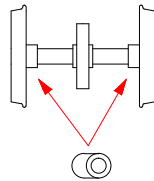
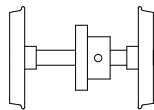


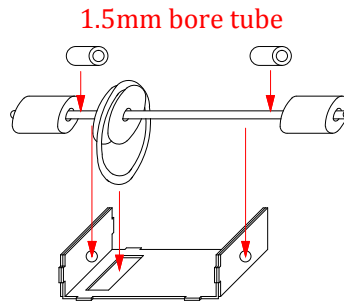
This is what the axles should look like when assembled. Cut the axles to the total of the back to back measurement plus twice the wheel thickness and chamfer the ends. Cut lengths of tube to take up the free play, you only need a tiny amount. Assemble as shown in the sketch, the gear must be central.



2mm bore tube

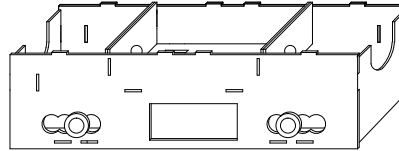


Some kits may have the grub screw gear which will look like this when fitted. One side of each end spacer will need trimming to clear the boss.

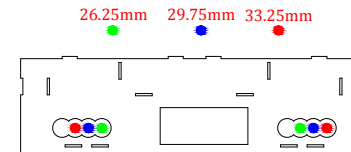
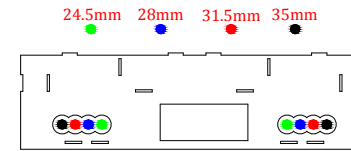


1.5mm bore tube

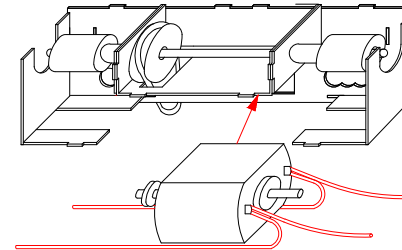
Thread the shaft through one end of the bracket and loosely fit the large pulley, reamed to be a tight fit, and O ring. Position the shaft centrally with the pulley in the cut out, lock with super glue if it is too loose. Fit the worms with short sections of tube or washers to position the worms over the axles. When happy that it all lines up, lock the worms in place allowing at least 0.5mm end play.



Fit the bushes in the correct holes for your gauge, 28mm shown. Refer to the diagrams on the right for the holes to use. Use a round file to ease the fit, not a broach or drill.

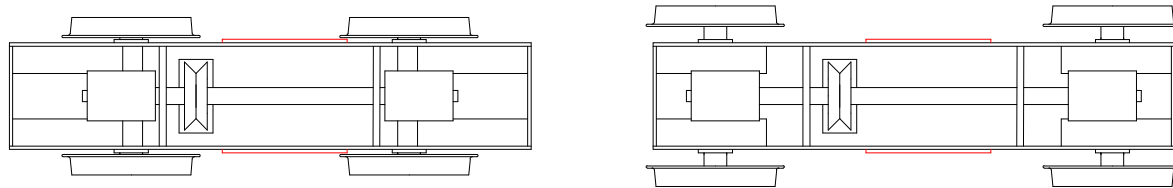


Lay shaft, worms, pulley and O ring assembled. One side missing for clarity, you should have both sides fitted.

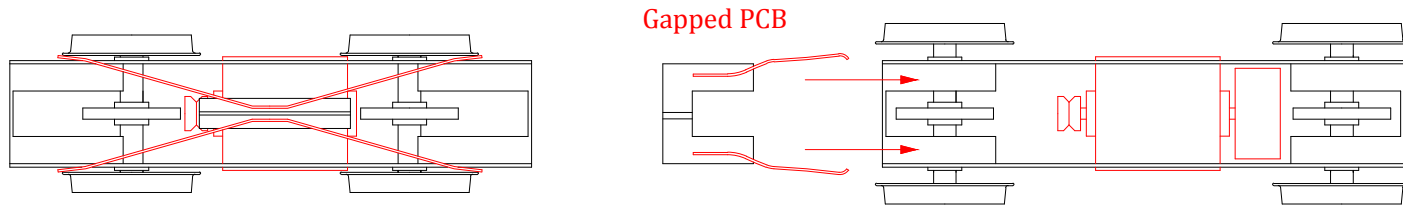


The motor fits underneath but cut the shafts and fit the wires and pulley first as access is difficult after fitting. Insert one curved side into a cut out and push firmly on the other side to seat it. The motor does not need fixing but double sided tape can be added under the top spacer if you wish.

Examples shown here, not to scale, are on the left a 24.5mm WB unit in 12mm gauge, on the right a 35mm WB unit in 14mm gauge, both with 12mm wheels.



Viewed from above, the 24.5 and 28mm units need just a single washer as a shim between the worm and bracket at each end. The 31.5 and 35mm units will need a piece of tube around 3.5mm long at each end. Clearance between the motor and backs of the wheels is tight on the 24.5mm WB unit in 12mm gauge, a small piece of sticky tape over the rear corners of the motor will prevent shorts. This only applies to 24.5 WB, 12mm gauge and 12 or 14mm wheels, all the others have plenty of clearance. Motor shown in red.



