

Hornby D16 EM Finescale Conversion



Before you start, it is a good idea to have some small containers or snap top poly bags to put screws and components in for safe keeping.....much better than crawling about on the floor trying to find lost bits!

We suggest converting the tender first, as this will be needed to test the loco chassis later because of the electrical engine/tender connection plug and socket.

Tender Conversion.

1. Invert the tender, and hold in a suitable device. We use a foam cradle – the Peco loco service cradle being ideal.
2. Unclip the brake gear, and place to one side.
3. Undo the three screws holding the keeper plate.
4. Remove the keeper plate, then lift out the Hornby wheel sets.



Keeper plate removed – Hornby wheels

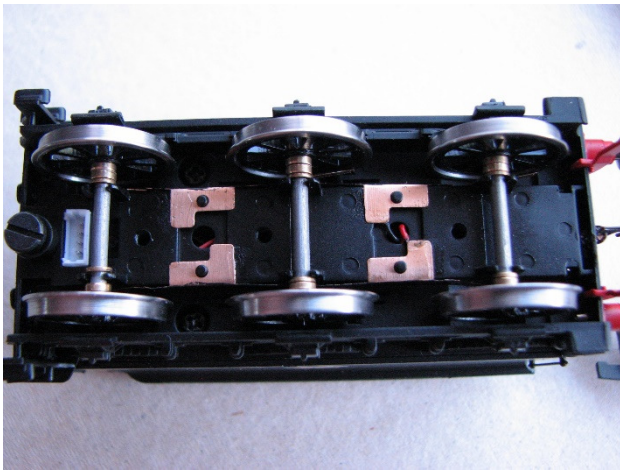
5. Assemble the Gibson replacement wheel sets, using some spacing bushes to take up the extra side play. We used 2 x 1mm + 1 x 0.5mm each side of each axle. You may wish to omit the 0.5mm spacers on the entire axle, depending how much side play you require on the centre axle, but it is a very short wheelbase tender.



Tender wheels assembled with spacer washers.

6. Before replacing the wheel sets, we need to tweak the pickups outwards slightly to compensate for the wider gauge.

7. Place the wheel sets into the chassis.



Gibson wheels installed.

8. The brake shoes need to be well chamfered on the front inside edges to prevent binding on the new wheels. We do this with a needle file, it being easier and safer than a sharp scalpel.....don't ask!!



Brake shoes chamfered for clearance.

9. Replace the keeper plate, and if the wheels revolve freely, fasten down with the three screws.

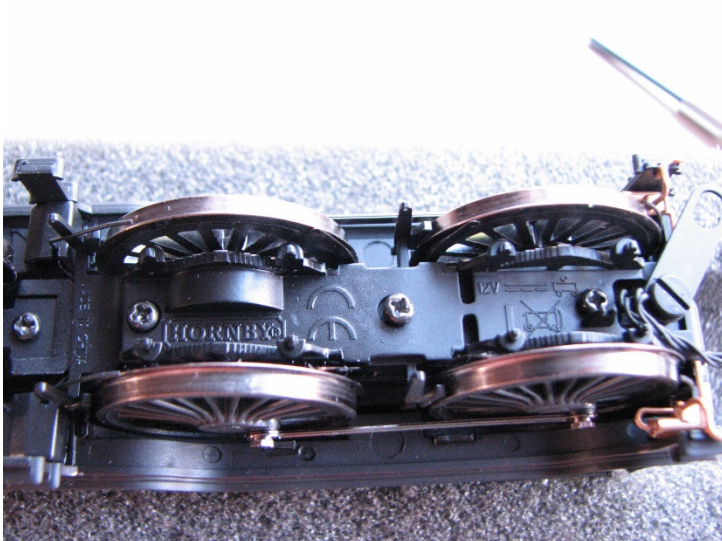
10. Brake rodding can be clipped back in place, and that completes the tender.



