

Bachmann Midland 4F EM/S4 Finescale Conversion

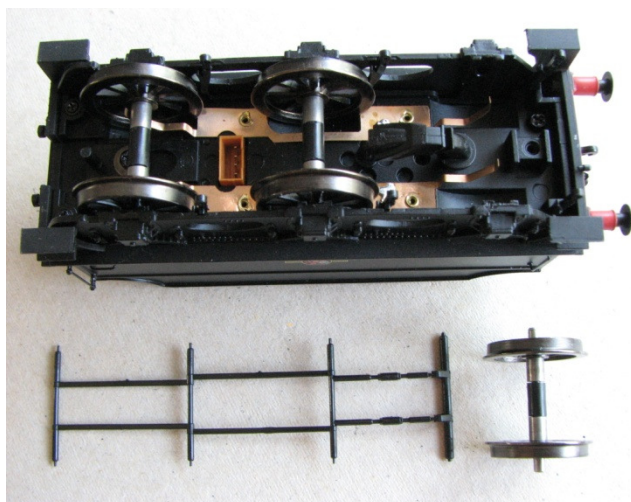


Before you start, it is a good idea to have some small containers or snap top poly bags to put screws and components in for safe keeping.....much better than crawling about on the floor trying to find lost bits!

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.

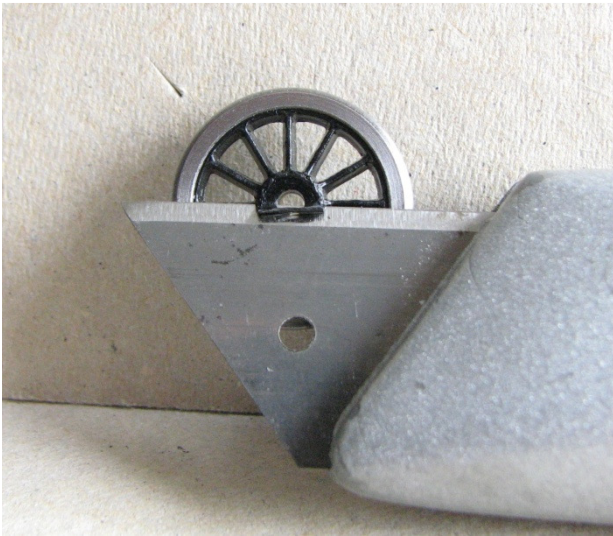
1. Invert the tender, and hold in a suitable device. We use a foam cradle – the Peco loco service cradle being ideal.
2. Unclip the brake gear, and place to one side.
3. Spring out the Bachmann wheel sets.



4. Remove the Bachmann wheels from their axles, and replace with Gibson scale wheels onto the Bachmann shouldered axles. Grip the axle by the metal portion near the end, not the hollow plastic middle part.



Removing Bachmann wheel.



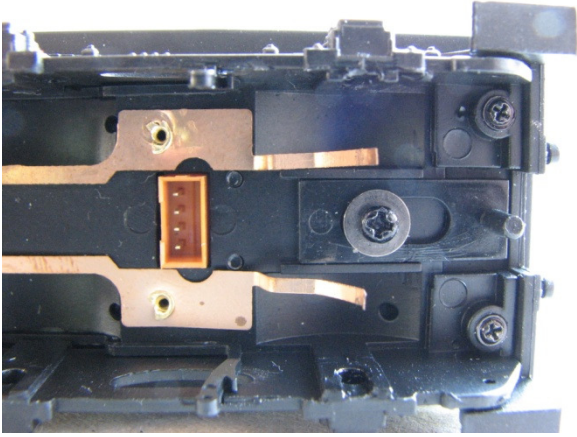
Removing wheel boss.

5. However as clearance is tight, we removed the boss of the Gibson wheel before mounting on the Bachmann axle.



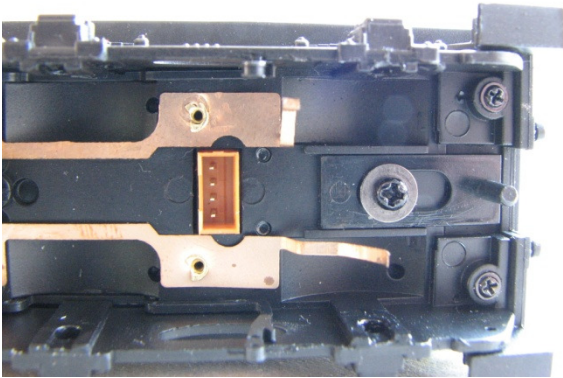
Gibson wheels mounted onto Bachmann axle.

