

BR1 Standard 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 its 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, tags and axle bearings have been kindly supplied by 'High Level'. You only have to provide the 3'-31/2" 10 spoke Stanier bevel rim wheels for your chosen gauge. Ultrascale and Alan Gibson do this wheel.

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 metal 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 detailing parts plus spare 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 opened out with a cutting broach 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 good 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 then rinse. 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 one of 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 front and rear 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.

The rear spacer (2) can now 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. At the front there is a 'bend up' spacer which can now be bend to almost 90 degrees, don't solder yet, this leaves just a bit of clearance for the brake cross shaft brackets. 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 quickly 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 using a triangular file to just take the edge off the slot where it runs in the guides. When they all slide freely, mark them so they are replaced in the same positions later, I drill mark 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 the CSB tags onto the bearings as per the 'HL' instructions.

Note:- some axles can be slightly oversize for the brass bearings so hold them lightly in pliers and open them out with a cutting broach from both sides.

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 CSB 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 the 0.45mm brass wire, (keep the spring steel CSB wire away from soldering operations in case the flux causes rust to form in the long term). Now place the anchors in the holes inside the sideframe, double checking you've got the correct eight holes which are nearest the edge. 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 is not necessary to file flush.

The front spacer (3) can now be fitted if required and sprung into it's slots between the sideframes, a tiny bit of the inside corners of the spacer will need to be filed to clear the nearest anchors, solder this in 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 after aligning the axles with the axleboxes the holes for the fixing screws can be marked through the chassis roughly in the middle of the two long slots. The fixing screws can be either the self tappers provided or by soldering two 2mm nuts on the inside of the tender floor for your own screws to fit. The self tapping screws should be used if retro-fitting this chassis to an already built model, the holes should be drilled with a 1.7mm drill (not supplied).

The DJH BR1 tenders have a cast underframe so I find it best to solder the frames together then cut the centre out to 73mm x 20mm starting 11mm from the front to 4.5mm from the outside of the rear bufferbeam. The chassis etch has half etched lines indicating where to file to or carefully cut to fit the modified casting, the same fixing method as above can then be used and the casting is held in place by the chassis, if not then glue the cast frames to the tender body. The modern Hornby tender is more difficult and will require further investigation.

If fitting to a Bachmann BR1 tender the following modifications are necessary.

First remove the Bachmann wheels, 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 at the axleboxes these may need to be flushed down a bit to clear the 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. Flush any mould lines or pips in the area where the chassis will sit and remove the kid-on brake hangers in the plastic sideframes.

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 or use the front spacer fitted with the 2mm dia rod.

The original rear body screws 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 self tapping screws (use 1.7mm drill- not supplied) through the slot at the rear whilst the front fixing is through the slot just behind the front axle, mark the drilling position through the middle of the slot. A set of guard irons for the inside of the rear of the Bachmann frames is included.

You will see the etched dimples on the guard irons, push these through with a rivet tool or even a compass point, 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 on the plastic 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 x4 (6), return spring bracket (7), steam brake cylinder mount (8) and bracket front detail (9) from the fret, you will find that parts (4-5) have a left and right, this is because part (5) has holes for the return spring bracket (7), see drawing for correct orientation. Take bracket (4) and using a cocktail stick to align the hole in the bracket and one of the detail parts (6) using spring clamps to hold the parts together solder the detail in place, then place the second part (6) on the other side and solder, do the same for bracket (5), these form the journals for the brake cross-shaft.

Also on bracket (5) are the slots for the return spring bracket (7) the angled sides of which should be bent up, the tag goes through part (5) and is bent down to hold it, check the orientation with the drawing and that the bracket is at 90 degrees to part (5) and then solder the tag, add a piece of 0.9mm wire 2.5mm long in the recess in the return spring bracket (7) to represent the return spring for the brake gear.

