

LMS Ivatt 2mt & 4mt tender chassis with CSB suspension, 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 3'-6 1/2" 10 spoke Stanier wheels for your chosen gauge. At the time of writing these instructions Ultrascale are working on a correct wheel for this chassis kit, the samples look very nice. Alan Gibson also does this wheel but with a steel tyre.

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.

I have included a few extra small parts on the fret just in case one gets lost in the carpet.

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 two small holes at the front 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 top plate between these and gently grip in a vice. Using another piece of wood bend over the first sideframe 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 bent up, fitted and soldered, this part has a lug for 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 for replacement. A spare is provided.

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 are 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, drilling the holes through the slots in the chassis with the drill provided.

If fitting to the Bachmann Ivatt 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. There are raised areas inside from the axleboxes these may need to be flushed down to clear EM and P4 wheel-sets depending on whose 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. Flush any mould lines or pips in the area where the chassis will sit and remove kid-on brake hangers.

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

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 hole for the rear fixing screw can be drilled from the top of the moulding just in front of the raised boss, an examination will show exactly where, the hole should line up with the slot in the chassis. Use a 1.7mm drill (not supplied) which is correct for the self tapping screw.

The original rear countersunk body screw can still be used to hold the Bachmann frames to the body, there are clips at the front. 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 which was for the screw that held the ballast weight in, 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. If the ballast weight becomes loose and rattles when the front screw is removed then place a small 'dod' of 'Bluetac' under the weight and replace the rear fixing screw. Ensure though that the ballast weight is down on the chassis as there is limited clearance to the underside of the bunker.

A set of guard irons for the inside of the rear of the Bachmann frames are included. You will see the etched dimples on the guard irons, push these through with a rivet tool or even a compass point, these align with the rivets moulded on the outside of the plastic frames (only on one side on my model!). Bend the guard irons to a lazy 'Z' shape and at approximately 45 degrees, see drawing. You can strengthen the bends with solder if you think it necessary. Scrape the paint away in the area and glue with epoxy glue.

So, back to our chassis on page 3.

Brake cross-shaft

Remove the brake cross-shaft brackets (4-5), detail parts (6-7) and steam brake cylinder mount (8) from the fret, you will find that parts (4-5) have a 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. Remembering cylinder mount (8), fit the other bracket with part (8) in the slots of both parts (4) and (5) checking that the detail pieces mentioned earlier are facing the inside, cut a piece of 1mm rod 26mm 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 and mount 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 (9) 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), drill a 0.5mm x 2mm deep hole in the top and glue or solder with low temperature solder into the hole in the cylinder mount (8), it is easier if you first cut the aligning spigot down to about 0.5mm. Now you can push the 1mm cross-shaft through the first bracket, place the cylinder lever on the shaft locating the thin 'rod' in the top of the steam cylinder, (you may have to trim it to approx 3mm in length). Then push the cross-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 slightly 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 brake 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 0.5mm, for P4 models these tabs are left in place, but for EM, the tabs will need to be filed off flush with the shoulder.

There are six brake hangers, three left hand, three right hand (16-17) and eight brake blocks (18), 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. The rear brake hangers have two brake block etches, one on either side to make the detail look better from the rear. Trim the wire on either side to about 0.5mm 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 2 pieces of 0.7mm wire to approximately 25 mm long.

Remove the brake pull rod etch or 'ladder' (19) from the fret. You will notice the lugs on the ladder, these are for the frame stretchers to be fitted later, Gently file the pull rod etch along the edges to remove the cusp, hold in a small vice, do a bit at a time and move it along to do the next bit. Open out the holes to suit 0.45mm wire. The brake stretcher detail overlays for the pull rod ladder (21-22-23) are slightly different so remove these in their pairs, going L to R remove the 1st and 4th for the front stretcher, 2nd and 5th for the middle stretcher and as might be obvious 3rd and 6th for the rear stretcher. Open out all the holes to 0.45mm. The length of these overlays needs to be trimmed to set the brake hangers to suit EM or P4, trim the stretcher equally on both ends to 19mm long for EM and 20 mm long for P4. Assemble the correct pairs of detail overlays to a stretcher on the ladder and locate using 0.45 wire through the holes, the wire is left in and trimmed to represent the pins. You will see that the extended ends on the ladder stretchers are showing beyond the detail overlays, so file the width of extended 'pins' down to match the trimmed overlays, try a brake hanger on to see if they butt up to the overlay neatly. File the centre portion of each stretcher to a round profile as per the prototype.

