

## BEETLE IRS CONVERSION

by Dave Ellis, in association with



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Carrying out an IRS conversion is undoubtedly easier when the body is removed from the floorpan, as in this case, but can still be carried out with the body in place, it's just a bit harder!

All the information below is based on the conversion I carried out on a 1971 1300 floorpan. As such some details, such as gearbox mounts, may be slightly different if carrying out the conversion on an earlier or later floorpan.

When carrying out the conversion you'll need:

- a pair of weld on IRS brackets
- an IRS gearbox and drive shafts from a 1302 or 1303
- a pair of IRS trailing arms from a 1302 or 1303
- a pair of 1302 or 1303 spring plates and torsion bars\*
- a jig to line up the rear IRS brackets

\* if you don't want the ugly IRS spring plate set up where the torsion bar sticks out into the rear wing (as on the 1302 & 1303) then you can simply cut down your swing axel spring plates to match them - this needs to be done accurately though, so you should make a template from an IRS spring plate and work from that.

**Fitting The IRS Brackets:**

Once the rear brake lines, gearbox & drive shafts have been removed, the first task is to start cutting away metal to fit the IRS brackets. When in place, the brackets will be recessed into the frame horns, so some sections need to be removed to get them in. First offer up the bracket to the frame horn so you can check how much of the 'flange' to cut away - it should be just up to where the handbrake cable guide comes out of the fork. Then cut away parallel to the guide so the trailing arm doesn't foul it when in place.

**\*Note:** if using aftermarket 'heavy duty' type trailing arms, then you may have to move or at least bend the handbrake cable guide out of the way as they tend to foul it.\*



I was lucky enough to borrow a jig from a mate (Firedancer's website - [www.airsouls.com](http://www.airsouls.com)), but if you're buying all your parts from a breakers then chances are they'd let you make a jig off one of their scrapped cars, otherwise you'll have to find a mate who doesn't mind you stripping down the back end of their bug in order to make the jig.



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This jig was made up of two sides with a piece of box tubing forming an extension between them. Therefore, by fitting longer bolts to one side, the end of the jig can be moved in and out so you can check the clearance without continually bolting and unbolting the jig (as can be seen in the pic above).



You should end up with a hole in the side of each of the frame horns where the IRS brackets recess into them. The depth of the hole shown below is about an inch too low as I got the jig in the wrong position when first marking it out - oops! As such it will be filled with fresh metal when it comes to fitting the brackets permanently.



Once they can be fitted up in place, ensure the area is thoroughly cleaned and free from rust and dirt so it can be welded. Then tack the brackets in place. Only enough to hold it in place though as you may need to adjust them if they are not perfectly aligned. This is what you should end up with:



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The spring plates and then the trailing arms can now be fitted up to check the alignment of the brackets. I've used the IRS spring plates here for speed and ease of checking the alignment as I've yet to cut down the swing axel spring plates. You can see here how the use of the IRS spring plates results in the unsightly torsion arm extending from the torsion housing. Also ensure that the trailing arm doesn't foul the flange left on the side of the frame horn.



**\*Note:** even if the brackets appear to be in the correct place, do not permanently weld in place yet! Keep reading...\*

### Fitting The Gearbox:

Mounting wise, the new IRS gearbox should be a straight swap for the swing axle box when fitting to a later floorpan (2-bolt nose cone). Once fitted in place you'll see that the CV joints will foul the frame horns when fitted:



There are several ways to rectify this;

- If you're doing the IRS conversion to a baja then you could fabricate a more robust gear box mount that will lift the back end of the gearbox higher, thus clearing the frame horns. This will, however, result in the engine being positioned higher up. Obviously not a major problem in a baja, but for a normal bug it would cause all manor of problems with the tinware not fitting.
  - A section of the frame horn can be cut out and a recessed and profiled section welded back in so the CV joint will clear it. This will, however, weaken the frame horns.
  - The frame horn can be reshaped using a big hammer! This will also probably weaken the frame horns as above. Either way, I would recommend bracing the frame horns against the rear damper mounts when done - just to make sure.
- In this case, I've done the latter.

Before starting you need to ensure that the frame horns do not bend out of alignment when reshaping them. Best way to do this is to support the horn from underneath with something like a bottle jack, with a piece of timber in between to spread the load of the impact when reshaping. Then measure the distance from the floor to the frame horn and from frame horn to frame horn, so you can check they're still in the same place when you've finished. You'll find it easier to reshape the horns if you spend some time heating them with a blow lamp or similar before hand.



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Once done, make sure that the CV joints can't foul the horns when there's gearbox movement on the mounts. I increased the gap slightly between the CV joint and the frame horn after this pic was taken.

You should end up with something like this when it's all assembled:



Once you're sure everything is ok and lines up alright, strip it all down again and start welding everything into place permanently.

**Re-Assembly:**

When it comes to fitting the dampers, the IRS ones have wide bottom bushes (as shown in pic below) whereas the swing axel don't. If you wish to re-use the swing axel dampers then you'll have to add a bush either side of the damper when fitted, in order to prevent it from moving side to side under loading. In this case I needed new dampers anyway, so bought some for a 1302/3.



If you fit the dampers using the original upper mounts then you'll notice that the damper doesn't appear to be running true and the rubber bush at the top appears to be under some strain. After much head scratching and thinking about relocating the damper mounts, I decided to leave them as they are. I found that when the weight of the car is put back on the suspension, the damper runs true again and the strain on the top bush is gone. I've also looked up a factory fitted IRS rear end on a US spec bug and found that the top damper mount appears to be at the same angle as it is in this case. The rubber bush will experience some strain under excessive movement (such as hitting a pot-hole) but it shouldn't be sufficient to cause any damage. If you don't fancy this then a lot of people reinforce the inner wheel arches and fit new damper mounts to them in place of the original upper mounts.

And here's the finished article:



Once you've re-assembled it all, you'll have to check the rear wheel alignment (something like a Haynes manual should help) and you're done!