

Marcus Burrows F4/5/6 Chassis

Notes

The chassis is designed to fit the Alan Gibson body kit and to be built with CSB suspension. The fulcrum points are built into the frame spacers and carrier tags are included on the fret combined with the driving wheel springs. For simplicity pony trucks that make use of the CSB suspension are provided rather than the proper radial trucks of the prototype. It is designed for P4 but can be built in EM with just a little extra work.



The chassis is designed to be used with High Level hornblocks. These should be attached to the **outside** of the frames. The horncheeks on the High Level hornblocks sit against the top of the cut outs in the main frames.

Due to the long nature of the prototype the minimum radius you can expect the chassis to traverse is around 1m.

All fold lines are through 90° with the fold line on the inside unless stated otherwise.

Refer to the instruction drawing as you progress.

F4/5/6 Chassis Parts List

- | | |
|--------------------------------------|--|
| 1 – Main frames (fold up to P4) | 11B – Rear pony truck (P4) |
| 2 – Front frame spacer (EM only) | 12 – Pony truck axle washers |
| 3 – Rear frame spacer (EM only) | 13 – Pony truck pivot washers |
| 4A-4E – Frame spacers (P4) | 14 – Pony truck side detail overlays |
| 5A-5E – Frames spacers (EM) | 15A – Ashpan detail (front) |
| 6 – Spring carriers/cosmetic springs | 15B – Ashpan detail (back) |
| 7 – Coupling rods | 16 – Brake shoes |
| 8 – Driving wheel washers | 17 – Brake pull rod |
| 9 – Cosmetic overlays | 18A – Brake shaft crank (cab hand brake) |
| 10A – Front pony truck (P4) | 18B – Brake shaft crank (air cylinder) |
| 10B – Rear pony truck (P4) | 19 – Balance weights |
| 11A – Front pony truck (P4) | |

Components

0.5mm wire, 1mm wire and 11/32" tube (K&S 134) are needed to complete along with 2 pairs of standard 1/8" High Level Hornblocks. A pair of 10BA nuts and short (6mm) bolts are also required for locating the pony trucks.

Driving wheels on the prototype were 5'4" 16 spoke with 11" crank throw.
Leading and trailing wheels were both 3'9" 10 spoke.

Ultrascale 5'3" driving wheels (LMS 4F) are recommended along with their 3'8" 10 spoke LNER pony truck wheels.

A High Level RoadRunner+ gearbox is recommended driving the front axle. There should be sufficient room for either a 1426 Mashima motor or a 1420 Mashima motor with 6mm flywheel.

Spring Wire

The CSB plot for this chassis is designed to produce a 0.5mm spring wire deflection with the following combination of wire and loco weight:

0.012" wire	250g loco weight
0.013" wire	340g loco weight
0.014" wire	460g loco weight

Choose a gauge that best matches the weight of the finished loco and chassis adding a little additional ballast if required. I use Ernie Ball guitar strings for my suspension. They are available singly and aren't expensive. If you are unsure of what the weight of the loco would be use a light gauge of wire to test the chassis, even something like 0.010" would be good for this. The CSB wire can always be replaced at a later date.

If you choose to use side play springs on the pony trucks then I would recommend starting with a gauge of around 0.010".

Construction

1 – Provision has been provided for fitting plunger pickups. If you wish to use them then drill out the half etched holes on the inside of the main frames. Don't worry if you have assembled the frames and forgotten to do this or decided later to use them; the holes are etched in the outer layer and can be used to pilot holes in the main assembly once the outer frames are soldered on. If building in P4 fold up main frames (1). If building in EM remove the frame spacers attached to the main frames and use front (2) and rear (3) frame spacers when assembling the chassis.

2 – Remove the frames spacers 4A-E or 5A-E depending on your gauge. Side control is provided for the pony trucks and if you wish to take advantage of it make sure the small holes in spacers A, B, D and E are cleared out with a 0.3mm drill. Fold up the frames spacers. The pivot holes for the pony trucks are designed for 10BA bolts. Solder a 10BA nut onto frame spacers B and D. Fit the frame spacers to the mainframes making sure everything is square.