Once done, open the journal holes on the cross-shaft brackets out to 1.5mm for the cross-shaft. File the edges to tidy them up particularly where the parts fit into the slot in the chassis top, then fit bracket (4) in place behind the fold up front spacer, (check it is on the left as you look at the chassis from the front as per the drawing), push it as far forward as it will go 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). Use the piece of 1.5mm rod supplied and push this through the journal holes 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. Solder up the brackets and mount starting at a point away from the first tack. Fit bracket front detail (9) to the front edges below the cross-shaft journals and solder this lightly. Push the 'bend up' spacer on part (1) to near 90° and solder to sideframes. Don't solder or cut the rod/shaft just yet. Remove the two halves of the steam brake cylinder lever (10) from the fret and solder together using the cocktail stick technique then open the main hole out to take the 1.5mm 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 2.5mm 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 1.5mm cross-shaft through the first bracket, place the cylinder lever on the shaft locating the thin 'rod' in the top of the steam cylinder, the lever should almost touch the steam cylinder in the 'brake off' position, (you may have to trim it to approx 3mm in length). Now push the rod/cross-shaft through the second bracket, clamp the journal detail just in case it moves whilst soldering the shaft, roughly centralise the shaft (it's still over long remember) and solder it carefully in both brackets. Hold the lever with tweezers and solder that lightly to the shaft, the other levers are fitted later.

Try the chassis in the body and if necessary cut a little off the shaft so that the chassis then sits centrally in between the tender mainframes, the shaft will be trimmed to it's proper length later.

Brakegear

The brake hangers have a folded portion at the top which spaces the hangers the correct distance from the frames. There are six brake hangers, three left hand, three right hand (19-20) and six brake blocks (21), 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 should run through and fix the wire also. Trim the wire on either side to about 0.5mm to represent the pin. Bend the top portion to 90 degrees with the bend line to the inside, open the holes at the top of the hanger to take a 0.7mm wire. Remove the brake pull rod etch or 'ladder' (22) from the fret. You will notice the four lugs on the ladder, these are for the frame stretcher to be fitted later, Gently file the pull rod etch along the edges to tidy up 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 (24-25) are slightly different so remove these in their pairs, the rear pair have only one hole aside. Open out all the holes to 0.45mm. 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. Try a brake hanger on to see if they butt up to the overlay neatly.

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

The front pull rods (23) 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 a piece of 0.7mm wire, thread the wire through the holes at the rear of the chassis, thread the brake hangers on, have you got the brakes facing the right way?

On the fret are two 'set-up' jigs (35), open the holes out, at the big end 1.5mm and 0.45mm and the small end 0.45mm, (this hole may need to be enlarged depending on the etching of the brake stretcher pin). Fit these set up jigs on both ends of the 1.5mm cross shaft and the first brake stretcher, this will set the position of the pullrods and later the levers to the correct angle, remembering that the bent up lugs on the ladder should face towards the inside of the chassis. Please study the drawing.

Locate the rear brake hangers on the pull rod ladder and check everything is still in line and parallel, solder the small end of the hangers to the ladder but leave the 0.7 wire loose. Now fit the middle set of brake hangers in the same way, remove the pullrod ladder by pulling out the wires from the chassis.

Locate the pull rod levers (11), spacer washer (13) and levers (12) and (14) on the fret, solder the spacer to lever (11) using a cocktail stick and open out the larger holes to 1.5mm and the small holes to 0.45mm, remove from fret and feed onto the cross-shaft and check the orientation with the diagram.

Continues overleaf/

Refit the pull rod ladder to the chassis and once again 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 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 fine tweezers. Check the return spring lever rod is aligning with the spring bracket.

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... 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 last 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, tack this wire to one brake hanger from the outside, trim off wire, repeat for the other brake hangers. 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 (26) from the fret, the small flanges with the six bolt detail (27x2) 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 checking that the 'arrow' is pointing forward, 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 arms (28)x2 and balance weights (29)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 (30) and open the hole out to 0.9mm and add the 0.45 wire detail to the etched joint. Feed a piece of 0.9mm wire through the pushrod lever on the chassis side and the first half of the bracket, now thread one balance weight on, next the lifting lever (30) check diagram for correct way up and then the other balance weight. Now push the wire through the other side of the bracket to just show by 0.5mm and lightly solder it there, being careful not to move the small flange. Move the loose bits to one end of the bracket and solder the shaft to the bracket at the other end, now solder to the pushrod lever and trim off. The balance weights sit below the shaft centre line with the tender on the track and forward of the shaft at about 8 o'clock looking from the left hand side.