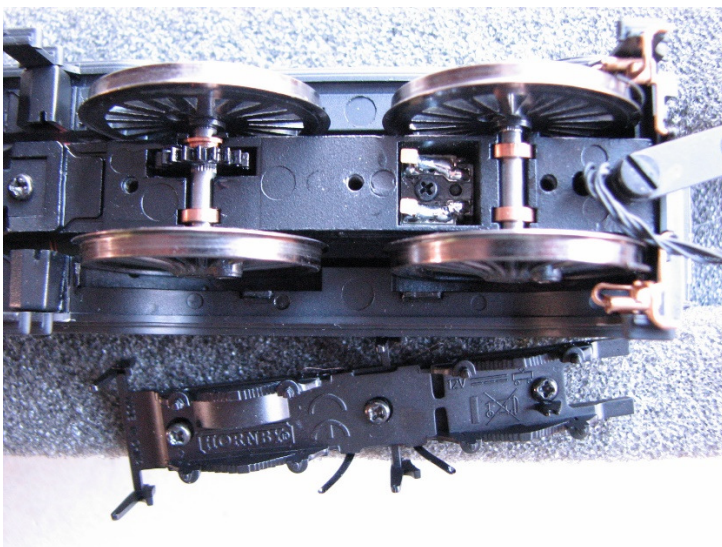
Completed tender.

Loco Conversion.

1. Invert the loco having disconnected the engine/tender electrical socket and plug. We use a foam cradle – the Peco loco service cradle being ideal.
2. Unclip the brake pull rods, and undo the screws holding the keeper plate, it will lift away from the rear and unthread at the front round the sand pipes. This exposes the wheel sets and bearings.

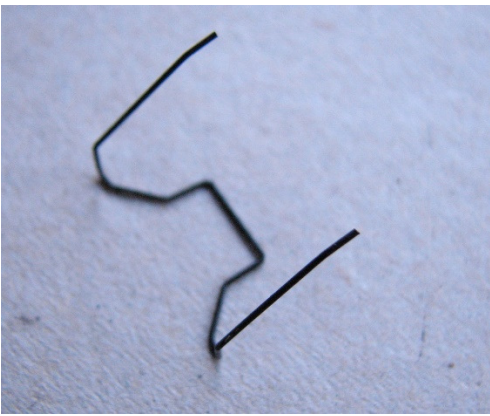


Undo and remove 3 keeper plate screws.



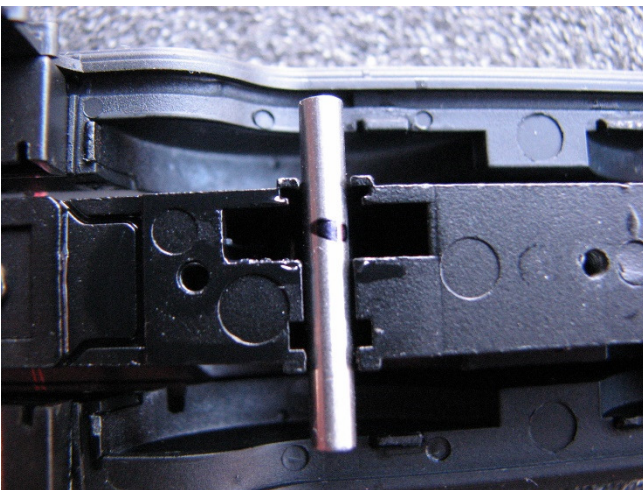
Keeper plate removed.

3. When removing the keeper plate, make sure you recover the front sand pipes, which look like a piece of bent wire, and store safely.



The front sandpipes.

4. Lift out the coupled wheel sets. Undo the crankpin screws, recover the coupling rods and store safely. The crankpin screws can go into the spares box; we have no further use for these!
5. Remove the wheels from the axle by either twisting the wheels off by hand, or punching the axle through the wheels, then recover the gear by holding the axle vertically on a firm surface and pushing the gear straight down with your thumbs – DO NOT TWIST the gear as it is held on a splined surface and twisting may well damage the bore of the gear.
6. We also need to recover the Hornby bushes the axles revolve in and place to one side for safe keeping.
7. The axles need shortening to 22.5mm
8. Take one of the replacement Gibson axles, and place into the inverted chassis driven axle slot above the drive gears. Measure each side to ensure you have it centralised, and mark with a pen (we used a permanent marker) directly above the gear in the chassis that the axle gear meshes with.



Marking gear position on the axle.

9. Place the axle onto a cutting mat or similar, take a hand file of around 6 inches in length, and using the edge of the file with teeth, roll the axle across the mat using the file and a fair degree of pressure at the point where you marked the axle. This will provide a splined effect on the axle sufficient to grip the axle gear wheel we removed from the Hornby axle. Do not allow the file to wander as we do not want any more splines on the axle other than underneath the gear itself. The gear can be pressed onto the axle by holding in your fingers until the splined effect is reached, then hold vertically on a firm surface and push down with thumbs either side until the gear reaches the desired position. This can be simply checked by placing in the chassis and measuring if in doubt.