3 – Make sure that the holes in the spring carrier/cosmetic spring (6) will fit the High Level bearings and adjust if necessary. The holes for this may be quite tight, so ream them out while the parts are still attached to the etch; the torsion of the reaming process may otherwise distort or even break the part. Fold up as per Fig. 1 making sure the small tab on the top that the CSB spring sits on is folded out. Solder to the back of the bearing. If you have already removed the parts from the etch, it may prove easier to file off the raised bush on the back of the hornblock and to solder the carrier on, making sure it is central. The fold and CBS tab will locate it vertically.

4 – Remove the coupling rods (7) and solder together.

5 – Fit the High Level hornblocks to the main frames using the coupling rods making sure they go on the outside not the inside. Make sure, also that the folder over tab does not foul the chassis frame – a quick touch with a small file is all that is needed. Thus, the hornblocks/springs should slide freely and smoothly. Fit the wheels, axles and gearbox. Fit the CSB wire through all the holes in the frame spacers and make sure you have a smooth running chassis. Driving wheel washers (8) are provided to take out any side play in the driving wheels but I doubt they will be needed especially in P4.

Balance weights (19) can be fitted at this point. Note there are two types. The crescent moon type was more common but check your prototype.

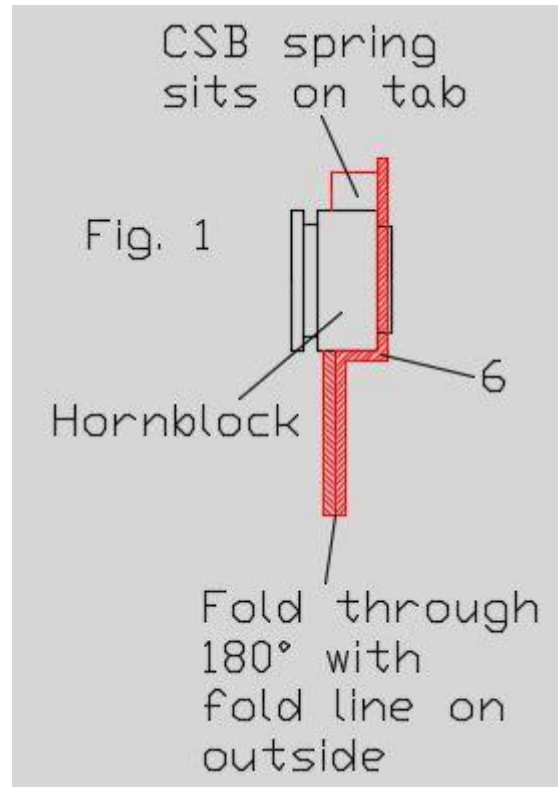
6 – Once the wheels are fitted place the chassis on some track and bend up the guard irons at the front and back.

7 – Press out the half etched rivet detail on the cosmetic overlays (9) and fit to the main frames. Use the two sets of holes for the brake shoe hangers (0.5mm wire) and the main brake cross shaft (1mm wire) to align everything and solder in place. If using plunger pickups the holes for them can now be enlarged.

