

Fowler tender chassis 6'6''x 6'6''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 the 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.

We have put two waterscoop push rods on this chassis as Fowler tenders were attached to locomotives that could be either left or right hand drive, if you have done your research you can remove the redundant rod or if no water pick-up gear is required remove both. Generally though, the waterscoop operating handle is on the same side of the loco as the driver, if you can see a reversing rod under the loco boiler then the waterscoop mechanism is on the same side. To remove the redundant pushrod, lay the etch down so that the legend EM/P4 is uppermost and the cutaway portion at the front end is to the top, if the driver is on the left (looking forward from the tender) of your chosen loco then remove the three sections of pushrod from the right hand side and if the driver is on the right remove the left hand pushrod.

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. 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 frames 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 all 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 flange on the rear pair of anchors partially cover the holes for the brake hanger wire so drill through from the outside and try a piece of 0.7 wire through. 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 (use 1.7mm drill – not supplied) 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, drilling the holes through the slots in the chassis with the drill provided.

If fitting to the Bachmann Fowler tender the following modifications are necessary.

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. Now pull all the brake gear off the frame moulding, it's only lightly glued. There are raised areas inside from the axleboxes these would need to be flushed down to clear EM and P4 wheel-sets and possibly, depending on which make of wheels you are using these areas may need further work to make clearance for the 0.5mm centre wheel side play, use a dental burr for this.

I've used Gibson and Ultrastyle EM and P4 wheel-sets in test builds and had no problems with clearances.

At the front of the Bachmann frames you will see that the plastic needs to have two slots formed to clear the etched sideframes, this only needs to be about 0.5mm deep by 2mm wide, I used the dental burr for this, I would have etched the sideframes less but the CSB anchors were getting too close to the edge....

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. At the rear of the moulded frames the raised edge including the 'corner boxes' requires complete removal leaving just the flat surface for the chassis to sit on.

The hole for the rear fixing screw can be drilled from the top of the moulding on centre between the two raised bosses, an examination will show exactly where, the hole should line up with the slot in the chassis.

The original rear countersunk body screw can be used to hold the plastic frames to the body and then the new chassis is secured by using the supplied self tapping screw in the new hole at the rear whilst the front fixing uses an original hole that held the body on, a quick run through the hole with a 1.7mm drill (not supplied) will stop the plastic boss splitting when the new self tapping screw is screwed home.

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 (6-7) 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 (6-7), you will see that when parts (4) and (6) are soldered together the detail of the bolted journal comes together. Parts (5) and (7) are 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 edges 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 wheel-set in position checking that the flange doesn't rub on the brake cross-shaft, it should be 0.5mm clear with EM standard flanges, if 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 frame cross members to be fitted later, if your loco has no water pick-up gear leave all lugs intact to mount the cross members on, if a water scoop is fitted, remove the rear pair of lugs as the rear frame cross member will be attached to the scoop casting. 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 and solder onto both sides of the pull rod near the front end, there are small nicks in the rod 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 rear of the chassis, (the hole that was close to the CSB anchor). 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, noting that the half etch on the lugs should face outwards, 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 in 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 'Fowler 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 cross wire, 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, now 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

Water pick-up gear wasn't always fitted to these tenders when built whilst others, during their lifespan, just had the brackets, a blanked off scoop pipe and a water dome on the tender top but no mushroom vents, scoop or operating handle. The chassis kit can represent all of these variants.

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 left hand side and the arms are 1mm away from each side of the bracket, hold them with tweezers and solder them lightly to the shaft, 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.

On the scoop behind the lugs is a raised platform which is where the frame cross member (26) is fitted, drill the hole marked with a pip on the area to 0.7mm by 1.5 deep. On the rear cross member fit a piece of wire 0.7mm in the central hole, this locates in the hole in the scoop and makes a stronger joint when glued on. The two redundant slots on the cross member can be filled with solder or filler.

The water scoop casting may have a bit of flash between the platform and the lugs so pare or file this away until the cross member fits neatly, don't glue the cross member on just yet.

