


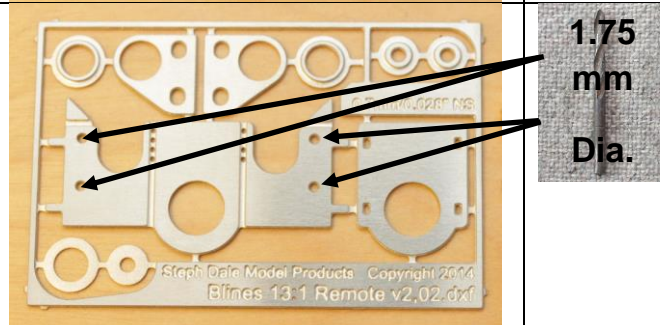
## Instructions for Blines 13:1 'Remote Mk2' Gearbox







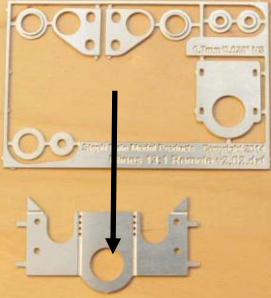


### Introduction









1. These gearboxes are much more closely toleranced than typical 'fold-up' types and care is required in their assembly. Taking a little care and time will result in an exceptionally quiet, smooth and long-lasting gearbox.
2. Failure to follow this procedure is likely to result in a gearbox that will not run (or not run well) – this is not a warranty issue although I will happily provide replacement frets or other components (at cost) should you run into difficulties.
3. These gearboxes use the cusps on the fret as a means to control tolerances – **DO NOT REMOVE CUSPS FROM ANY OF THE COMPONENTS UNLESS DIRECTED.**
4. Twisty-tabs. These components use twisty-tabs to position and secure the components before soldering. Twisting the tabs approximately 90degrees will hold the parts firmly relative to each other in preparation for soldering.

### Additional items

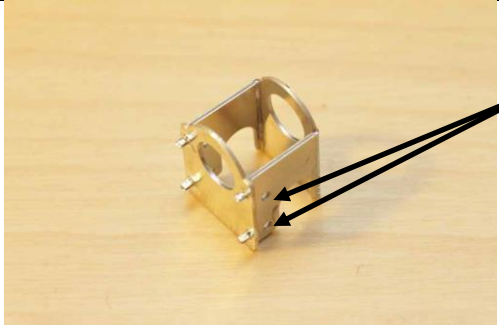

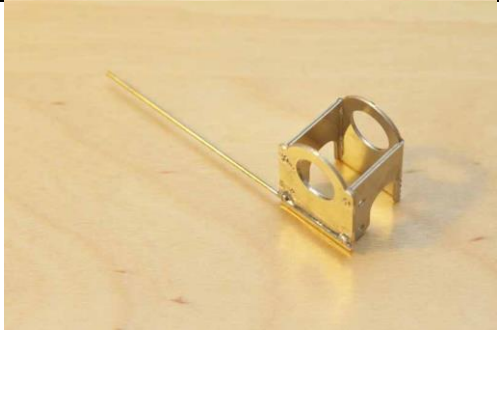
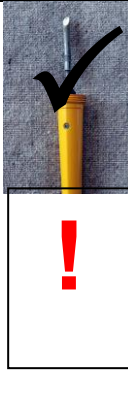



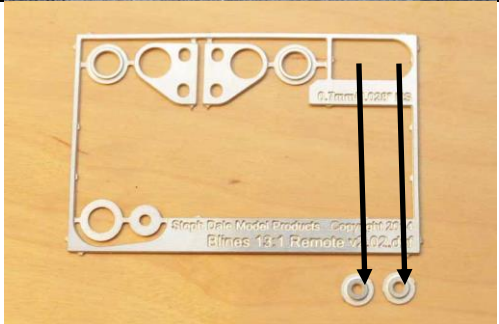

1. Axle/wheelset of your choice, on a 3/16" diameter axle. These instructions show a Slater's axle in use.
2. A universal joint/drive coupling. For coupling this gearbox to a motor or adjacent gearbox. Suitable items are available from me (in the form of a low-cost silicon tube 'ball drive') as well as Branchlines, Exactoscale, etc.







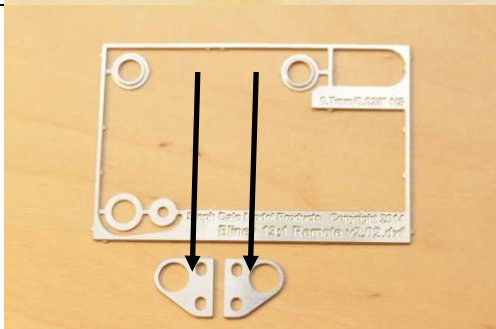

No.	Illustration	Symbols	Text
1			<p>First job is to check you have everything:</p> <p>Fret x1            FR156zz 3/16" id bearings x2            MF62zz 2mm id bearings x2            Gearset x1            M2x2mm screws x4            2mm diameter silver steel x1</p>
2		1.75 mm Dia.	Drill the four fixing holes 1.75mm.



