wire, anneal midway (heat to red-heat, allow to cool slowly), and on each piece hammer a 6mm-long flat midway. I do this over an 'anvil' of a scrap of ¼" thick steel strip. They should look like the top diagram.



42. Make a former from a small piece of metal sawn and filed to the shape in the diagram (or a flat length with a rod soldered into a hole, and the rod filed. The size should be such that the wire flat fits nicely as shown.

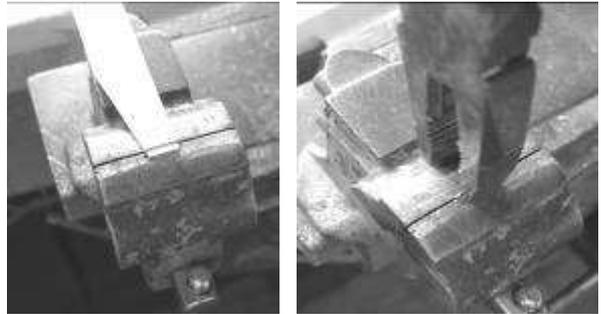


43. Place the flat against the former as shown, and pull the ends back to make a U shape (actually, bent a bit more than a U).

44. With fine-nose pliers bend dog-legs on either side of the flat. Finally bend in the legs and trim to fit. With a bit of practice, this comes quite easily, but be prepared to throw away some of the cruder attempts (as I did).

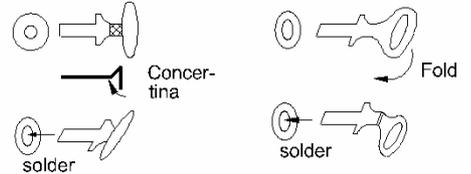
2nd Class Carriage commode rails

45. Made from 0.5mm brass rod, they require joggling. This is my method:
46. Bend one end and insert into its drilled hole in the carriage side. Bend the other end to fit. Then place in the vice using scrap 60 thou styrene packing for the correct depth. Bend the rail over with pliers as shown.

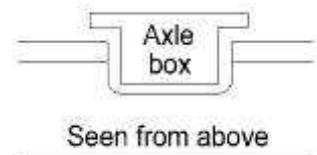
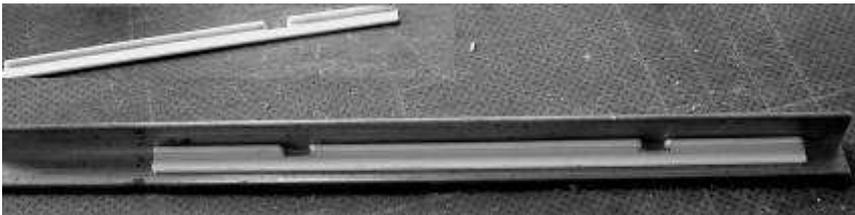
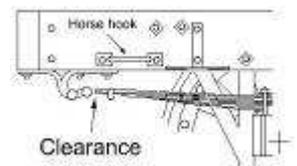


Handles

47. Fold and solder handles into washers. The solder will run to turn the flat profile into round. Glue handles into holes drilled earlier. **Note** that I'm now supplying castings for straight handles as these were probably iron or steel and handling would polish them silver.



48. Trial fit the cast axleboxes/springs on the top hat bearings, and cut off the ends of the springs until they just fit between the spring hangers. For the rocking axlebox, there must be just sufficient clearance so that the rocking springs can move up and down). Glue the castings to bearings & w-irons.
49. Make up running boards from pieces of 2x1mm styrene strip cut to suit the drawing and glued behind 4x2mm styrene strip. A piece of metal angle makes a useful jig. (If the styrene sticks to the metal, you're applying too much solvent – use a smaller brush.)