On each side of the water scoop are the tubular brackets for the stay rods, 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 30 degrees. Fit stay rods (wires) after water scoop is fitted.

Fit the water scoop using glue or solder then fit a rear wheel-set to the chassis and try the cross member in place, the deep cut away edge is toward the middle of the chassis and the shallow edge is very close to the rear wheel flanges. If your flanges rub on the cross member either file a small notch or move the cross member forward slightly, test builds were just okay with EM Ultrascaple wheel flanges. Before fixing the cross member check it fits between the mainframes of the tender and file the ends equally to fit. Now glue in place checking the clearance to the flanges and the vertical alignment as the glue sets.

Check the front frame cross member (and the rear one if no water scoop) for fit between the tender mainframe as before, trim each end equally if necessary and then solder onto the brake pull rods with the deep cut away edge on both cross members towards the middle axle.

The last few bits/

The last few bits,

Remove the pushrod shaft bracket (13) from the fret, open hole out to 0.9mm and bend end 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. Depending on your prototype this could be on the left or right side of the tender. Use the wire to align the bracket then solder 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.

At the front of the chassis there are two holes in the side frames, open these out to 0.45mm, take a piece of 0.45 wire just over 30mm long and bend the first 8mm to 90 degrees. 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. So if 20mm it is, thread the long leg of the wire through the two holes and set the bent end to 10mm from the chassis centre line and at 90 degrees to the chassis (pointing down at the track), solder this in place. Remove the water scoop lever (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 the wire that has just been fitted. Put the two halves together with the groove to the inside, hold with tweezers and thread the groove onto the wire and then manoeuvre the lever onto the short shaft. Align with the chassis sideframes and solder both ends letting the solder run between the two halves.

The final 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 the other end onto the wire on the chassis, set the centre to the afore mentioned 10mm and solder the links to the wire again at 90 degrees to the track, pull the loose wire out and remove the lever, fit lever onto the brake cross shaft and slide back between the links and push the wire back through, align with the chassis sideframes, solder the lever to the cross shaft and solder the joint with the links. Trim the wires and cut wire where it runs through the chassis to clear the loco coupling. 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're 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 down or up into the chassis.

Final assembly

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

Cut or rather bend with pliers until snapping the spring steel wire to 77mm 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 in service, then 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 brakegear 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 brakegear 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.

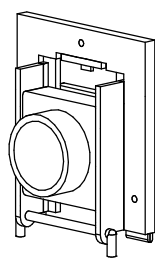
Parts list

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 detail	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	

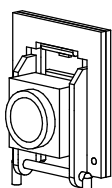
Miscellaneous

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

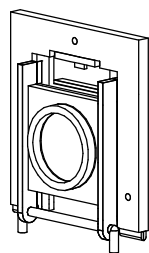
These instructions cover three types of High Level Hornblocks:



STANDARD



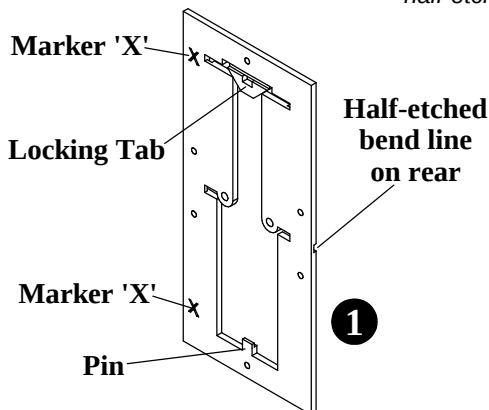
MINIBLOX



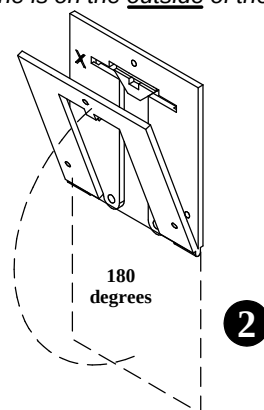
SPACESAVER

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

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

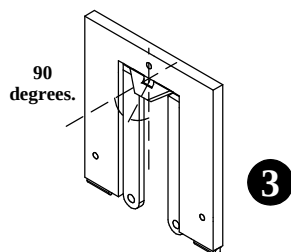


Clip out the etch and clean off any mounting tabs.