Hold the weights with tweezers and solder them lightly to the shaft, the weights should be 6mm apart, leave the lifting lever for the moment. Clean up the water scoop casting and clear the slot between the two small lugs, this is to take the small tail of 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 under the base so pare or file this away. Do not fix the water scoop yet.

Remove the tender frame stretchers (31-32), these are the parts with three big holes down the centre line. Check the fit across your tender underframe as some models are narrower than others, trim both ends equally for a neat fit. 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. You may find that using a small triangular file in the half etch bend line until a mark shows on the far side it will bend more easily.

The rear stretcher (32) has two small slots in the edge and this edge is only bent up to 45° all others are 90°.

The frame stretcher with the four small slots is the front one (31) and this fits on the four lugs on the pullrod ladder, you did fit the ladder the right way up? The front 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 water scoop 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.

The scoop lifting lever can now be soldered, using tweezers grab the tail of the lever and pull it up into the middle of the square hole in the frame stretcher, solder the lever onto the shaft with the tail as near the middle as possible. On each side of the water scoop casting (C2) are the tubular adjusters for the stay rods, these can be carefully drilled 0.45mm just a little way in to accept the end of the wire stay rods or if in doubt just file a point on the piece of wire. Glue or solder with lowmelt the water scoop casting, it locates in a hole in the chassis top and against the frame stretcher edge which should be the one set at 45°, fit the stay wires through the small slots in the chassis top and into the tubular brackets. Solder stay wires to the chassis after water scoop is fitted.

Remove the water scoop lever bracket (17) from the fret, open hole out to 0.9mm and bend end to 90 degrees, on the chassis open out the hole in the front water scoop pushrod lever on the chassis side, 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 so that it almost touches the tender frames that it is supposed to be attached to. There is a small round flange on the fret which is to fit of the outside of the frames to represent the journal that the water scoop lever shaft runs in, some models have one some don't.

The last few bits on page 5

The last few bits,

At the front of the chassis there is a hole in the side frame just beside the water scoop lever bracket, 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 approximately 19mm but some models do vary and it is better to have all the levers lining up with the standards. So if 19mm, thread the long leg of the wire through the hole and set the bent end to 9.5mm from the chassis centre line and at 90 degrees to the chassis (pointing down and slightly forward), solder this in place. Remove the water scoop lever (18)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 and cut the wire leaving about a 1mm showing, trim the other end inside the chassis.

The final lever is the handbrake lever (15) and the handbrake lever detail (16). Open the holes out to 0.45mm and 1.5mm, clamp the two parts together, thread a piece of 0.45 wire through the small end and solder the levers together, the lever should be bent to a lazy Z shape with a 2mm offset to clear the wheelset.

On the chassis side frame the hole for the wire is just below the CSB anchor so be careful when you solder the wire in place.

Now is the time to cut the brake cross-shaft. The side where you are going to fit the handbrake lever should be cut to just 0.5mm beyond the width of the chassis frame and it should clear the wheel flange, the lever is fitted just on the end of the shaft with the wire on the other end entered through the hole in the chassis side and this positions the lever correctly.

The other end of the shaft is cut just about 0.5mm from the pull rod levers. Just check when fitted that the wheel flange clears the shaft end on the handbrake side.