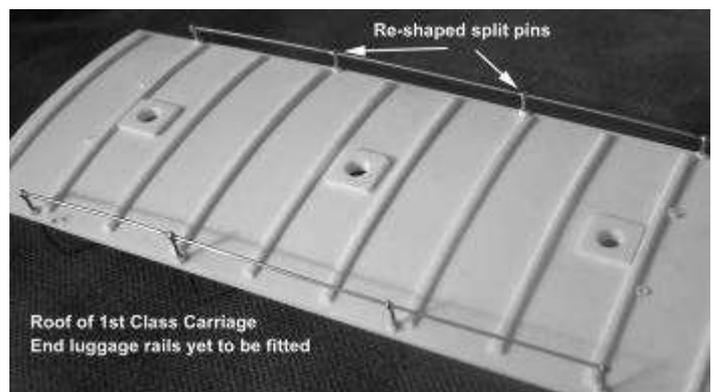


50. Offer the running boards to the carriage and file to fit around the axleboxes as in the diagram.
51. Paint carriage body, varnish, add transfers.
52. Cut glazing, using printout guide, but check the fit of each piece before gluing. Glue by using a wooden toothpick to first place a thin line of Evostik around the edge of each window-frame in turn.

ROOFS

For Brake Seconds, see extra page at end.

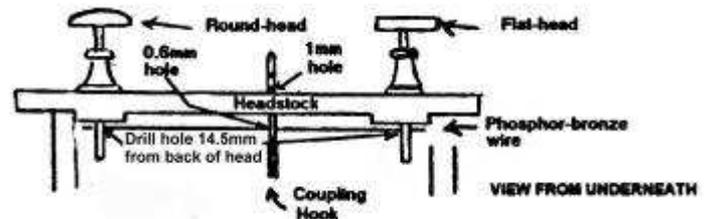
53. Until c1880, the roofs of non-brake carriages had curved wooden luggage bearing-rails and iron railings. Later, the roof rails and iron railings were removed, so that the only roof features were the end grab rails and the lamp-pots on their raised bases. For this version go to #58 below.
54. Sand sides and ends smooth & remove remains of sprue under one edge. Check for snug fit. Fill any casting bubble holes (usually around fine detail such as lamp-pot bases and stanchion bases).
55. Note that one end has little fixings for end grab rails –see scale drawing and photo opposite (of the rails on a passenger van). Drill 0.55mm where pipped and bend 0.5mm wire to fit.
56. Drill 0.7mm for luggage rail knobs, made by squeezing split pins with pliers around 0.5mm rod.



57. Cut side luggage rails from 0.5mm rod, thread on knobs, and glue knobs (called 'props' in an SER specification) into roof holes with superglue. Cut end luggage rails from 0.5mm rod or wire, and curve gently through thumb & forefinger. Thread on knobs, push into roof holes. Line up one end of rail with outer knob, then trim other end to fit against the opposite knob. Solder ends of rod to outer knobs.
58. (Plain roofs only) Cut lamp-pot bases from styrene and glue to roof. Drill through bases and roof 3.5 mm to take lamp-pots. Drill ends 0.5mm for the end grab rails, and form these from 0.5mm wire, adding little rectangles of styrene to complete, as in the photo with #55 above.
59. Paint roof white (for new) and handrails black. Separately paint lamp-pots black. I recommend postponing fixing the roof and pots until after the following:

BUFFERS AND DRAWGEAR

60. The kits have an etched screw coupling which is strong and easy to assemble, as well as etched safety chain hooks and eyes. If looks are more important than strength, I can supply castings for hooks, coupling screws and bob weights plus wire to form the loops. Formed this way, the couplings are to scale and quite tiny, but stronger than they appear. They work well for me in period trains of to 12 or 15 vehicles. Of course, sudden 'snatching' can break them – as with the prototype.



