

CK01 Stanier tender chassis 7'6''x 7'6''wb with CSB, EM/P4

This range of replacement chassis has been designed to fit Bachmann and kit built tenders, they provide an easy to build, fully sprung and detailed chassis which will aid locomotive conversions to EM and P4 gauges. The suspension system is of the Continuous Springy Beam type, referred to as 'CSB'. Further information on the CSB suspension system and it's uses can be found on the Central London Area Group (CLAG) website. The chassis kits are designed for CSB only and include all the parts needed to construct a working chassis. The hornguides and axle bearings have been kindly supplied by 'High Level'. You only have to provide the wheels for your chosen gauge. A few detailing parts are included on the etch which you may want to use.

General notes

Please read the instructions carefully and 'more than once'. Study the diagrams until you become familiar with all the parts and the assembly sequence. We have tried to make these instructions comprehensive but as easy to follow as possible both for the average modeller and expert.

Please remember, soldering irons are hot, knives are sharp and there are jagged edges on etched parts!

Don't be tempted to cut the parts from the fret until they are required, this will make identification easier. Small holes can be drilled while the parts are still in the fret. The holes are etched slightly undersize so they can be drilled or reamed out for a good fit. As with any etching process there is a 'cusp' along the edges of the parts. It shouldn't be necessary to file the cusp to achieve a good fit of the parts but the edges that are seen would look neater if tidied up. I use a 25 watt iron with a small tip of around 1/1.5mm, 145 or 188 degree solid solder and a separate liquid flux. Use a small paint brush to apply some flux to the joint and then hold the iron (with a small amount of solder on the tip) on the joint for a second or two then move it slowly along the joint, you will find this technique produces a neat joint. Also invaluable are some aluminium spring clips or clamps, you will find them in the well known high street chemists for holding one's hair in place... After each soldering session it is recommended that you wash the flux off with bathroom cleaner. If you do have a problem with any part of the build or suggestions for the instructions please let us know.

Chassis assembly

As the basic chassis can only be built one way we will start with the main etch (1), this consists of a top plate and two side frames which are joined by long dotted bend lines. Remove this etch from the fret taking care not to lose the few parts that are tagged to it, leave the strips of etch at the bottom of the hornguide slots as this strengthens the slots whilst construction takes place. If you're fastidious you can gently file around the edges of the etch to remove or just 'soften' the cusp.

Open out the larger holes (14 in all) in the side frames to 0.7mm remembering to take the rag off the edge of the holes, especially the holes that the spring wire anchors (knobs) fit into. Drill out the six holes 0.45mm at the top of the hornguide slots and take the rag off once again. Leave the four small holes at the extreme ends of the side frames for the moment.

On the top surface of the chassis you will see a horse shoe shaped half etched area at the front, this is to give options for the loco coupling, if reusing the plastic pin or fitting an upward facing brass pin, this area is to be removed. For a downward facing pin, solder the pin through both the top plate and part 3.

Now, for those who have bending bars, grip the side frames with the legend 'Lanarkshire...' uppermost and bend the top plate up to 90 degrees, the bend line is on the inside, use a piece of smooth wood to assist bending evenly. If you haven't got bending bars then cut two pieces of approximately 12 x 20mm soft wood 100mm long, place the side frame between these and gently grip in a vice. Using another piece of wood bend over the top plate to 90 degrees, repeat for the other sideframe. The etch should bend easily so don't over do it. Once the end spacers are in place the frame is strong enough to do the job so it's not necessary to run solder along the bend line but if you feel so inclined then it's up to you.

Rear spacer (2) can now be fitted, this part has a lug to take a 'Jackson' wire coupling, if this is not required cut off the lug flush with top of the spacer, the locating lugs should hold the part in place while soldering but a spring clamp would stop any miss-alignment. The front spacer (3) must be left out until the suspension anchors are fitted.