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 pointing up into the chassis to be almost flush with the top of 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 82mm 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 (open out with a 0.45 drill if necessary), 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 the etched washers to eliminate all sideplay on 1st and 3rd axles and 0.5mm side play on the middle axle. 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

1	Basic chassis
2	Rear spacer
3	Front spacer
4	Brake shaft bracket, r/h
5	Brake shaft bracket, l/h
6	Bracket detail
7	Return spring bracket
8	Steam brake cylinder mount
9	Bracket front detail
10	Brake cylinder lever x2
11	Pull rod lever x3
12	Pull rod lever with two legs
13	Lever spacer
14	Lever for return spring
15	Handbrake lever
16	Handbrake lever detail
17	Water scoop lever bracket
18	Water scoop lever x2

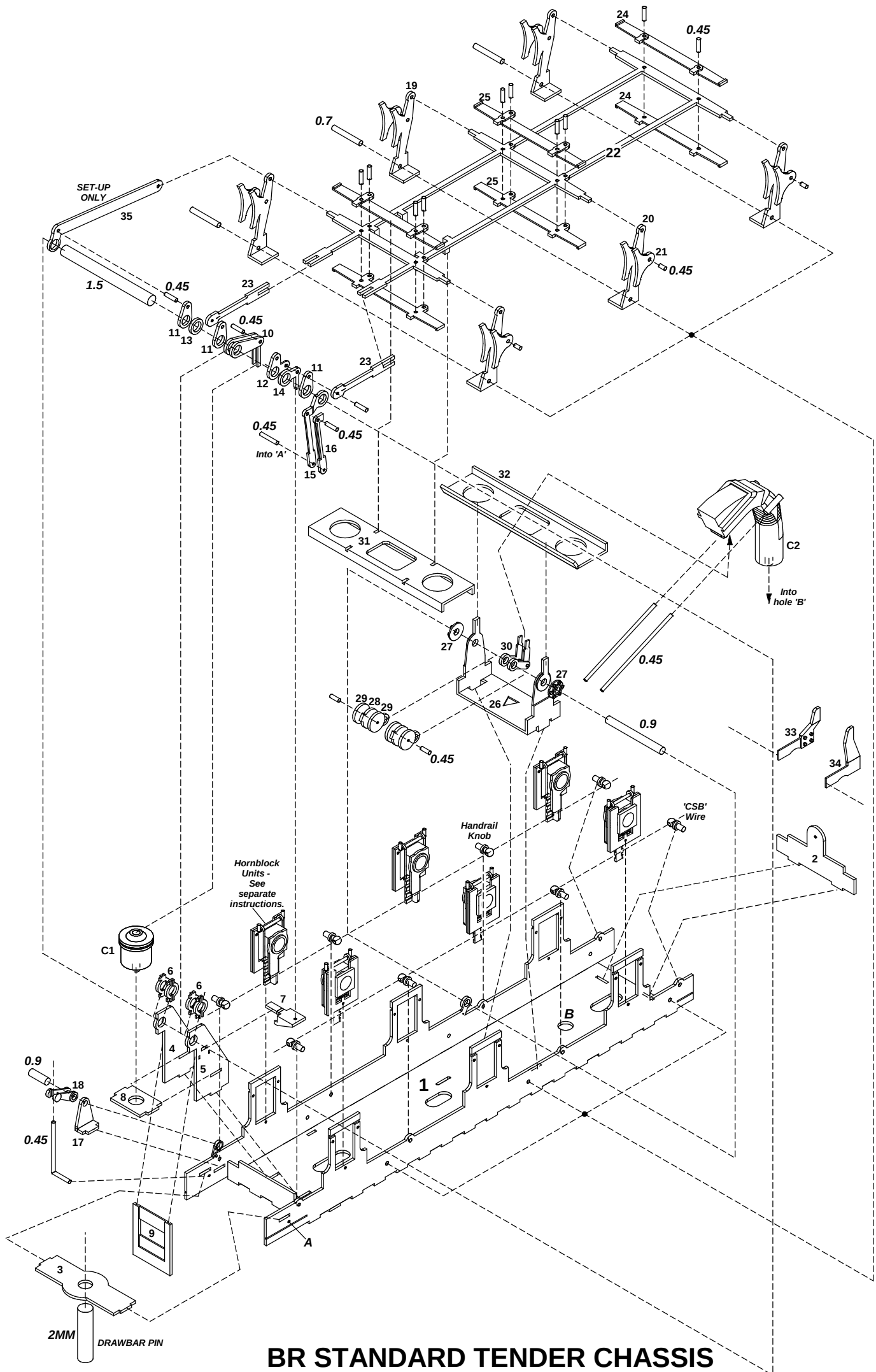
19	Brake hangers x3
20	Brake hangers x3
21	Brake blocks x6
22	Brake pull ladder
23	Front pull rods x2
24	Brake stretcher detail x2
25	Brake stretcher detail x4
26	Water scoop bracket
27	Flange detail x2
28	Balance weight arm x2
29	Balance weight x4
30	Lifting lever x2
31	Front frame stretcher
32	Rear frame stretcher
33	Guard iron l/h
34	Guard iron r/h
35	Set up jig