61. Clean up the buffers. (Note that two are flat-heads and two are round-heads. Check with the drawing to get them the right way round!) Some modellers have been worried about the fragility of these buffers, but the metal is pliable, and can be bent straight again after an accident! I've been using them for more than 20 years now. (The alloy is prone to pitting, so you may need to use filler)
62. The buffers should need little adjustment in order to slide easily in the stocks. If necessary, gently run a 1.7mm drill through the holes in the buffer stocks, and scrape the buffer shanks along the length with a craft knife, rotating the buffer between each scrape. Don't file the shanks across the width – the roughness will stop the buffers sliding smoothly. The buffers should slide easily in and out. If not, your derailment rate will rise!
63. Measure 14.5mm along the shanks from the back of the buffer head. Drill a hole 0.6 mm (No 73) right through each shank to take the spring wire. If you're squeamish about drilling through a narrow rod, make a simple jig from a couple of inches of 1/16" I.D. brass tube. Drill the hole through the brass tube at the correct distance from the end. It's then a simple matter to feed each buffer into the tube for drilling. This jig is also useful for protecting the shank if you paint the buffer heads before assembly (rear – black, front and edge – teak colour).
64. The kit has both etched and cast drawhooks (coupling hooks). The latter look better. If you choose to use them with the etched screw couplings, you'll need to make a saw-cut into the front hole in order to slide the top link in, and close it with glue or 70° solder.
65. Clean up the hole in the resin end for the Use either a fine needle file, or a hand-held 1mm. drill. The hook should slide smoothly in and out without sticking.
66. Run the phosphor-bronze wire through your fingers to straighten it, then cut off two pieces 41.5 mm long. Checking with the diagram, slide the wire through the hole in the coupling hook just behind the headstock, and then into the hole in the right-hand buffer shank. The wire can now be pulled back into the hole in the other buffer shank. (It's much easier to do than explain)
67. Solder the wire to the hook, or use a blob of resin glue. When set, the ends of the wire can be bent to touch the headstock so that the buffer heads protrude fully and the draw-hook is held back by the spring.
68. Solder or glue bob weights into the holes in the coupling centres. Fold coupling links around the coupling centres, insert long link into the slot in the coupling hook, and fold lip down to hold.
69. Safety chains: Insert eyes through washer plates and glue into holes drilled earlier. If modelling vehicles pre-1890, hang safety chain hooks from eyes with short lengths of chain cut from the length supplied. The safety chains were often looped up out of the way by threading the hook through the eye.

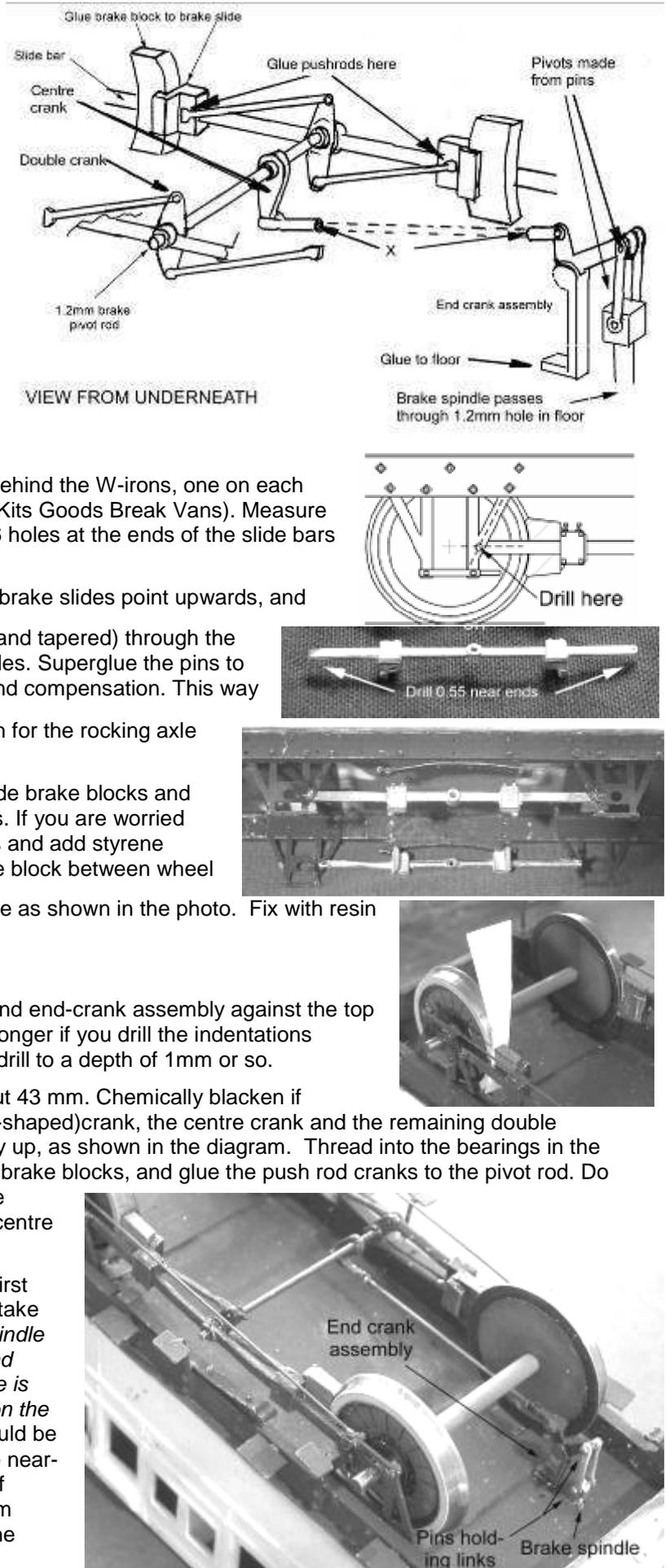
FINALLY:

70. Glue roof to body with Evostik. Glue in the lamp-pots – be warned that the catches sticking up are fragile.
71. Sight along all the steps and straighten them up where necessary.

SERKITS

Extra instructions for Brake Seconds. 19th Century SLIDE BRAKE

1. Before starting, study the vehicle scale drawing and the sketch opposite until you understand how the brake works.
2. Paint all items black, except brake blocks which were made of wood, probably teak. Note that leaving the painting until after assembly can make life difficult.
3. Drill 0.6mm holes in the W-irons on a line with the axles. These are to pivot the brake slide bars
4. Clean up the slide bars. They are to locate behind the W-irons, one on each side, so file off the spigots (intended for SERKits Goods Break Vans). Measure between the holes in the W-irons and drill 0.6 holes at the ends of the slide bars the measured distance apart.
5. Make sure the little 'adjusting screws' on the brake slides point upwards, and push dressmakers pins (cut-down to 2.5mm and tapered) through the holes in the W-irons and into the slide bar holes. Superglue the pins to the slide bar, but not to the W-iron if you intend compensation. This way the slide bars can move up and down enough for the rocking axle to rock.
6. Support the vehicle upside down. Choose wide brake blocks and file them down a little so as not to foul wheels. If you are worried about electrical shorts, choose narrow blocks and add styrene strips to widen the blocks. Wedge each brake block between wheel and slide with a narrow strip of card or styrene as shown in the photo. Fix with resin glue or a drop of superglue.
7. Before continuing, identify the centre-crank and end-crank assembly against the top diagram. Fitting the pull-rod is easier and stronger if you drill the indentations (marked X in the top diagram) with a 0.8mm drill to a depth of 1mm or so.
8. Cut the 3/64"/1.2mm pivot rod to length, about 43 mm. Chemically blacken if possible. Thread on to it in order a double (Z-shaped)crank, the centre crank and the remaining double crank. Make sure they are all the correct way up, as shown in the diagram. Thread into the bearings in the slide bars, and glue the pushrods behind the brake blocks, and glue the push rod cranks to the pivot rod. Do not glue the pivot rod into the bearings, or the compensation will not work. Do not glue the centre crank either, for the time being.
9. Get ready to fix the end-crank assembly, by first drilling a 1.2mm hole into the vehicle floor to take the brake spindle. *(In the real vehicle, this spindle passes up through the near-side dog-box, and terminates in a winding handle. As the handle is rotated, a thread on the spindle lifts a block on the end crank to apply the brakes.)* The hole should be 8mm from the headstock and 11mm from the near-side solebar (The solebar furthest from you, if you're looking at your model as in the diagram above.) Glue the end crank assembly as in the photo.



- Cut the 0.7mm pull rod to fit between end crank and centre crank (about 39mm).
- Cut down two dressmaker's pins to form pivots for the pair of straight links to be fitted between end crank and the block on the bottom of the gear spindle.

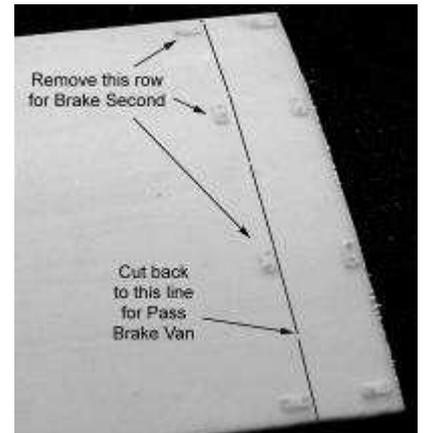
ROOFS FOR BRAKE SECONDS

- The roof casting is dual purpose and is also used for some PBVs.