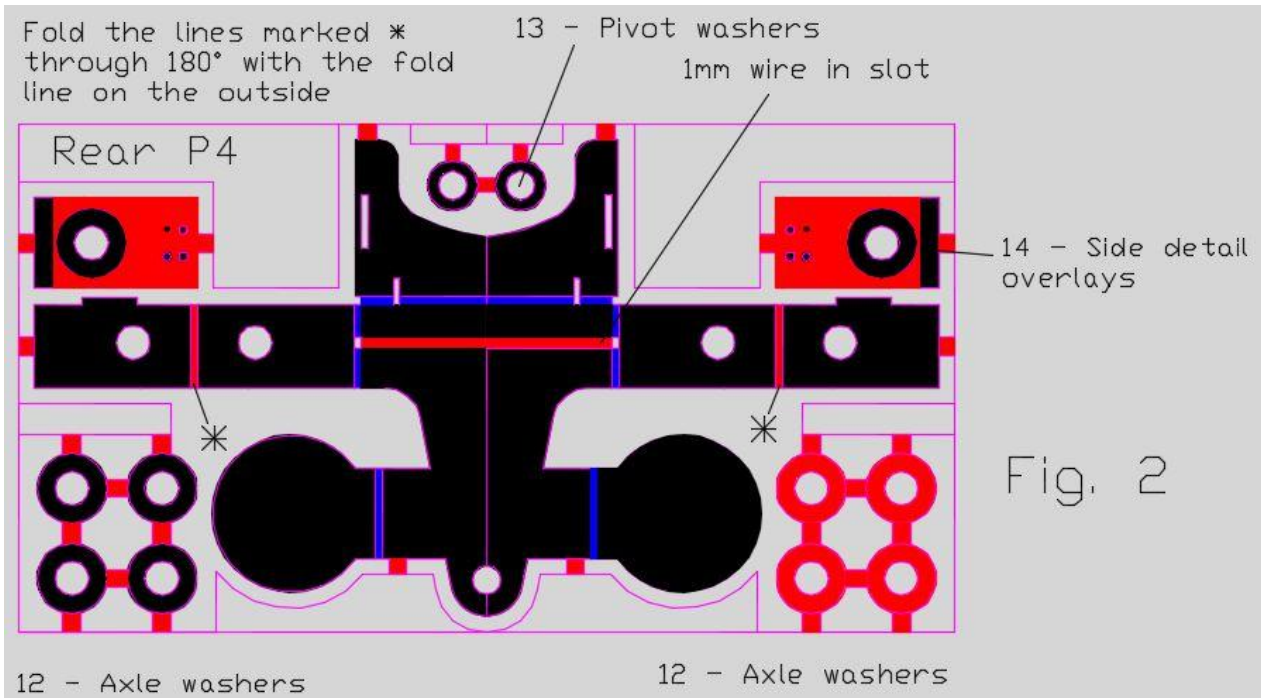
8 – The pony trucks (10A/B and 11A/B) can now be folded up. See Fig. 2. Note that the fold lines marked * are through 180° with the fold line on the outside. Solder everything together fitting the pony truck side detail overlays (14) and also a length of 1mm wire into the slot on the top of the pony truck. This will act as a bearer against the CSB spring wire.

On the rear pony truck a piece of 1 1/32" tube can be used to replicate the air reservoir. This needs to be cut to 11.5mm for P4 and 9.7mm for EM then fitted between the two end outlines. Before doing so, install the 10BA bolt to secure the truck to the chassis. The clearances are tight here; experience in building this chassis has shown that the bolt cannot be fitted afterwards without some serious distortion to the assembly. To make matters more convenient, you may also file a groove down the centre of the tank to allow the bolt to be removed when necessary.

There is no provision for the fitting of bearings in the pony trucks. Three layers of 15 thou brass should more than suffice. Open out the holes for the axles if necessary and fit the wheel using the axle washers (12) if necessary. Make sure you have bent them up and soldered them together true so both wheels sit on the track at the same level.



Fit the pony trucks to the chassis using a 10BA bolt making sure there is a spacing washer (13) between the pony truck and the frame spacer on the chassis.



9 - The ashpan detail comes in two parts, front (15A) and back (15B). Use lengths of 0.5mm wire to pin the two parts together and also to fit to the main frames.

10 - Solder together the three layers that make up the brake shoes (16). The one with the half etched area goes on the outside. Use a length of 0.5mm wire through the middle hole to align everything. Once soldered trim this piece of wire to represent a bolt.

Make sure the holes in the brake shoes can accept 0.5mm wire. Along with the smaller holes in the brake pull rods (17), brake shaft crank (cab hand brake) (18A) and brake shaft crank (air cylinder) (18B). Also make sure the larger holes in 17, 18A and 18B can accept 1mm wire. Solder short lengths of 0.5mm wire into the smaller holes on 18A and 18B and trim to represent bolts. Fit lengths of 0.5mm wire through the main frames and solder the brake shoes in place making sure they line up with the driving wheels. If you wish to make the brake shoes removable it is recommended that you fit short lengths of 1mm x 0.5mm tube to act as spacers at this point. Once everything is in place the wire can then be cut on the inside of the mainframes. Fit lengths of 0.5mm wire through the bottom holes of the brake shoes and then fit the pull rods. Fit a length of 1mm wire through the pull rods and the main frames along with the two brake shaft cranks. The brake shaft cranks locate into slots in the frame spacer. The cab one goes just behind the left hand main frame and the air cylinder one slightly inboard of the right hand main frame.

Trim the various wires.

11- Add pickups and paint!

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