Castings

C1	Steam cylinder
C2	Water scoop

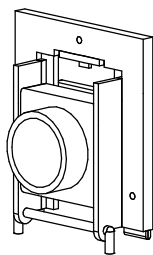
Miscellaneous

Brass wire	0.45,0.7,0.9,1.5mm
Brass rod	2.0mm
Spring steel wire	x2
Handrail knobs (Anchors)	x9
Highlevel hornblocks	x6
Self tapping screws	x2
Instructions	

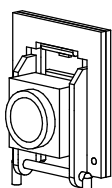


BR STANDARD TENDER CHASSIS

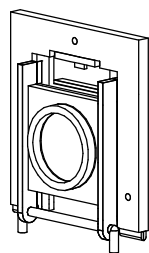
These instructions cover three types of High Level Hornblocks:



STANDARD

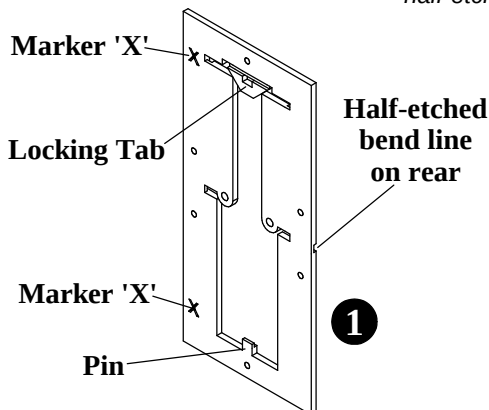


MINIBLOX



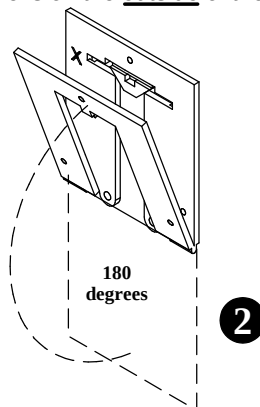
SPACESAVER

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



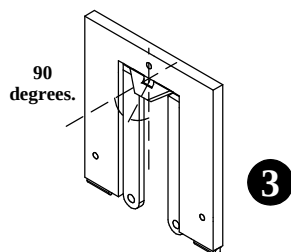
Clip out the etch and clean off any mounting tabs.

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

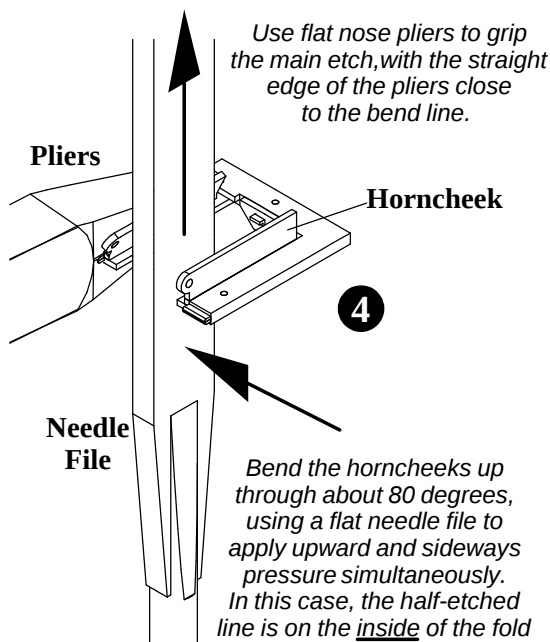


When it's folded, tap the layers between two pieces of hardwood, so they sit absolutely flat.