Attaching the hornguides, overleaf/

Attaching the hornguides

Separate the hornguide etches and assemble as per the High Level instructions, drill out the small central hole in the top of the etch and using a piece of 0.45 wire through this hole and the corresponding hole in the sideframe locate the hornguide correctly in the slot on the inside of the sideframe, use clamps on both edges making sure the hornguide sits vertical and very lightly put two solder tacks on the edges near the tips, check the hornguide is still vertical, move the clamp slightly for the next procedure. Now with more flux and solder run the iron along the joint from the 'top' of the hornguide to the tip, repeat on other edge. Use the minimum of solder to avoid flooding the sliding surface of the hornguide. You can now remove the strip of etch left across the tips of the slots. If necessary use a pointed tool and/or a blade to remove any traces of solder from the sliding surfaces of the hornguides. Fit the rest of the hornguides and try the bearings in place rubbing the side faces on emery if necessary and, when they all slide freely, mark them so they are replaced in the same positions later, I drill one pip on the front ones in such a way that they can also be distinguished left from right, two pips on the middle bearing and so on. Solder on the CSB tags as per the 'HL' instructions.

Fitting the CSB anchors

The CSB suspension system is designed into this chassis so there is no marking off to do, you've already opened out the holes to accept your anchors, which are basically a strongly made handrail knob. First check the knobs by sliding all eight on to a piece of suitable wire, now, looking along the wire it will be easy to spot any that are misaligned, if so try sliding that one off and turning it 180 degrees, if it now aligns mark all the knobs on one side with a marker pen so that they can be fitted the same way up. These knobs are usually very accurate but if there is a problem please return any faulty ones to us for replacement.

To fit the anchors (knobs) in place slide two onto a piece of suitable brass wire, (keep the spring steel wire away from soldering operations as flux can cause rust to form) now place the anchors in the holes inside the sideframe, double checking you've got the correct holes. Using the spring clamps, clamp the wire tight to the sideframes on either side of one anchor, this procedure ensures that the anchor is tight to the frame and in alignment with the next anchor, now solder this anchor from the outside of the chassis observing the solder flowing through to the inside under the anchor flange. Continue fixing the anchors using the wire for alignment. Trim the tail of the anchors and file down to be neat, it's not necessary to file flush.

The front spacer (3) should be bent to 90 degrees (bend line inside) and sprung into it's slots between the sideframes, solder this now.

Trial fitting to the tender body

Now would be a good time to try the chassis in the tender as there's no delicate bits to get in the way. If it's a kit tender where the floor of the tank is level with the footplate edge then the chassis can fit straight in and the fixing screws can be either the self tappers provided or by drilling two holes above the slots of the chassis and soldering two 2mm nuts on the inside of the tender floor for your own screws to fit. The self tapping screws could be used if retro-fitting this chassis to an already built model, marking or drilling the holes through the slots in the chassis with the drill provided.

If fitting to the Bachmann Stanier tender some modifications are needed.

First remove the Bachmann wheel-sets, remove the rear coupling, undo the screws holding the body on, the body should now lift off the Bachmann frames. Remove the ballast weights. Now cut all the brake gear off the frame moulding and flush any areas that stop the chassis from sitting down properly, use a dental burr for this.

The plastic coupling pin can be re-used if required but check it isn't holding the chassis up off the floor, pare a sliver off the length of the pin if unsure.

The holes in the Bachmann frames for the chassis fixing screws can be marked and drilled using a 1.7mm drill (not supplied) through the slots in the chassis. The original rear body screws can be used to hold the plastic frames to the body and then the new chassis is secured by using the supplied self tapping screws in the new holes. When putting the screws in only tighten them lightly as the plastic is relatively thin.

Replace the ballast weights, turning them round to avoid the chassis screws coming through, the ballast weight screws may catch the chassis on the inside so either shorten them or fit a couple of washers.

Detailing parts included on the fret are lifting eyes for the top of the tender as well as the journals or flanges which should be on the mainframes at the ends of the brake and water scoop shafts, these are partially hidden by the front steps.

So, back to our chassis.

Brake cross-shaft

Remove the brake cross-shaft brackets (4-5) and detail parts (6)x2 from the fret, you will find that parts (4-5) are marked left and right, this is because of the detail of the journals. Also look closely at the detail parts (6), you will see that when parts (4) and (6) are soldered together the detail of the bolted journal comes together. Part (5) is made opposite hand so the added detail is on the 'inside' of both brackets. Using a cocktail stick to align the holes and spring clamps to hold the parts makes the soldering job easier.