Gear on new axle.

10. The new wheels can now be prepared. Insert crankpin screws and apply balance weights if desired. We use 10 thou plasticard and a compass cutter to make these.



Wheel preparation.

11. Wheel set assembly can now begin. Also you will need some spacing washers to take up side play, and we find that 2x1mm thick each side gives just a little side play but allows free running. So push the axle just into one wheel, add one sides spacing washers, then the Hornby bushes, followed by the opposite side set of spacing washers. The wheels can now be pressed home to gauge. We use a GW Models wheel and quartering press for this task.

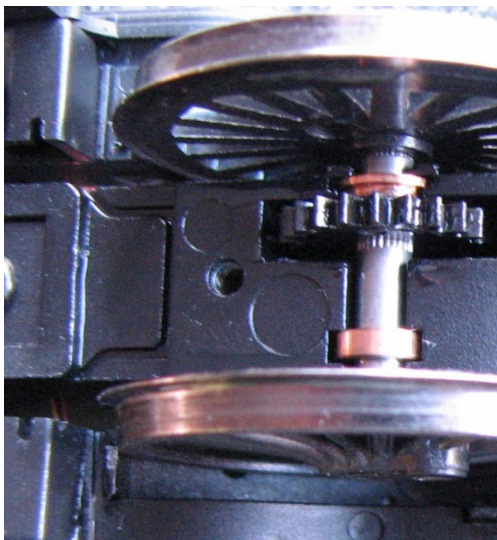
12. Repeat this for the remaining axle.



The driven axle with spacing washers and Hornby bushes.

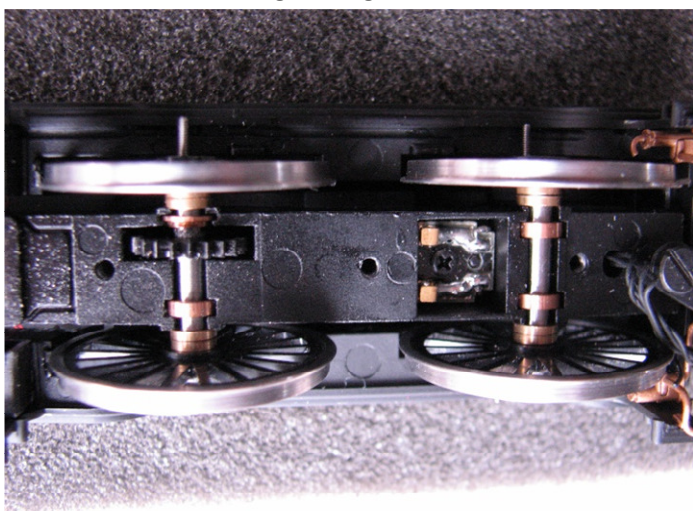
13. The brake shoes need chamfering on the rear of their leading edges, otherwise they act as very good brakes on our wheels, which we do not really want!

14. Once both axles are assembled and placed into the chassis, the sandpipes need placing in their cast slot in the chassis, and then the keeper plate can be replaced and screwed down. Tweak the pickups out slightly to accommodate the wider gauge, easier to do before replacing the keeper plate.



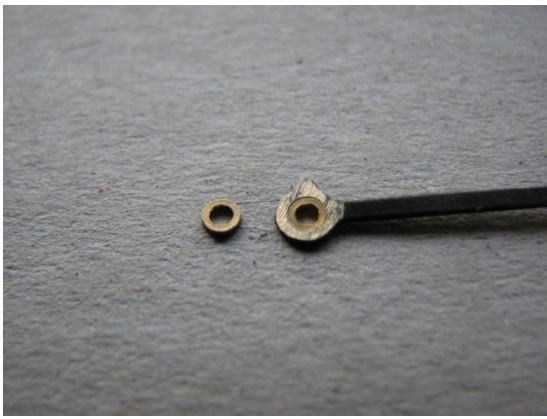
The sandpipes sit in the u shaped groove in the chassis casting in front of the leading driving wheels. (Shown to the left of the driving wheels in the picture).

15. It is always worth placing on the track and applying power gently at this point, just to ensure that all is well and we have free running of the driven axle. Remember with this loco, you will have to plug the loco chassis to the tender again to get it to work!



Assembled wheels installed in the chassis.