You should now have the ladder and overlays ready for the brake hangers to be fitted to the stretcher 'pins'.

The front pull rods (20) have a fork which locates on the fork on the ladder ends, drill the holes at the other end to 0.45, these front pull rods can be forced onto the ladder ends if the etch is good! Leave these unsoldered for now. The small lugs on the ladder can now be bent up to 90deg. The bend lines to the inside.

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 holes at the rear of the chassis, thread the brake hangers on and feed another wire (which we'll call a set-up wire) through the small end of the hangers, Have you got the brakes facing the right way?

You are now going to need all your fingers so prepare the soldering iron with drop of solder. Swing the hangers and set-up wire right over the rear of the chassis and rest the set-up wire on the top of the chassis, hold the set-up wire 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 set-up wire under your finger can still be removed.

Continued overleaf/

Trim the wire just soldered to about 0.5mm proud of the hanger and tidy it up although it's not seen.

Locate the pull rod levers (10 x4) and spacers (11x2) 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 'set-up' jigs (33) 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 and position of the pullrods. Please study the drawing.

Take the pull rod ladder, noting that the bent up lugs should face up towards the chassis, spring the rear stretcher of the ladder in between the already set up brake hangers, shortening one of the pins to make it easier maybe, the rest will be trimmed later.

Thread the set-up jigs on the brake cross-shaft and the first brake stretcher (see diagram). Feed a 0.45 wire through the jigs, the levers and the first hole in the pull rods, move the front pullrods in the forks if necessary for the 0.45 wire to be straight. Slide the levers (10) together on either side of a pullrod. 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... At the rear end, check the brake hangers are tight in to the brake stretcher and solder the brake hangers to the stretcher. Solder the forks which then represent the rod adjuster. Remember to take the set-up jigs off but leave the 0.45 wire in place. The pull rod assembly is now in it's correct position.

For the rest of the brake hangers, thread a 0.7mm wire through the hole the chassis, place both hangers on this wire and the stretcher, hold in alignment, tack the small ends of the hangers onto the stretcher. Now pull the wire through the chassis till it is only just visible on the inside of the chassis, now tack this wire to one 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 small pair of side cutters and snip this wire as close to the inside of the chassis as possible, you should now be able to pull the hanger out from the chassis enough to cut the wire again just leaving about 0.6mm showing on the hanger similar to the other hangers, do the same on the opposite side, tidy cut ends with a file. 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 (24) from the fret, the small flanges with the six bolt detail (25x2) 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, then file flush.

Drill out the scoop balance weight arm (26)x2 and balance weights (27)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 arms to 0.9mm. Remove from fret and solder the two halves of the waterscoop lifting lever (28) 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 (28) see diagram for correct way up and then the other balance weight. Now centralise the shaft 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, being careful not to move the small flanges

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 weights are 6mm apart, 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. Clean up the water scoop casting and drill a 0.7 x 2mm deep hole between the small lugs parallel to the delivery pipe, this is to take the small spigot on the lifting lever. Trial fit the cast water scoop (C2) in place and adjust the position of the lifting lever if the scoop doesn't sit properly. The water scoop casting may have a bit of flash behind the lugs so pare or file this away. Do not fix the water scoop yet.

Remove the tender frame stretchers (29-30), these are the parts with three big holes down the centre line. File around to tidy the cusp then bend up the edges in the vice, this can be quite tricky and I'm quite prepared to do this for you if you return the two stretchers with an SAE for return.

The frame stretcher with the four small slots is the front one and this fits on the four lugs on the pullrod ladder, you did fit the ladder the right way up? The frame stretcher sits above the pull rods with the bent up edges pointing up to the chassis. The rear frame stretcher fits onto the two lugs pointing down from the waterscoop lifting bracket and sits with the bent up edges pointing down to the track, the opposite of the front one. Tack these stretchers onto the lugs with just enough solder as cleaning up would be difficult.