Once soldered, open the journal holes out to 1mm for the cross-shaft. File the seen edges of the etch to tidy them up then fit one bracket in place behind part (3) and tack it along the base, fit the other bracket checking that the detail pieces mentioned earlier are facing the inside, cut a piece of 1mm rod 24mm long and push this through the journal hole checking that it sits square and level, file a little off an edge of the bracket in the right direction if necessary, tack this bracket then check the alignment again. At this point I suggest you try the nearest wheelset in position checking that the flange doesn't rub on the brake cross-shaft, it should be 0.5mm clear with EM standard flanges. Trial fit bracket stiffener (7) it should push right down till the top is level with brackets 4 & 5. If all is okay solder up the brackets starting at a point away from the first tack. Don't solder the shaft just yet.

Remove the two halves of the steam brake cylinder lever (8) from the fret and solder together using the cocktail stick technique then open the main hole out to take the 1mm rod, to add a bit of detail open out the hole at the small end and fit a piece of 0.45 wire to represent the pin. Take the cast steam cylinder (C1) and glue or solder with low temperature solder into the hole in the top plate, it is easier if you first cut the spigot down to about 0.5mm so there is less cleaning up to do on the top surface of the chassis. Now you can push the 1mm cross-shaft through the first bracket, place the cylinder lever on the shaft locating it in the top of the steam cylinder then push the shaft through the second bracket, now, clamp the journal detail just in case it moves whilst soldering the shaft, centralise the shaft (it is still over long remember) and solder it carefully in both brackets. Hold the lever with tweezers and solder lightly to the shaft. The other levers are fitted later.

Try the chassis in the body and mark the shaft ends for cutting so that the chassis then sits centrally in between the tender mainframes, the shaft doesn't have to touch the frames as it won't be seen.

Brakegear

The brake hangers have a folded portion at the top which spaces the hangers the correct distance from the frames these also have a small projecting tab of about 0.4mm, for P4 models these tabs are left in place, but for EM, the tabs will need to be filed off.

There are six brake hangers, three left hand, three right hand (15-16) and six brake blocks (17), open out the holes in the centre for a 0.45 wire and use this to locate the block on the hanger, (the opposite side to the bend line). Clamp the block in place and solder from the brake block/wheel edge, the solder will run through and fix the wire also. Trim the wire flush at the rear and leave about 0.5mm on the front face to represent the pin. Open the holes at the top and bottom of the hanger to take a 0.7mm wire and bend the top portion to 90 degrees with the bend line to the inside. Cut 4 pieces of 0.7mm wire to approximately 25 mm long.

Remove the brake pull rods (18) from the fret. You will notice the lugs on the pull rods, these are for the front frame cross member to be fitted later. Gently file the pull rods along the edges to remove the cusp, hold one in a vice, do a bit at a time and move it along to do the next bit. Open out the three single holes on each to suit 0.7mm wire and the four grouped holes at the forward end to 0.45mm. Remove parts (19)x4 from the fret and solder onto both sides of the pull rods near the front end, there are small nicks in the rods to show where they go, they represent the screw adjuster on the pull rod.

Now for the fiddly bit, take two of the brake hangers and two pieces of 0.7mm wire, thread one of the wires through the hole near the rear of the chassis. Now thread the brake hangers on and feed another wire (which we'll call a crosswire) through the small end of the hangers. You are now going to need all your fingers so prepare the soldering iron with drop of solder. Swing the hangers and cross wire over the rear of the chassis and rest the crosswire on the top of the chassis, hold with a finger and slightly pull towards the front, spread or pinch in the hangers so they are tight to the chassis side frames and parallel to each other, still holding down with your finger, solder the wire where it comes through the big end of the hanger, do the same on the other side so you end up with the two hangers swivelling in the chassis but the crosswire under your finger can still be removed. Trim the wire just soldered to about 0.5mm proud of the hanger and tidy it up although it's not seen.

Take the pull rods, thread a 0.7mm wire through rear end holes and lay the rods on a flat surface. A spacing jig with two notches is to be found on the fret along the top edge, use this jig to set the pull rods the correct distance apart on the crosswire, check the pull rods are perpendicular to the wire, solder the rods to the wire. repeat this process for the other crosswires.