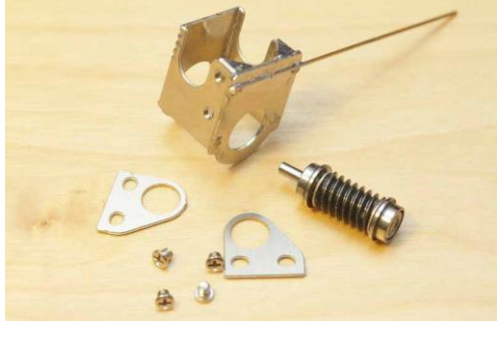


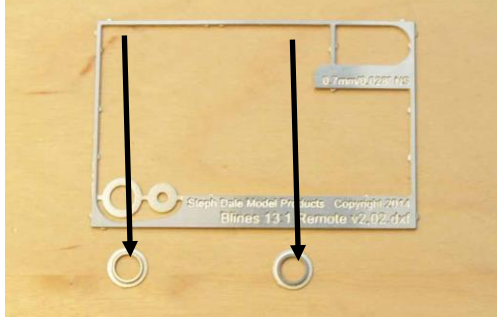

3			<p>Test fit the bearings in the holes as shown.</p> <p>Do not fix at this stage.</p>
4			<p>Test fit the bearings on the 2mm diameter silver steel shaft.</p> <p>If it's too tight then you can polish the motor shaft with emery paper until it just fits.</p> <p>Do not fix at this stage.</p>
5			<p>Test fit the bearings on to the axle you'll be using.</p> <p>If it's too tight then you can polish the axle with emery paper until they just fit.</p> <p>Do not fix at this stage.</p>
6			<p>Cut the main part of the gearbox from the fret.</p>
7			<p>Bend up the front and back to 90 degrees.</p>

8			<p>Bend down the two top ears to 90 degrees.</p>
9			<p>Cut the sideplate for the gearbox from the fret.</p>
10			<p>Check that the sideplate and the main part of the gearbox fit together easily on the tabs.</p> <p>If you find that any of the tabs are too tight they can be eased now.</p> <p>Do not solder at this stage.</p>
11			<p>Twist the tabs to lock the parts together.</p>
12			<p>Run solder around the joints and folds.</p> <p><b>Note: Do not allow solder to remain around the bearing holes.</b></p>








13			Tap the holes in the frame M2 for the provided screws.
14			<p>If necessary the tabs can now be trimmed off and/or a torque arm fitted to the gearbox</p> <p><b>Note: Do not allow solder to remain around the bearing holes.</b></p>
15			Cut the shaft to a suitable size for your application. De-burr both ends
16			Carefully remove the burrs from the end of the worm.
17			Remove the two small shaped washers from the fret.

18			Carefully de-burr the back of the washers.
19			<p><b>Note:</b> The smaller washers always fit with the worm in this position. The shaped side should always be away from the worm.</p>
20			<p>Assemble the washers, bearings and worm on to the silver steel shaft.</p> <p><b>Note:</b> These bearings fit with the flanges on the inside of the gearbox.</p>
21			Test fit the worm shaft and bearings in to the gearbox frame.
22			Remove the bearing holders from the fret.

23			<p>Fit the bearing holders to the frame, both front...</p>
24			<p>...and rear.</p> <p>At this stage test that the shaft turns over smoothly.</p>
25			<p>Removing the screws will allow this entire assembly to be separated from the gearbox and also provides a means of adjusting the mesh of the gears when finally assembled.</p> <p>At this stage the gearbox frame and bearing holders may be blackened, if desired. Allow to dry completely before continuing.</p>
26			<p>Fix the two larger bearings with retaining compound. I use Loctite 603.</p> <p>Take care not to get any of the retainer on the faces or races of the bearings – they will seize solid in no time. If you think this has happened remove them from the frame and if found to be seized I can supply replacements for a nominal fee.</p>
27			<p>Remove the two large shaped washers from the fret.</p>



28			<p>Carefully de-burr the back of the washers.</p>
29			<p><b>Note:</b> The larger washers always fit with the gear in this position. The shaped sides of the washers should always be away from the gear.</p>
30			<p>Test fit the axle, gears and washers into the gearbox.</p> <p>At this stage test that the axle turns over smoothly.</p>
31			<p>Replace the worm unit, bearing holders and screws and adjust the mesh of the gears by sliding the holders up and down in the frame, before locking off the screws.</p> <p>The screws can be fitted with Loctite 242 or similar if desired.</p> <p>You should now have a fully functioning gearbox.</p>

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At this stage I lubricate the gears with a little gear lubricant which must be plastic compatible.

The aim is to get a thin, even coating on both the gear teeth and worm. I use Woodland Scenics Hob-E-Lube 'Gear Lube' (Item WHL655).

The bearings are lifetime lubricated and will need no further lubrication.