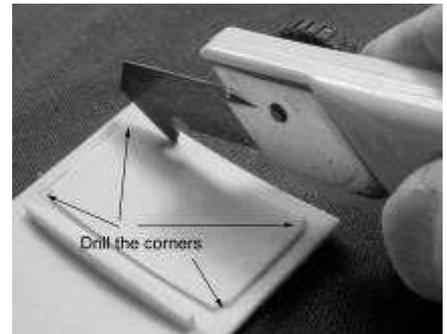
File off the inner row of grab handle fixings. Drill the centre of the lamp-pot base 3.5mm/1/8 inch and trial the lamp pot in position. Best not to fit yet.

NOTE: if you leave drilling until after the roof is fixed, you'll get out-of-scale swarf in the compartments!

- Trial the roof on the body, making any necessary adjustments. DON'T wait until you've cut out the birdcage hole, because the roof is fragile at that stage.
- Drill 0.55mm holes for the end grab-rails (commode handles) in the little cast rectangles, leaving the bolt heads. (Check with the scale drawing and the photo at #9 below if you're not sure.)
- If you haven't done so already, fold and solder the 'birdcage' (guard's observatory) halves together. Bevel the bottoms of the sides to match the end curves.
- Trial the birdcage in the recess in the roof casting. Note that the roof extends into the guard's space in order to cover the last passenger compartment. To achieve a snug fit, it may be necessary to enlarge the recess by scraping with a square-head craft knife blade. I find you can get best end result by scraping most from the right-hand side as you look towards the rear.



- Prime and paint the birdcage while continuing with the roof.
- NOW you can remove the birdcage hole! Turn the roof upside down, and drill (2mm diam. or so) the corners of the thick slab where quadrants have already been cut away. Use a scrowker to cut grooves around the slab which acts as a cutting guide. Cut the rear first, then the sides and finally the front, otherwise you may fracture the resin. Make the final cuts with a sharp craft knife. Be careful not to drop the roof: the sides of the hole are fairly fragile until the birdcage is fitted.
- Trial the roof on the body, and use a file to clean up the edges of the hole. The sides of the hole can be caught in the vice for filing, even the rear curved part. This will spring back into shape afterwards.
- Bend and fix the end grab rails. (The photo shows one of the rails on a passenger van.)



- I paint the main and birdcage roofs at this stage (white or dirty white), also the grab rails and separate lamp-pot (black). (The little sticking-up catch on the lamp-pot is fragile).
- Go back to the section on fitting buffing and draw-gear. Then return to the following:
- Glue the roof in position. Glue the birdcage into the recess, and add glazing. Check the curve of the styrene roof, rolling it more between fingers or with rollers if it's become flatter in the box. Glue in position.
- Glue the pre-painted lamp-pot.

- The rear lamp casting will need a slot drilled out to fit the lamp-iron, or else file the rear collar away and replace with a square U-shaped piece of thin metal (shim). Drill either side of the lamp chimney 0.55mm and make a tall U-shaped handle with wire. I believe the lamp body was painted red as, of course, was the glass. The lamp should be on the right-hand side of the carriage, looking



towards the locomotive.

HISTORICAL NOTE:

These carriages are typical of 4-wheelers used in the mid-19th Century. Long trains of them were used on main lines, and short ones on branch lines. On the SER these carriages formed part of the express train involved in the Staplehurst accident which could have killed Charles Dicken or led to the discovery of his affair with a young actress. In the 1880s the carriages were replaced on main lines by 6-wheelers and bogies, while the 4-wheelers continued in use branch lines such as those to West Wickham and Hayes, Hawkhurst, Westerham, Sandgate, etc. They lasted into the early years of the 20th Century before withdrawal. A few survived longer as Engineering and Maintenance Dept. stock. A photo of the construction of the Bexhill branch shows one of the Second Class carriage being used as an Engineers carriage, still with its roof and luggage rails – looking just like the kit.