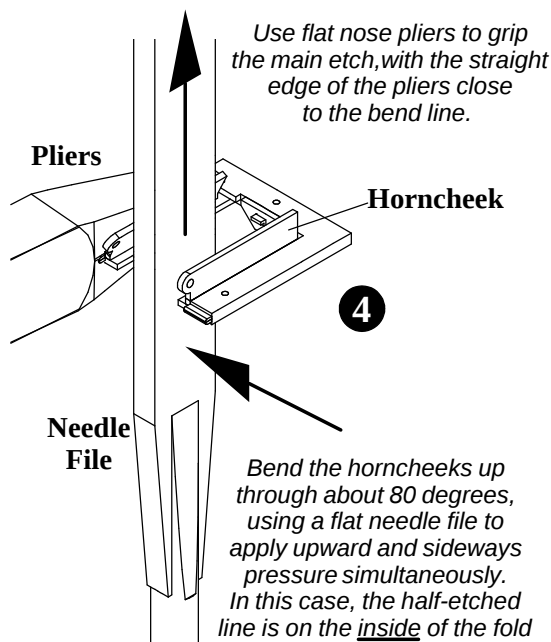


When it's folded, tap the layers between two pieces of hardwood, so they sit absolutely flat.

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.

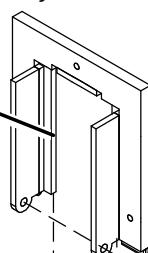
If the bearing's tight in the etch, check that these edges aren't 'bottoming out' in the groove...

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

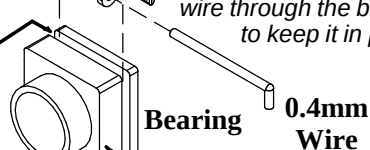
...so there is clearance in this groove...

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

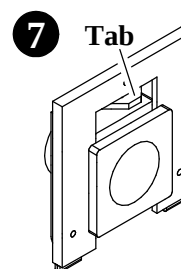
To fit Standard or MiniBlox 'CSB' Tags, turn to the instructions (overleaf) at this point...



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.

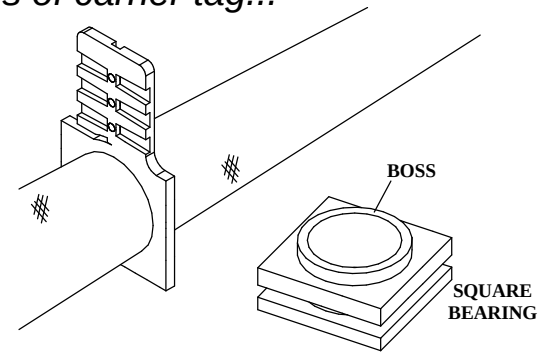
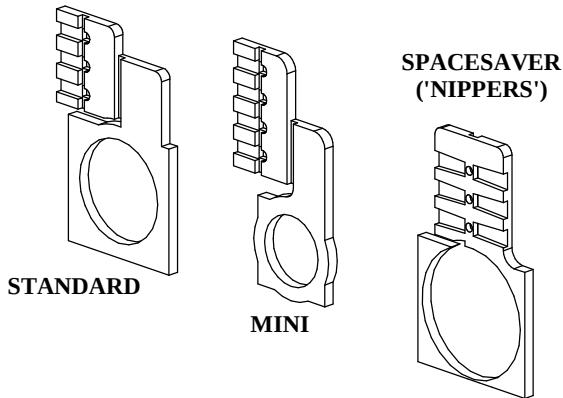


The top edge of the cut-outs on most loco chassis is 4mm above the axle centre. For 'Standard' and 'SpaceSaver' hornblocks, butt the tab up to the top of the cut-out, to set the unit at the correct height.

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

For all types of carrier tag...