6. Before replacing the wheels into the tender, we need to modify the Bachmann pickup arrangement so that it picks up from the wheel tyre and not the stub axle.



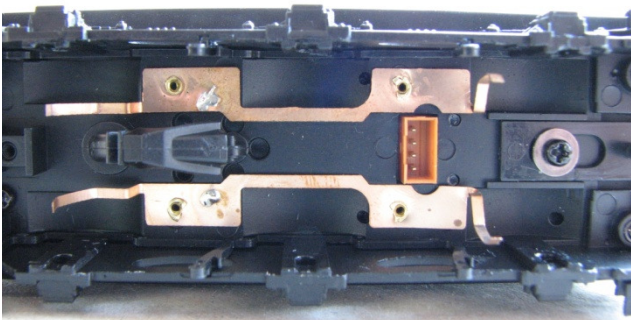
Pickups as supplied.

7. We need to turn the pickups through 90 degrees. Grip the base of one pickup using fine nose pliers, and simply twist through 90 degrees.



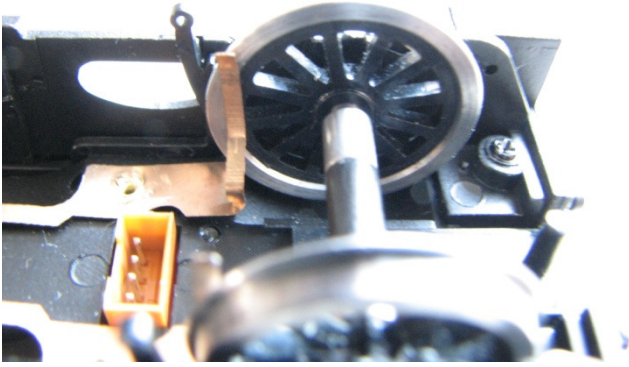
Upper pick up bent through 90 degrees.

8. Do the same for the remaining pickups.



Right hand pickups modified.

9. Once the 4 pickups have been modified, the wheels can be put back in the chassis, and the pickups adjusted so they just bear lightly on the wheel rim backs.



Pick up resting against tyre rim back.

10. The brake gear can be clipped back in place, or left until later as it makes plugging loco/tender together a bit easier.

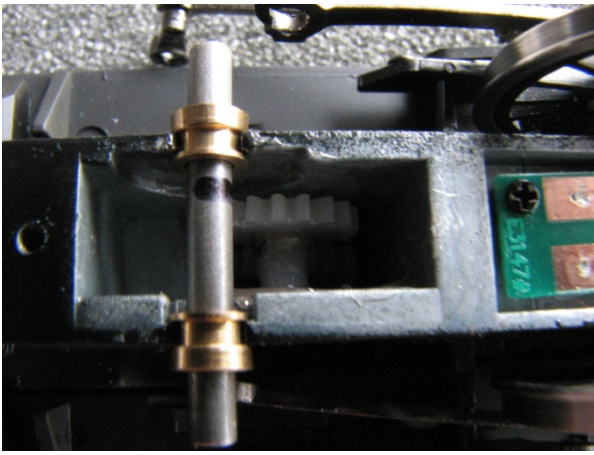
Loco Conversion.

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 unhook from the front of the chassis. This exposes the wheel sets and bearings.



Keeper plate removed exposing axles and bearings.

3. 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!
4. 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.
5. Take one of the replacement Gibson axles, and place into the inverted chassis centre 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.

6. 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 Bachmann 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.



Axle knurled for gear.

7. 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 we found was 8mm from plain side of the gear to the axle end.



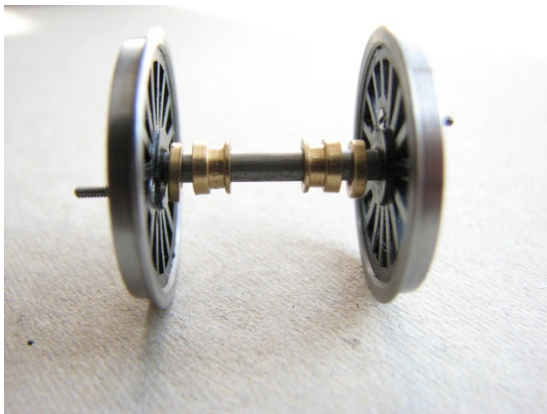
Gear on new axle – note boss faces chassis centre.