Locate the pull rod levers (9)x4 and spacers (10)x2 on the fret, open out the larger holes to 1mm and the small holes to 0.45mm, remove from fret and feed onto the cross-shaft as shown on the diagram. Also on the fret are two 'Stanier set-up' jigs (30) again open the holes out, at the big end 1mm and 0.45mm and the small end 0.7mm. These jigs fit on both ends of the cross shaft and are used to set the angle of the levers.

Continued overleaf/

Take the pull rod assembly and feed the end crosswire through the rear brake hangers, trim one end slightly if too long, ensure the projecting lugs are pointing toward the chassis. Now thread the set-up jigs on the brake cross-shaft and the first crosswire (see diagram). Feed a 0.45 wire through the jigs, the levers and the first hole in the pull rods, slide the levers together and sit the spacing jig on the pull rods. Check the alignment of the levers and the pull rods with the chassis and very carefully with the minimum of solder tack the levers onto the brake shaft, it's maybe a good idea to hold the group of parts together with a clamp or tweezers.

If you do solder the whole lot up solid it's not the end of the world, it just means the brake gear isn't removable.... Remember to take the set-up jigs off but leave the 0.45 wire in place.

At the rear end, centralise the pull rods with the brake hangers and solder the crosswire in the hangers.

The pull rods are now in their correct position.

For the rest of the brake hangers, thread a 0.7mm wire through the hole the chassis, place brake hanger on this wire and the crosswire, hold in alignment with tweezers, tack the small end onto the crosswire on the pull rods. Now pull the wire out of the chassis till it is only just visible on the inside of the chassis, tack this wire to the top of the brake hanger, trim off wire as before, repeat for the other brake hangers. At the rear, the first wire to be fitted needs to be cut to make the brake gear removable, use a pair of side cutters and snip this wire roughly in the middle, you should now be able to pull the hanger out from the chassis enough to cut the wire again just leaving about 0.5 or 0.6mm showing on the hanger similar to the other hangers, do the same on the opposite side. So now you should have the brake gear assembly that can be clipped into place, you may need to bend the hangers in slightly so they are tight to the chassis when fitted.

That's the worst bit over with.

Water Pick-up gear

Remove the water scoop lifting shaft bracket (20) from the fret, the small flanges (21x2) can be tacked on to the raised area using the cocktail stick method and then the hole opened out to take a 0.9mm wire. Bend the bracket up into a U shape with the bend lines inside. Trial fit the bracket into the slots in the chassis and thread a 0.9mm wire through the pushrod lever and the two holes in the bracket, if it all fits then solder the bracket in place from the top of the chassis where the slots appear. Remember to file flush later.

Drill out the scoop balance arm (22)x2 and balance weights (23)x4 to take a 0.45mm wire, remove from fret and assemble as per diagram, after soldering, a bit of filing around the balance weights would tidy them up.

Open out hole in arm to 0.9mm. Solder the two halves of the waterscoop lifting lever (24) and open the hole out to 0.9mm and add the 0.45 wire detail to the etched joint. Cut a piece of 0.9mm wire 13.5mm long and feed it through the pushrod lever and the first half of the bracket, now thread one balance weight on, next the lifting lever (24) see diagram for correct way up and then the other balance weight. Now centralise the shaft (wire) and lightly solder it to the pushrod lever, move the loose bits to one end of the bracket and solder the shaft to the bracket at the other end, now do the same at the opposite end.

The balance weights sit below the centre line and forward of the shaft at about 8 o'clock looking from the pushrod side and the arms are 1mm away from each side of the bracket, hold them with tweezers and solder them lightly, the lifting lever is fitted centrally on the shaft and is approximately at 2 o'clock. Try the cast water scoop (C2) in place and adjust the position of the lifting lever if the scoop doesn't sit properly, the two lugs for the lifting lever on the casting may need cleaning out to accept the end of the lever.

The edges of the frame stretchers (25-26) require folding up with the bend line inside, this is done by gripping in a vice with a strip of 1-2mm thick brass which is wide enough to grip the centre of the stretcher and tapping over the edge lightly, I know it is difficult, the other option is to remove the edges and re-attach at 90 degrees with solder.