Body Modifications

Presumably as a result of amended Board of Trade regulations concerning air space per passenger, some of these 4-wheelers had the roof raised later in their lives by between 4 and 6 inches, and this can be seen in some photos. It's a reasonably simple job to make the risers from 1.5mm styrene.

Similarly, after a number of horrible amputations when people fell between the platform edge and carriage, the single iron steps (etched brass in the kit) were often replaced with a running board. Again, this can be made out in some photos, particularly of passenger brake vans. 1mm styrene strip can be glued to the steps, which may be trimmed down before fitting.

Vacuum braking and fitting to the kits

The type of vac. brakes is related to the changing use of carriages. It's a thorny question, and hard to tell anything from photos.

- In the 1870s the SER adopted Smith's non-automatic brake with its distinctive double connecting pipes between vehicles. These would have first been fitted to main line trains, and it's not possible to know how many of the kit 4-wheelers would have been fitted. (Of course, some dedicated historian – if one still exists – may discover a register.) Fitted locomotives not only have the double pipes, but distinctive ejectors on the side of the smokebox, disappearing into it near the top, to make use of the (rather weak) vacuum in the smokebox.
- Also during the 1870s, moulded panel stock was being introduced on main lines, starting with 4- and 6-wheelers. I suspect that the 1860s practice of several brake vans per train continued, and suggest that the intermediate carriages were piped and only the brake vans fitted with vacuum-operated clasp brakes. (Previously, passenger brake vans had slide brakes.) By the end of the 1870s, Ashford drawings start to show ordinary carriages fitted with the clasp brake and the distinctive Smith's bellows vacuum cylinder.
- From 1892, the SER began to standardise on the more effective automatic vacuum brake with the end stanchions well known to the majority of modellers. The changeover would have been fairly quick for clasp brake stock, really only replacement of the vacuum cylinder. To begin with these seem to have been simple cylinders rather like those on locomotives, but later they were convex ended and pivoted. Photos of boat-train bogie carriages show it fitted from the outset, but it would take a while to spread though carriage sets across the system.
- Close coupled suburban stock, 4 wheelers built by Gloucester in the late 1890s clearly had vacuum-operated clasp brakes from the outset, which would require fewer or no brake vans, as brake compos had been in use for a couple of decades.
- My kits could represent a branch line train, e.g. Sandgate or West Wickham branches, and up to the mid-1890s the brake vans clearly have Smiths non-auto vac brakes (or in one or two cases, also the auto, one being fitted, the latter piped I assume, as the locos have Smiths). I think it unlikely that the passenger carriages (2nds, Oldbury, Compo etc) would have been fitted, only piped, so that the end vehicles would be connected to the loco ejector.
- How long it took these branch line sets to be fitted with the automatic vacuum brake (if at all) is impossible to say, as the photos we have are not easy to date with any precision.

Castings for various combinations of brakes can be supplied as extras (see the SERKits catalogue).

If you wish to fit the Brake Second with clasp brakes, please check at the time of ordering. Instructions for fitting can be found in the EB PBV92 Instructions pdf.

Painting and lettering

EXTERIORS PRE-1885

The lower panels are a 'warm rich brown' and the upper panels 'a pale yellowy flesh colour' (definitely not the pale pink often used by modellers on LSWR stock.) Ends are all brown. See the box cover for the general idea, but do not necessarily use the pictures as a definitive guide because of the different lights they were photographed in. As for the Oldbury 1st carriages, the original contract states that the upper panels were black. Whether they were supplied like this or whether Ashford repainted them in the standard 'pale flesh' is an open question. Certainly many early railways followed horse-carriage practice in this respect and upper panels were black, copying the black leather hoods of road vehicles. However, an 1840s print of SER carriages shows pale upper panels.

As to the exact shades of brown and 'flesh', there is no definitive answer. It is likely that paint was mixed up by eye and differed according to the carriage manufacturer. The finish on 2nd and 3rd class carriages would be cheaper and appear cheaper for obvious reasons. This gives plenty of licence to modellers. I've experimented over the years, and there is variation amongst my vehicles, which I believe is more accurate for the period than a single 'corporate' look.

As a guide, for 1st and 1st/2nd compos, I mix my brown from Humbrol Wine Red 73 with Humbrol Red 60 in the approx. ratio 50-50 and then a little black.

