

## MARKITS GEARS SINGLE STAGE GEARBOXES

These gearboxes are much more closely tolerated 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.

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 we will happily provide replacement frets or other components (at cost) should you run into difficulties.

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.**

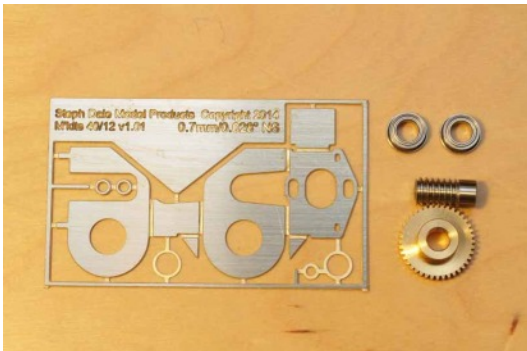
The reamers mentioned in the instructions can be obtained inexpensively from discount tool sellers and even from well-known on-line auction sites. They are recommended for the assembly of the gearboxes as they result in the necessary accuracy in the opening of the critical holes as well as being speedy to use.

Twisty-tabs. These components use twisty-tabs to position and secure the components before soldering. Twisting the tabs approximately 90° will hold the parts firmly relative to each other in preparation for soldering.

### Additional items

Axle/wheelset of your choice, on a 3/16" diameter axle. These instructions show a Slater's axle in use.

### Step 1



First job is to check you have everything:  
 Fret x1 (40:1, 12mm motor fixing fret shown)  
 FR156zz 3/16" id bearings x2

### Step 2



The bearing holes have been reamed for you. Test fit the bearings in the holes as shown. Do not fix at this stage.

### Step 3



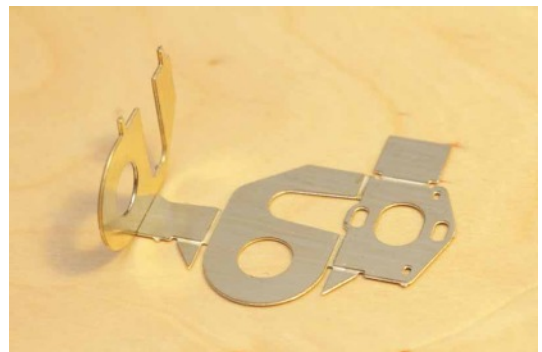
Test fit the bearings on to the axle. If it's too tight then, polish the axle with emery paper until the axle just fits. Do not fix at this stage.

### Step 4



Cut the main part of the gearbox from the fret.

### Step 5



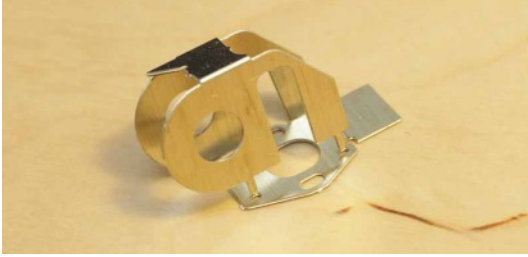
Bend up the front to 90°.

### Step 6



Bend the second fold to 90°.

## Step 7



Bend the back to 90°.

## Step 8



Twist the tabs on the backplate to lock the two ends together.

## Step 9



Bend down the top tab to 90°.



Bend in the two corner ears to 90°.

## Step 10



The joints and all other bend lines can now have solder run in. Take care to ensure that solder does not get on to the surfaces that seat the bearings.

## Step 11



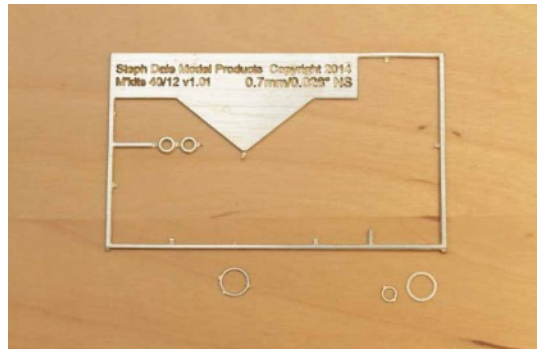
Rub down the back of the gearbox on a flat surface.

## Step 12



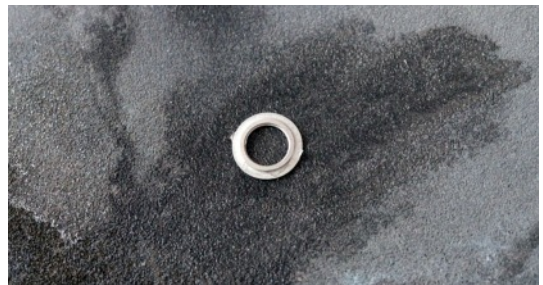
You should now have a frame like this, with a smooth back.

## Step 13



Remove the washers from the fret.

## Step 14



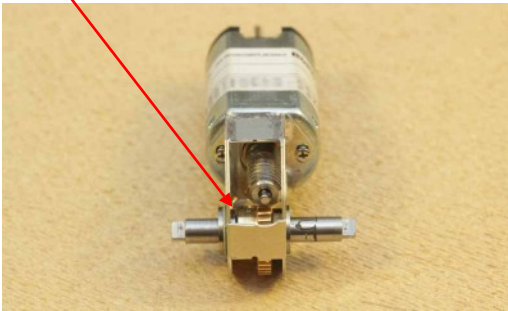
Carefully de-burr the washers.



## Step 15



**Note:** If your gearbox is provided with extra bearing-size washer(s) it goes between the bearing flange and the frame on this side.



Fix the two bearings with retaining compound. Loctite 603 is recommended.

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, we can supply replacements for a nominal fee.

## Step 16



Assemble the small washer and worm on to the motor front shaft.

## Step 17



Gently hold the worm home on the shaft and tighten the grub screw; you need the motor to turn smoothly but with minimal float on the shaft at this stage.

## Step 18



Fit the motor and worm to the gearbox.

## Step 19



**Note:** The axle washers always fit between the gear and bearing in these positions.

## Step 20



Test fit the axle, gear and washers into the gearbox.

At this stage test that the axle turns smoothly. Gear mesh can be adjusted at this time moving the motor/screws up and down in the slots on the backplate. Test that the motor still turns over smoothly and that the gears mesh smoothly; it may take several goes to get this absolutely perfect.

## Step 21

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.