The two tabs on the top of the lifting shaft bracket (20) are for the rear frame stretcher (26) and locate in the slots on the cross member, see diagram. Check the cross member fits between the mainframes of the tender and trim the ends equally for a loose fit. File the cusp on the tabs and fit the cross member to the tabs with a little solder, check from the side that the cross member is sitting level.

On each side of the water scoop are the tubular brackets for the stay rods (0.45 wires), these can be carefully drilled 0.45mm just a little way in to accept the end of the stay rods or if in doubt just file a point on the piece of wire and trim to the correct length to fit between the water scoop and the holes in the chassis top plate near the middle axle, bend the last 0.5mm to approximately 30 degrees as per the diagram.

Now fit the water scoop using glue or solder ensuring it is vertical looking from the end of the chassis.

Fit and solder the stay rods to the chassis, flush the wires on top of the chassis.

Check the front frame cross member (25) for fit between the tender mainframes and as before, trim if necessary, then solder onto the brake pull rods and yes, it does sit the other way up to the rear cross member.

The last few bits,

Remove the pushrod shaft bracket (13) from the fret, open hole out to 0.9mm and bend to 90 degrees also, on the chassis, open the corresponding hole in the front water scoop pushrod lever. Using a length of 0.9 wire thread the bracket onto the wire and feed the wire through the lever, push the tab on the bracket into the slot in the side frame, see diagram.

Continued on page 5/

Use the wire to align the bracket then solder to the side frame carefully and quickly as it is close to the CSB anchor. Pull the wire back to the lever and solder to the lever, check bracket is parallel to the side frames and solder this on the wire also, trim wire to the same as the brake cross shaft.

Now, on your tender body measure the centres between the brake standard and the water scoop standard, on the Bachmann tender it is 20mm but some kits do vary and it is better to have all the levers lining up with the standards.

Near the front of the chassis there are two holes in the side frames, open these out to 0.45mm.

Remove the water scoop lever halves (14)x2 from the fret and open the holes to 0.9mm, on the other end there is a boss which has a groove etched in, this is for a 0.45mm wire. Clamp the two halves together and place a piece of wire through the groove with about 10mm on each side. Solder the lever together with the wire at the acute angle. Try the lever on the short shaft with the lever slightly pointing down to the track, mark the wire for bending at 90 degrees so as to enter the hole in the side frames, the wire will be at about 10 degrees to vertical. Bend the wire, refit the lever to the shaft and feed the wire into the hole, space the lever to the 10mm from the chassis centre and solder to the shaft, solder the wire to the side frames. Trim loose wire end to about 1mm and tidy up with file.

The last lever is the handbrake lever (11) and the handbrake links (12). Open the holes out to 0.45mm and 1mm, thread a piece of 0.45 wire through the three parts so that the lever is sandwiched lengthways between the two links, clamp them all together and feed another wire about 10mm long through the two links and solder this in. Pull the lever out from between the links, thread onto the brake cross shaft and feed the wire on the links into the hole in the side frames, set to the 10mm centres and solder the lever and wire. Solder the lever to links joint and trim all the wires and tidy up ends.

The guard irons at the rear of the chassis may not be needed if your tender already has them fitted to the bufferbeam. However, if you are fitting them there are holes for wires to position them, these are suited to the Bachmann tenders. Kit tenders may be slightly different. As per the diagram packers are needed, one each side for EM and two each side for P4. the Guard irons should be bent so the offset is 1.5mm. When soldering the irons on put a clamp on the nearest CSB anchor just in case you melt the solder joint.

Loco coupling

The Bachmann plastic coupling pin can be used as mentioned in the text or, use the length of 2mm brass rod soldered into the hole in the front spacer (3). Either pointing up into the chassis or down.

Final assembly

Clean up all the parts and paint them, if spraying, mask where the horn guides are.

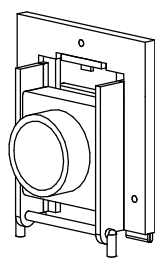
Cut or rather bend with pliers until snapping the spring steel wire to 87mm then bend 1mm to 90 degrees at one end, straighten the length of wire through the fingers if necessary. Fit the axle bearings with the CSB tags soldered on and slide the spring wire through all the anchors and the top holes of the tags from the rear of the chassis so the bufferbeam of the tender retains the wire when in service. Fit the wheels to the chassis using washers to eliminate sideplay and try the model on the track. If you do have derailments check that the spring wire is through all the tags and anchors. Clip the brake gear in place and fit two short pieces of wire in the pull rod levers and, either very carefully tack solder these in or to be safe just a touch of paint would hold them. You do want the brake gear to be able to swing out of the way for chassis maintenance don't you.