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. Solder stay rods (wires) after water scoop is fitted.

The last few bits on page 5

The last few bits,

Remove the water scoop lever bracket (14) from the fret, open hole out to 0.9mm and bend end to 90 degrees, 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. 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 length/width as the nearby brake shaft.

At the front of the chassis there is a hole in the side frame, open this 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 the Bachmann tender body the centres between the brake standard and the water scoop standard are 20mm but some kits do vary and it is better to have all the levers lining up with the standards. So if 20mm, thread the long leg of the wire through the hole 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 (15)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 then manoeuvre the lever onto the short shaft and thread the groove onto the wire. Align with the chassis sideframes and solder both ends letting the solder run between the two halves.

The final lever is the handbrake lever (12) and the handbrake links (13x2). 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 (12mm long) through the end of the links only, solder this wire to the links, swing the lever out from between the links and slide it onto the brake shaft, the wire that's through the links is pushed through the hole in the chassis sideframe. Align the lever to the afore mentioned 10mm from centreline, solder the lever to the brakeshaft and solder the joint with the links then solder where the links wire goes through the chassis sideframe. Trim the wires to look like the link pins.

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), pointing up into the chassis.

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 77mm then bend 2mm to 90 degrees at one end, straighten the wire as much as possible 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 correctly 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.

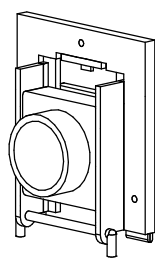
I recommend an all up weight of 100 grams for these tenders for good operation.

Parts list

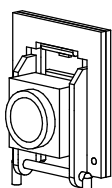
Etched parts			Castings	
1	Basic chassis	18	Brake blocks x8	C1 Steam cylinder
2	Rear spacer	19	Brake pull ladder	C2 Water scoop
3	Front spacer	20	Front pull rods x2	
4	Brake shaft bracket, r/h	21	Brake stretcher detail x2	Miscellaneous
5	Brake shaft bracket, l/h	22	Brake stretcher detail x2	Brass wire 0.45,0.7,0.9,1.0mm
6	Bracket detail	23	Brake stretcher detail x2	Brass rod 2.0mm
7	Bracket detail	24	Water scoop bracket	Spring steel wire x2
8	Steam brake cylinder mount	25	Flange detail x2	Handrail knobs (Anchors) x9
9	Brake cylinder lever x2	26	Balance weight arm x2	Highlevel hornblocks x6
10	Pull rod lever x4	27	Balance weight x4	Self tapping screws x2
11	Lever spacer x2	28	Lifting lever x2	Instructions
12	Handbrake lever	29	Front frame stretcher	
13	Lever links x2	30	Rear frame stretcher	
14	Water scoop lever bracket	31	Guard iron l/h	
15	Water scoop lever x2	32	Guard iron r/h	
16	Brake hangers x3	33	Set up jig	
17	Brake hangers x3			

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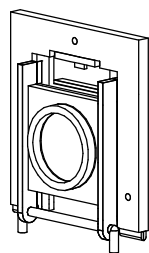
These instructions cover three types of High Level Hornblocks:



STANDARD

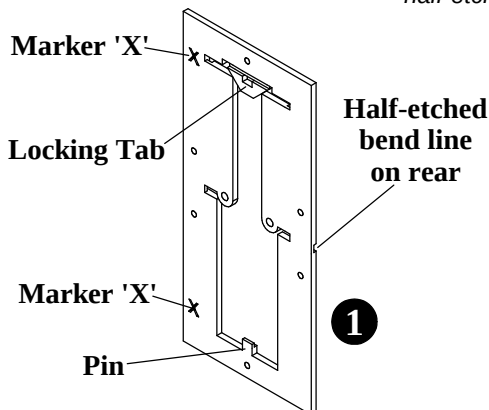


MINIBLOX



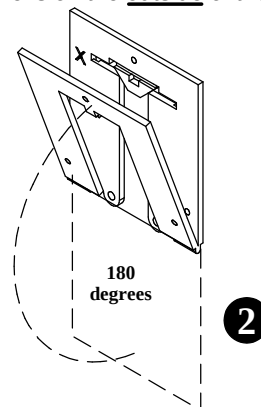
SPACESAVER

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



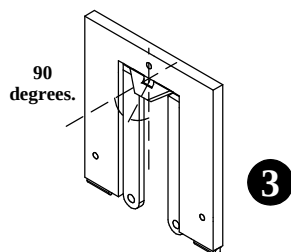
Clip out the etch and clean off any mounting tabs.