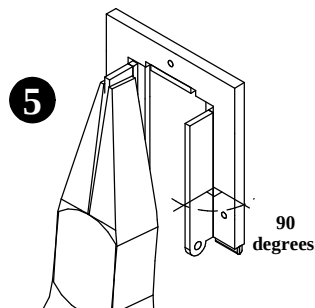
Hold the layers tightly together and fold the locking tab through 90 degrees, so it locates on the small pin.



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.



Bend the horncheeks up through about 80 degrees, using a flat needle file to apply upward and sideways pressure simultaneously. In this case, the half-etched line is on the inside of the fold



Finish off the horncheek bends so they are at 90 degrees. Check this through a magnifying glass and adjust as necessary.

For SpaceSaver 'CSB' units, follow the instructions (overleaf) at this point...

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.

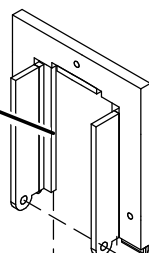
If the bearing's tight in the etch, check that these edges aren't 'bottoming out' in the groove...

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

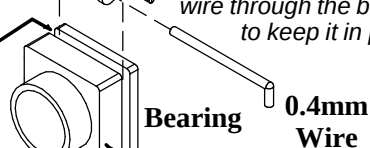
...so there is clearance in this groove...

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

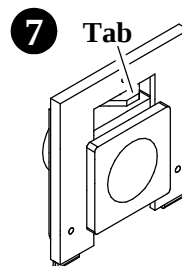
To fit Standard or MiniBlox 'CSB' Tags, turn to the instructions (overleaf) at this point...



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.

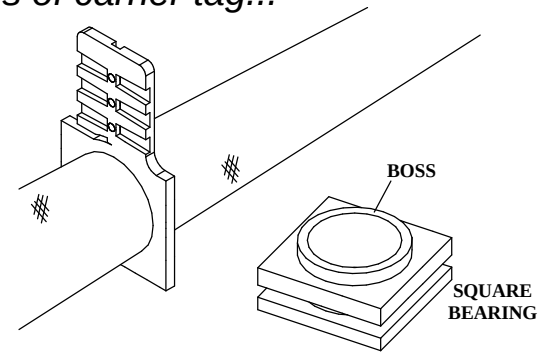
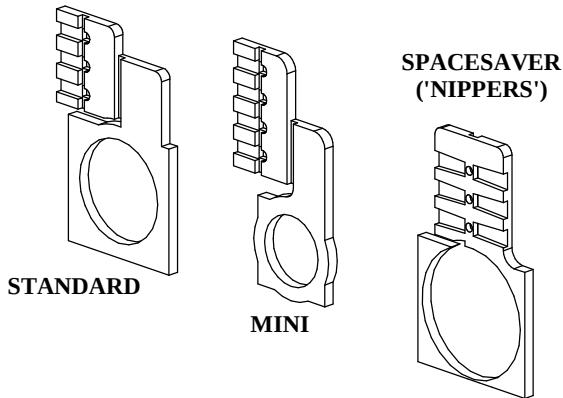


The top edge of the cut-outs on most loco chassis is 4mm above the axle centre. For 'Standard' and 'SpaceSaver' hornblocks, butt the tab up to the top of the cut-out, to set the unit at the correct height.

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

For all types of carrier tag...

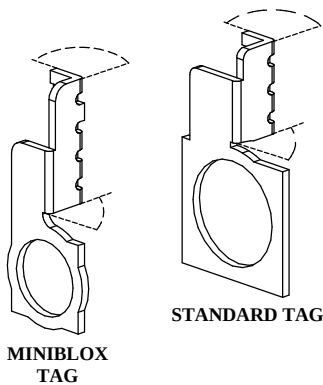
Three types of 'CSB' Carrier Tags are available to fit our hornblocks.