I recommend an all up weight of 100 grams for these tenders for good operation.

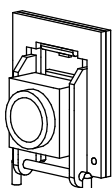
Parts list

Etches			Castings	
1	Basic chassis	16	Brake hangers x3	C1 Steam cylinder
2	Rear spacer	17	Brake blocks x6	C2 Water scoop
3	Front spacer	18	Brake pull rods x2	
4	Brake shaft bracket, r/h	19	Pull rod detail x4	
5	Brake shaft bracket, l/h	20	Water scoop bracket	
6	Bracket detail	21	Flange detail	
7	Bracket stiffener	22	Balance weight arm x2	
8	Brake cylinder lever x2	23	Balance weight x4	
9	Pull rod lever x4	24	Lifting lever x2	
10	Lever spacer x2	25	Front frame stretcher	
11	Handbrake lever	26	Rear frame stretcher	
12	Lever links x2	27	Guard iron r/h	
13	Water scoop lever bracket	28	Guard iron l/h	
14	Water scoop lever x2	29	Guard iron packer x4	
15	Brake hangers x3	30	Set up jig	
			Miscellaneous	
			Brass wire 0.45,0.7,0.9,1.0mm	
			Brass rod 2.0mm	
			Spring steel wire x2	
			Handrail knobs (Anchors)x9	
			High level hornblocks x6	
			Self tapping screws x2	
			Instructions	

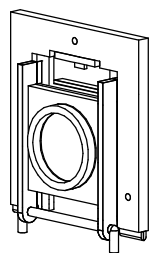
These instructions cover three types of High Level Hornblocks:



STANDARD

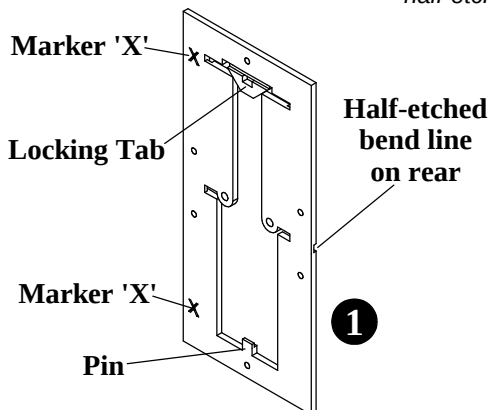


MINIBLOX



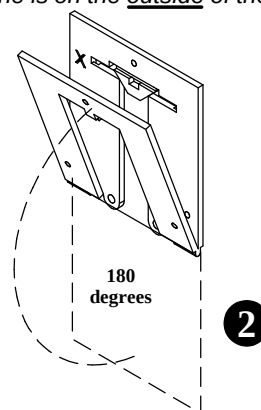
SPACESAVER

Although their size may differ, the procedure for folding the hornblock etch is the same for each type.



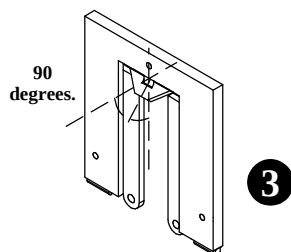
Clip out the etch and clean off any mounting tabs.

Fold the etch through 180 degrees, so the markers 'X' face each other. The half-etched line is on the outside of the fold.

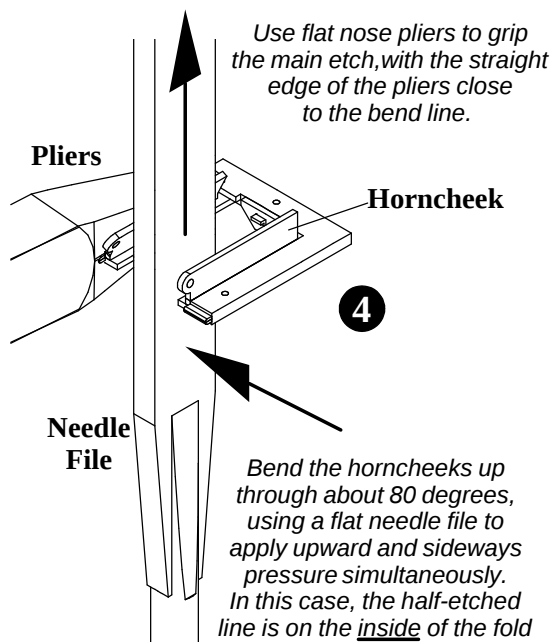


When it's folded, tap the layers between two pieces of hardwood, so they sit absolutely flat.