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

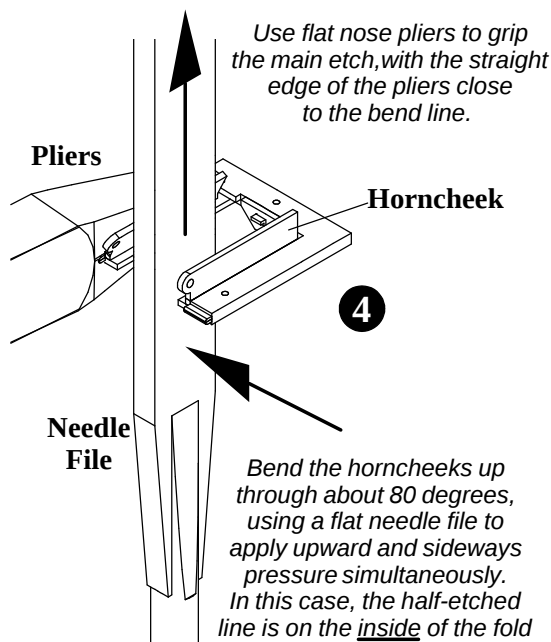


When it's folded, tap the layers between two pieces of hardwood, so they sit absolutely flat.

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.

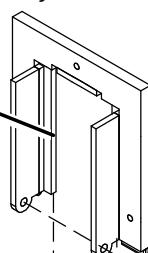
If the bearing's tight in the etch, check that these edges aren't 'bottoming out' in the groove...

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

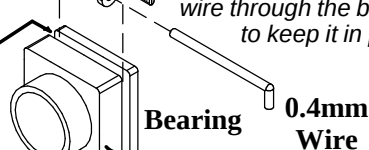
...so there is clearance in this groove...

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

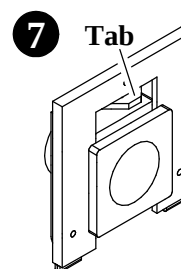
To fit Standard or MiniBlox 'CSB' Tags, turn to the instructions (overleaf) at this point...



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.

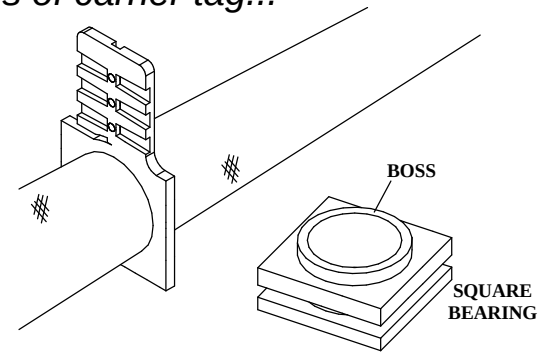
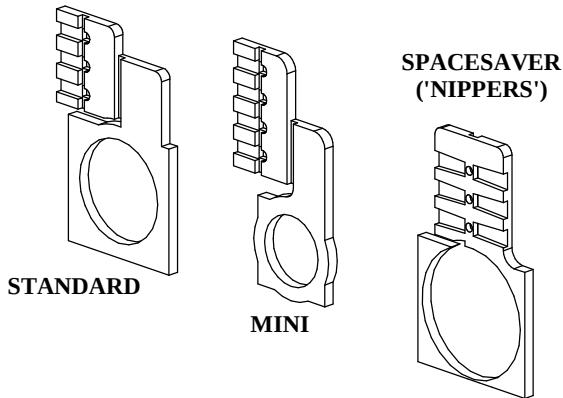


The top edge of the cut-outs on most loco chassis is 4mm above the axle centre. For 'Standard' and 'SpaceSaver' hornblocks, butt the tab up to the top of the cut-out, to set the unit at the correct height.

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

For all types of carrier tag...