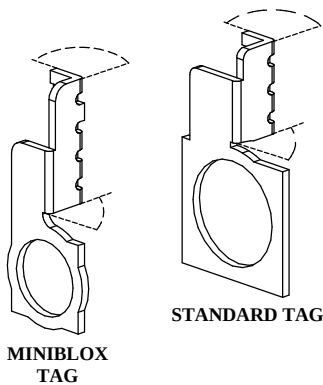
Three types of 'CSB' Carrier Tags are available to fit our hornblocks.



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

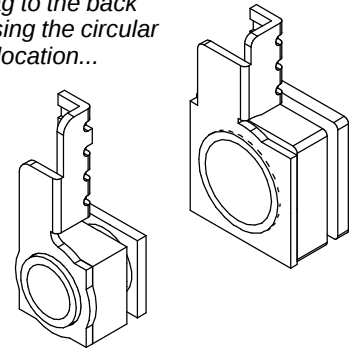
STANDARD AND MINIBLOX TAGS

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



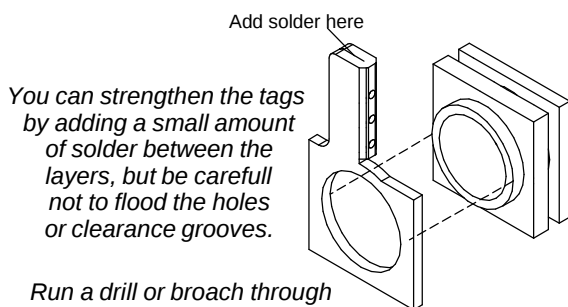
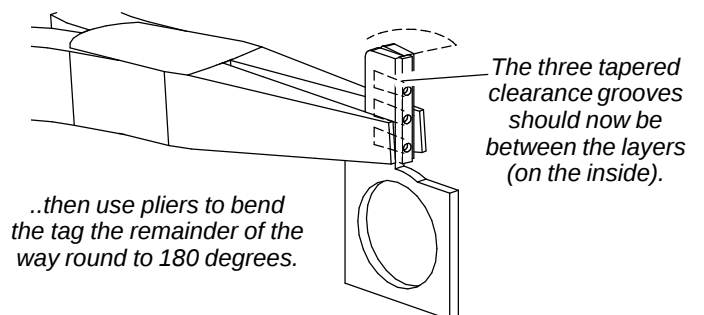
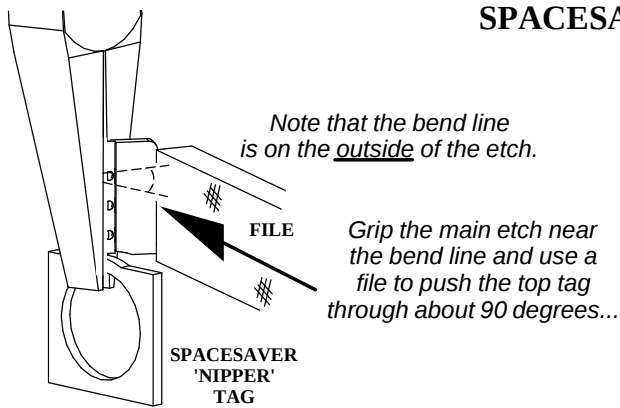
To prevent them from distorting when bending, use small, flat-nosed pliers to grip the etches near the bend lines.

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



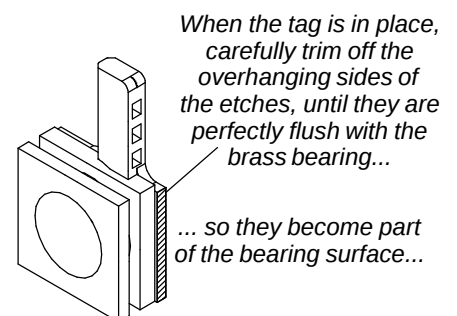
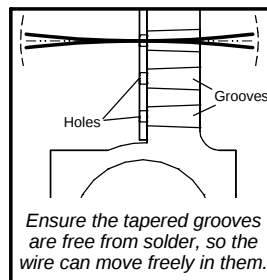
... then resume the assembly sequence at stage 7, overleaf...

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...