Viewed from below, the lack of clearance of the pulley and gear wheel can be seen. Cut the motor shaft as short as possible and keep the pulley close to the motor. In 31.5 and 35mm there is room for an 8mm diameter flywheel which I can supply separately. Cut PCB to fit at each end and around the gear wheel on the longer WB units, they must be gapped by filing a slot through the copper. The shorter units work best with a central PCB, shown on the left, which can be used on any type if you wish. The motor case does not take glue well unless the black is rubbed back with abrasive. Use the phosphor bronze wire to form pick ups and wire to the motor.



Universal Power bogie

This kit will make up into a 4 wheel drive bogie / power unit with a wheelbase of 24.5, 28, 31.5 or 35mm, to any gauge from 12 to 16.5mm. It can be made to wider gauges but longer axles will be required. The gear ratio is around 45:1 giving superb slow running with a reasonable top speed. If you need a faster speed I can supply pulleys of a different ratio but slow running will suffer a little.

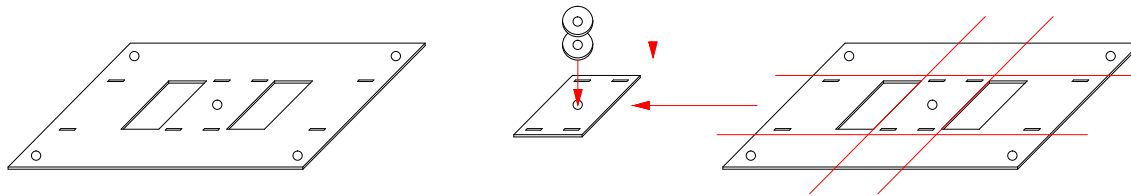
The pulleys supplied are 3D printed and may look a little wonky, but they will run fine, even if not perfect. If yours don't run well, ask me for another pair. They come with undersized holes which need opening out to 0.85mm for the motor and 1.3mm for the shaft. They are best as a tight push fit but they can be glued if you make them too loose.

It is easy to assemble so no written instructions are included, just follow the sketches and notes below. The wheelbases were chosen to equal 3'6", 4', 4'6" and 5' in 7mm scale. You can also build 26.25mm (3'9"), 29.75mm (4'3") and 33.25mm (4'9") by following the second colour coded sketch below.

Although the motor is rated at 9 volts, it is quite happy on 12 volts, as long as it is not continuous. This is highly unlikely in model railway use so no extra precautions need to be taken. For use with DCC, extend the motor wires so they will reach the chip and run wires from the pick ups to the chip.

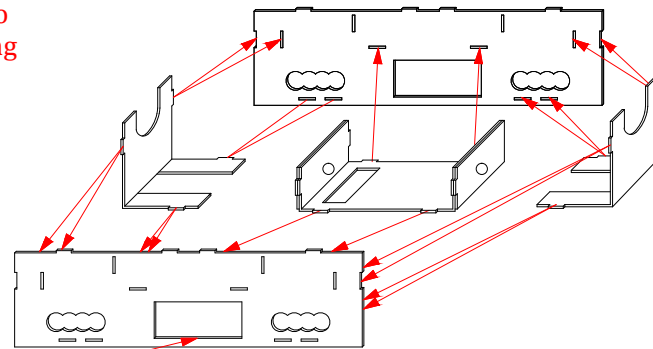
If you need help with assembly or have comments to make, email me on borsig1958@gmail.com or call 01634 575081 before 8pm.

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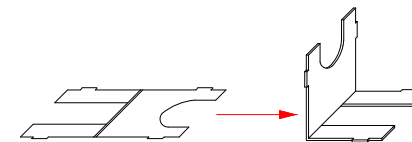


If using the unit as a power bogie, you can cut the top plate to leave just the centre part, solder on one or two washers and use this as a pivot point.

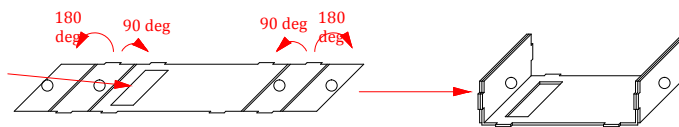
Fit the top plate onto the tags as a mounting plate or leave it off and file off the tags.



Note that the cut out for the motor is nearer one end so make sure both sides are the same way round. The cut out in the top spacer must be nearer the other end. In the sketch the motor cut outs are nearer the R/H end and the O ring cut out is nearer the L/H end.



The end pieces can be fitted before or after the shaft, worms and pulley are fitted. Although the cut outs allow access for the shaft, it becomes more fiddley. When fitting to a 31.5 / 35mm unit, the end spacers must go in the outer slots. For 24.5 / 28mm they can go in either. When using the inner slots, the excess side frames can be cut off if required.



Open holes to fit 1.5mm shaft before fitting