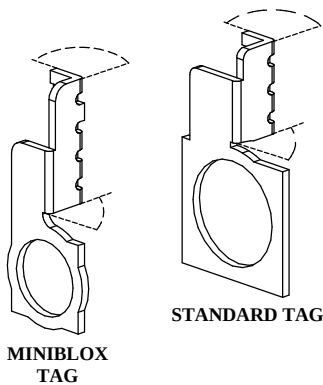
Three types of 'CSB' Carrier Tags are available to fit our hornblocks.



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

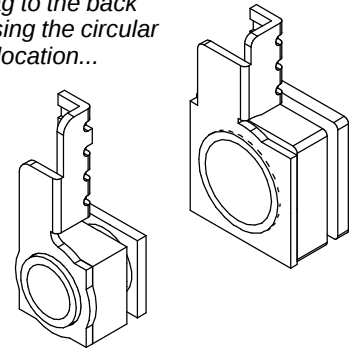
STANDARD AND MINIBLOX TAGS

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



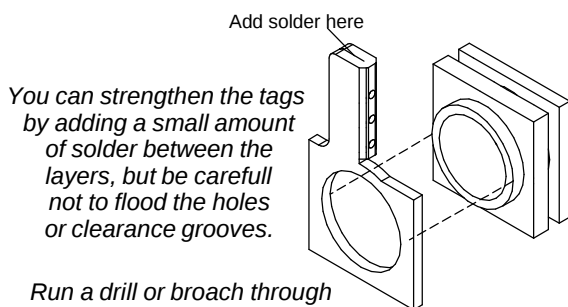
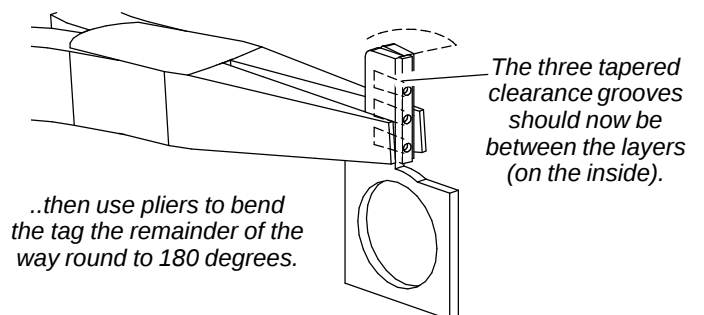
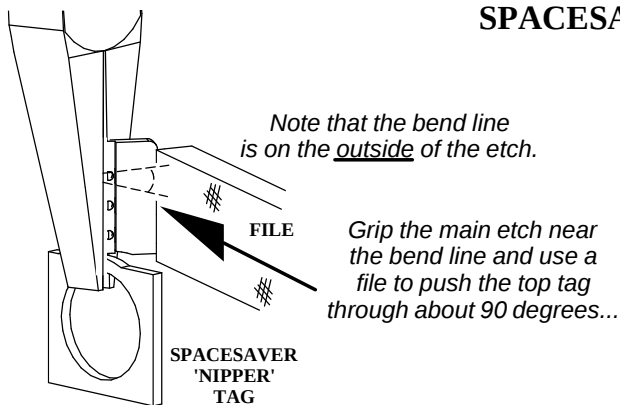
To prevent them from distorting when bending, use small, flat-nosed pliers to grip the etches near the bend lines.

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



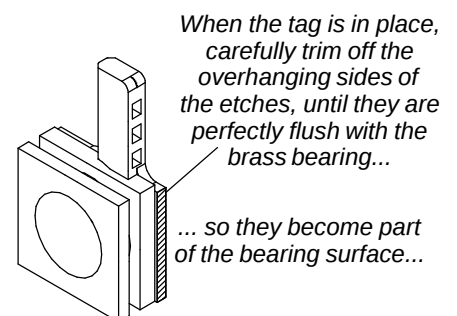
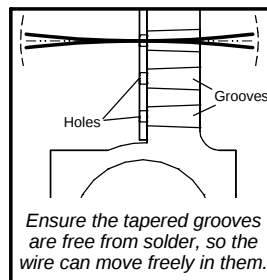
... then resume the assembly sequence at stage 7, overleaf...

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...