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

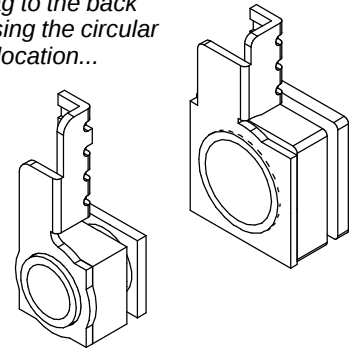
STANDARD AND MINIBLOX TAGS

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



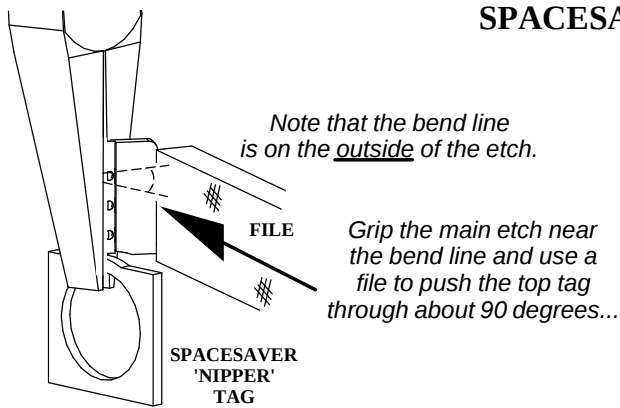
To prevent them from distorting when bending, use small, flat-nosed pliers to grip the etches near the bend lines.

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

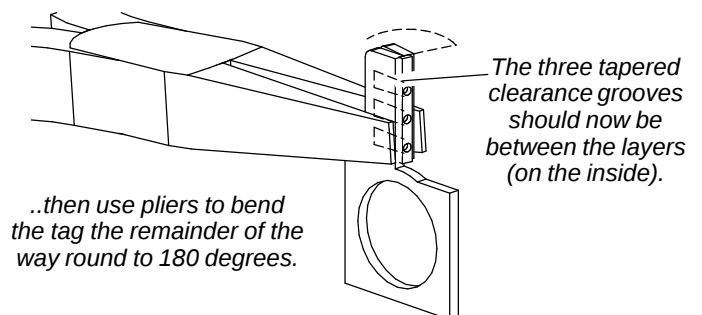


... then resume the assembly sequence at stage 7, overleaf...

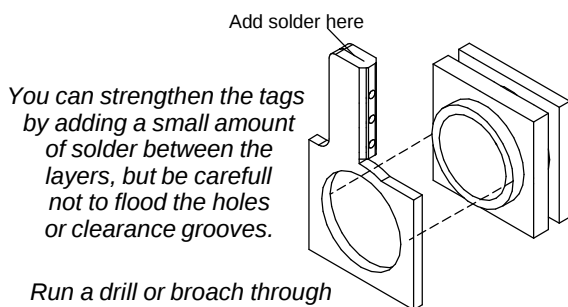
SPACESAVER TAGS



Grip the main etch near the bend line and use a file to push the top tag through about 90 degrees...



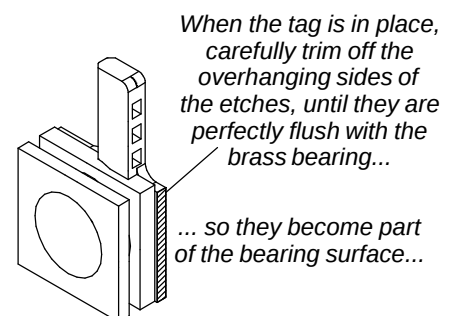
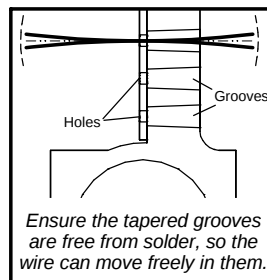
...then use pliers to bend the tag the remainder of the way round to 180 degrees.



You can strengthen the tags by adding a small amount of solder between the layers, but be careful not to flood the holes or clearance grooves.

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...