Hold the layers tightly together and fold the locking tab through 90 degrees, so it locates on the small pin.



The end of a flat, pointed needle file is a good tool for this job. The tab locks the layers together, eliminating the need for solder.



Use fine emery to clean up the bearing, remove any burrs and then try it in place - the groove on the block locates on the front layer of the etches.

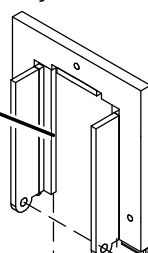
If the bearing's tight in the etch, check that these edges aren't 'bottoming out' in the groove...

...If they are, use a file to remove the sharp 'cusp' from the edge of the etch...

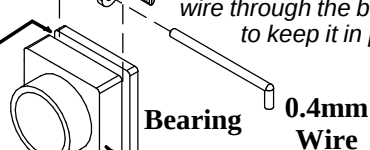
...so there is clearance in this groove...

...then polish the bearing's side faces until it's a smooth, sliding fit in the etch.

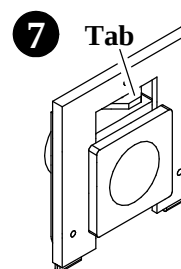
To fit Standard or MiniBlox 'CSB' Tags, turn to the instructions (overleaf) at this point...



When the bearing (and tag) is fitted, slot a length of 0.4mm wire through the bottom holes to keep it in place.



The completed assembly can now be soldered to the inside face of the chassis, using axle jigs. If you fit it with the bearing in place, make sure the sliding surfaces are lightly oiled, to prevent the bearing being soldered to the etch.

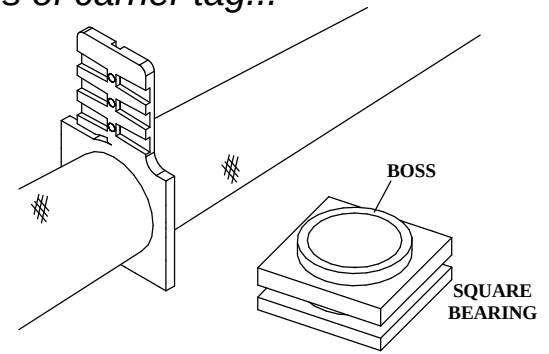
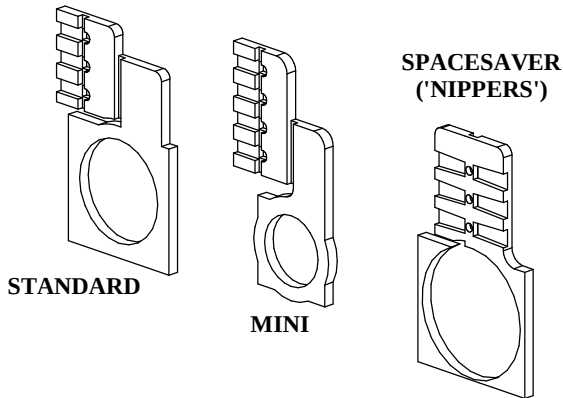


The top edge of the cut-outs on most loco chassis is 4mm above the axle centre. For 'Standard' and 'SpaceSaver' hornblocks, butt the tab up to the top of the cut-out, to set the unit at the correct height.

For MiniBlox, the top edge of the tab is 3mm above the axle centreline.

For all types of carrier tag...

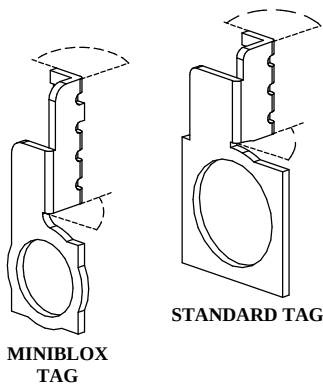
Three types of 'CSB' Carrier Tags are available to fit our hornblocks.