For 2nds, I've experimented with Humbrol German Camouflage Brown 160 plus black, and also red + blue + black. I aim for a (plain) chocolate brown, not too dark - a mid-brown neither orangey nor crimson. I paint the upper panels white with a little yellow and even less red mixed in.

Headstocks and solebars and ironwork were painted black (unlike wagons) and varnished. Roofs were originally white, so I use white with dashes of black and yellow for a bit of weathering – all different!

The wheels were to Mansell's patent, with varnished teak segments between hub and tyre, so I paint the hub black, the segments 'teak' and the tyres (weathered) white, according to patent and photos. The axles were supposed by patent to be painted blue. This was an expensive pigment and was presumably intended to show that these were classy wheels.

From 1872, the lower panels of new stock were painted a dark crimson lake (see below). Whether old stock was changed is an open question.

EXTERIORS POST-1885

After c1885, carriages were repainted in a single overall colour that is recorded as dark crimson lake or chocolate. I use a purple-brown undercoat (SR goods brown with a little extra red, or Humbrol Wine 73 + black) and cover this with varnish into which is added a tiny amount of Precision Paints SECR crimson lake or Humbrol 73. This allows the undercoat to show through, but tinted by the crimson. Practise on scrap styrene first.

Using this approach, vehicles look dark crimson lake or chocolate, depending on the light they're viewed in. To my mind, this is how it should be.

However, Dick Moger who models the SECR in Gauge 1 uses a car body paint, 'Citroen opera rouge', and having seen the results, in my opinion this is equally good. (See *Invicta*, the South Eastern and Chatham Railway Society Journal, No.72, Autumn 2009) The choice is yours.

After the body colour has dried, the panels should be lined around in gold – or probably yellow on lower-class vehicles. Various gold lining pens are available in stationers – check these out.

LINING TIP

The narrow brown lines on the top panels are easy to mess up. If you don't trust your lining skills, it's probably best to omit them. However, suitable transfers should be available in 2017. For hand lining, here's my method:

- First rub over with a glass fibre pen to ensure that the surface is smooth. Tiny imperfections can ruin the lining.
- Use a 0.3mm Rotring pen with brown ink mixed from red and black to suit the body colour. If it's not an exact match, it really doesn't notice. Wipe the pen frequently to avoid blobs.
- Using a ruler, draw lines near the top and bottom of the panels, but don't yet line the door ventilators - this avoids smudging.
- Thicken up the lines by a second stroke overlapping them. You can overlap top or bottom of the line, so that the final lines appear equally distant from top and bottom of the panels. By eye, put dots at each end of each panel where you think the middle lines should go. Draw the middle lines across these dots, and thicken either top or bottom with an extra stroke or two so that the spaces are equal on either side.

- Draw single lines along the door ventilators, between the sections. It helps to slant the pen a little upwards to get in between. The match to the panels is not exact in the prototypes either.

LETTERING

Specific SER transfers are now available from SERKits.

INTERIORS:

First Class:

I paint the woodwork of sides and partitions in mahogany colour and upholstery in blue or crimson (both seem to have been used). I make up the crimson from Precision Paints SECR crimson lake (because I have a lot of it) + Humbrol matt red no.60.

Second and Third Class:



The originals were painted cream and then grained in a darker wood colour with graining combs to simulate more expensive wood. I mix up orange, white and black to make a colour similar to old varnished pine. (I do not use scale graining combs, as the tooth pitch would be about 0.07mm!) The seats were covered in 'drill'. I do not know if this meant colour as well as cloth in the mid-19th Century, so I interpret it as light brown. In Third Class the seats were – according to an eye-witness – bamboo slats.

Brake Seconds and Thirds:

As above. The guard's compartment was possibly whitewashed but may have been comb-grained.

FINALLY:

I hope you've enjoyed assembling this kit. If you've had any problems, let me know, and I'll try to find a solution for later kits. I'm hoping at some stage to detail the SER's fairly complicated lettering and numbering arrangement which no-one has yet chronicled. In the meantime, modellers will need to rely on photos.

If you want to know more about the SER, the LCDR and the SE&CR, why not join the South Eastern and Chatham Society? Website address: www.southeasternandchathamrailway.org

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