16. Next are the coupling rods. The Hornby rods require their large holes reducing in size by bushing. First, clean the rear of the rods around each hole by filing all plating off to expose the base metal. The Gibson rod bushes may require the rod holes to be opened a bit further with a taper broach to allow the bushes to be pressed in. This also cleans the inside of the hole prior to soldering from the back of the rod. Solder each bush in turn. If you accidentally fill the bushes solid with solder, don't panic! Allow all to cool, and you should notice in the middle of your filled in hole there is a slight depression in the centre – use this as your centre mark to run a drill through – simply hold a drill in a pin vice and twiddle away with moderate pressure on a firm surface – not the polished dining table preferably!



Bush inserted into rod ready for soldering.

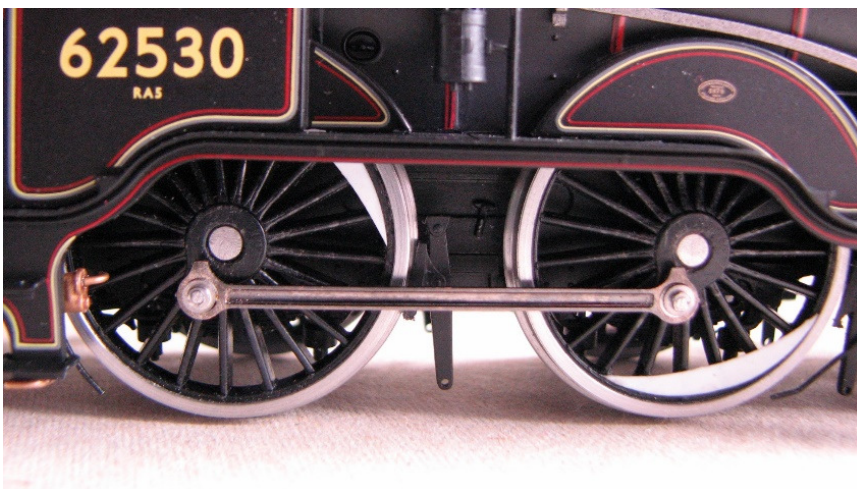
17. The last job on the rods is to make sure the bushed holes are a fairly slack fit over the Gibson crankpin bushes – ream out as required with a cutting broach.



Bushed rods.

18. Place a short Gibson crankpin bush over each crankpin on one side of the chassis, place the correct coupling rod onto the bushed crankpins and retain with the crankpin nuts. You may wish to tighten these finally with fine nose pliers now, or later; but ensure you have firm hold of the wheel so as any turning pressure from the pliers does not move the wheel on the axle, thereby upsetting the quartering.

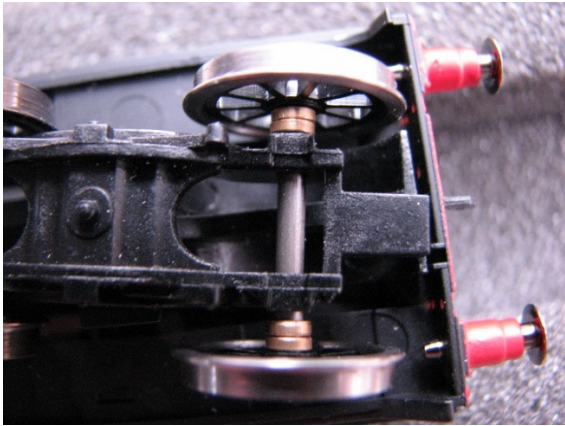
19. Repeat the previous step for the opposite side of the chassis.



Rods fitted to loco.

The Bogie.

1. Remove the Hornby wheels by pulling one wheel off the axle and withdraw the remaining wheel and axle through the bogie casting.
2. Assemble one Gibson bogie wheel onto its axle, add 2 x 1mm spacing washers, then thread through the bogie casting, adding another 2 x 1mm washers to the protruding axle, followed by the second wheel. Do this for both bogie axles.



One pair of wheels installed.

Final Work.

1. The loco should now be plugged electrically into the tender and both placed on the track, power being applied gently to ensure all is well.
2. Once satisfied with the running, the crankpins should be re checked for security, trimmed and tidied up as required, before replacing the chassis into the loco body.
3. Brake gear can now be finally clipped back into place.
4. Lubricate all the new parts.
5. Track test.



Pete Hill
October 2015

Parts Used

- 4800/58 Driving Wheel Pack
- 4M42A Crankpin Set
- 4800 Conversion Washers
- 4M67/3 Washers
- 4844 x 2 Bogie Wheels
- 4847 x 3 Tender Wheels