...open out the large hole in the tag, so it's a snug fit on the circular boss at the rear of the bearing.

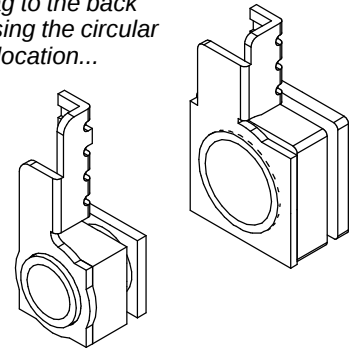
STANDARD AND MINIBLOX TAGS

Carefully fold the top tab to make a three-sided box shape.



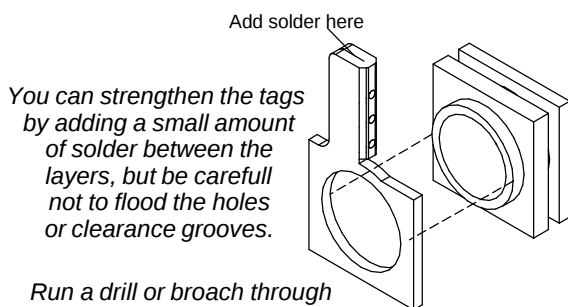
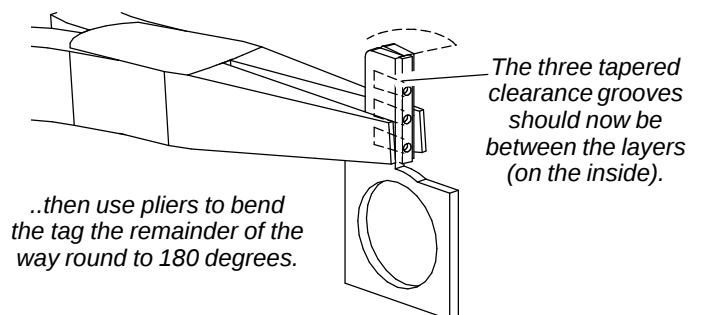
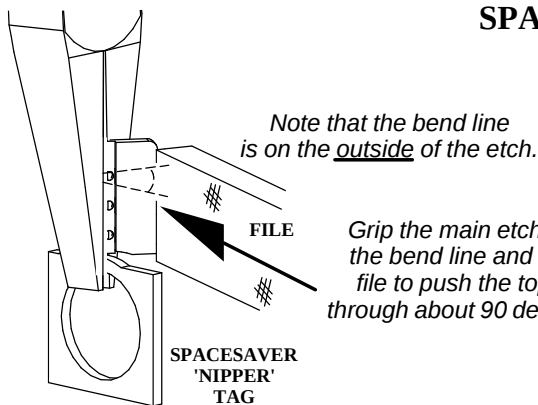
To prevent them from distorting when bending, use small, flat-nosed pliers to grip the etches near the bend lines.

Solder the tag to the back of the block, using the circular boss for location...



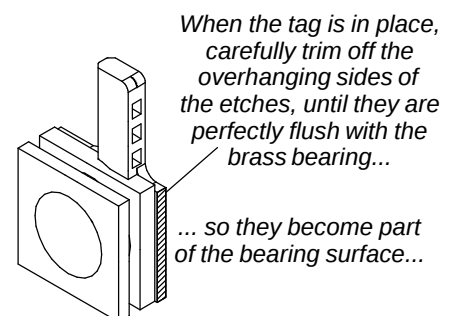
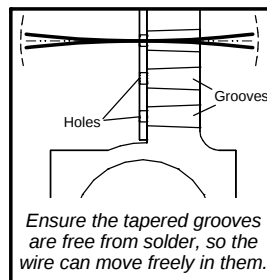
... then resume the assembly sequence at stage 7, overleaf...

SPACESAVER TAGS



Run a drill or broach through the holes and open them out to suit your spring wire...

...then solder the tag over the circular boss on the block, making sure it is absolutely square.



... then resume the assembly sequence at stage 6, overleaf...