8. The new wheels can now be prepared. Because the wheels are moulded from older tooling, the crankpin screw holes will need drilling first. Just follow the simple instructions supplied with the crankpins; metric drill size required is 0.7mm. Insert crankpin screws and apply balance weights if desired. We use 10 thou plasticard and a compass cutter to make these.



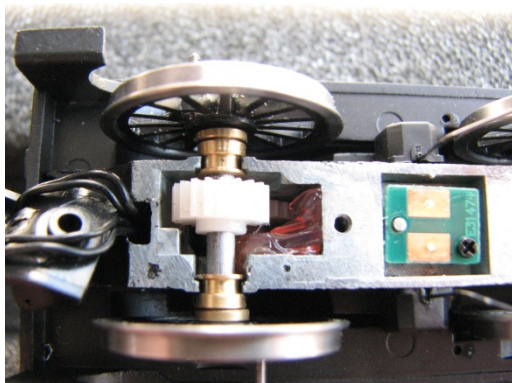
Wheel preparation.

9. Wheel set assembly can now begin. Also you will need some spacing washers to take up side play, and we found that 1x1mm thick each side gives a little side play. So push the axle just into one wheel, add one sides spacing washers, then the new axle bushes with the thicker flanges outermost (that is with the thin flanges back to back!), followed by the opposite side set of spacing washers. Then place the second wheel on the axle and set to the correct back to back. Quartering was by eye viewing through the spokes, as the usual axle press does not accommodate 2.5 axles.



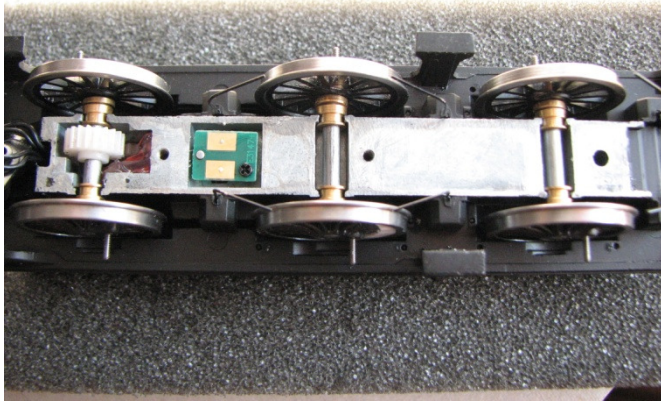
Wheels and bushes assembled on an axle.

10. Repeat this for the remaining axles.

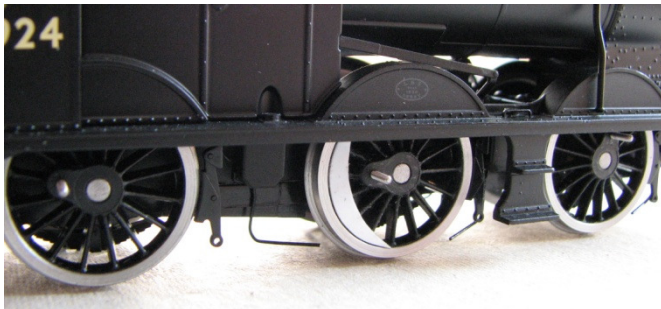


Driven axle with spacing washers placed in chassis.

11. Once all 3 axles are assembled and placed into the chassis, the keeper plate can be replaced and screwed down. 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!



New wheels and bushes installed.



Wheels installed.

12. Next are the coupling rods. The Bachmann 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!

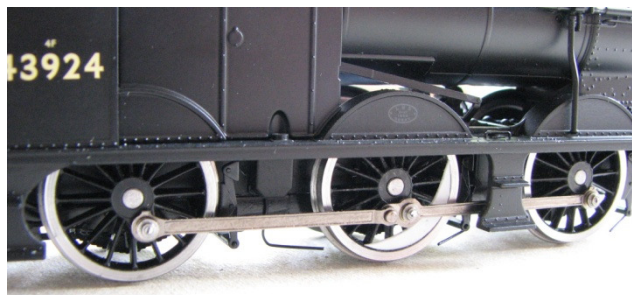


Bush inserted into rod ready for soldering.

13. 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.

14. 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.

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



Converted loco ready for track test.

16. 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.

17. Once satisfied with the running, the crankpins should be re checked for security, trimmed and tidied up as required.

18. Engine and tender brake gear can now be finally clipped back into place.



Pete Hill, August 2013

Parts List

Driving wheel pack 4800/47 x 1
Crankpin Set 4M42B
Crankpin Washers for Conversion 4800 x 1
Tender wheels 4851 x 3