

## **Converting side-facing to OEM forward facing seats in the load area of a Land Rover Defender 90**

### **Tools and hardware needed:**

Tub conversion kit from CSK Land Rovers <http://www.csklandrovers.co.uk/online-shop/interior-parts/>

A pair of OEM Land Rover load area seats (take off seats from 110s are relatively common on Ebay – if you speak German, trying bidding on [www.ebay.de](http://www.ebay.de) – they are much cheaper here, although you have to consider how you get them back. It can work out cheaper to but them and drive to Germany to collect them than buy them in the UK!)

Pair of seat belts for Puma 90 load area seats (if they did not come with the seats)

Seat belt mounting brackets <http://www.lrisolutions.co.uk/index.php/land-rover-defender-rear-load-area-forward-facing-seat-belt-bracket-pair-90-110.html>

Rear crossmember-to-seat belt mounting point reinforcing tubes (LR part numbers EIO500060 and EIO500070 for left and right I THINK. I have found these numbers on the internet on the [www.defender2.net](http://www.defender2.net) thread below, but I bought the parts second hand, so have not checked they are correct)

Large, thick penny washers. Careful on the LR part numbers here! NOT part number WC108051L, but instead AYF500020

Jig Saw

Riveter/rivets

Tigerseal

Hammerite Special Metals Primer

Drill

Double sided tape

Various High tensile metal bolts (8.8)

2 metres of trim edging from Woolies Trim <http://www.woolies-trim.co.uk/p-1290-pvc-edge-trim-grey.aspx> (check colour of your interior trim. This mid grey is a good match for the only grey I have ever seen inside a Defender, but there may be Defenders in other colours)

About 50 off large (but thin) aluminium penny washers (from Ebay – listing/supplier gone)

2m x 1.2m sheet stainless steel for spreader plate

Sheet metal folder (<https://www.machinemart.co.uk/shop/product/details/cm24-sheet-metal-folder?da=1&TC=SRC-sheet%20metal%20folder>)

AYR500110 "Stud" (2 off)

Note that this can be done as a one man job (I did). The seats are heavy and bulky, but even if I had had the option of a helper, I'm not sure there would have been room in the back of my 90, and the helper may even have got in the way on occasions! It's always quicker to have someone holding the spanner on the bolt while you tighten the nut on the other side of the chassis tub, but I'm sure we have all developed ways of doing this on our own.

This is the original set up in an earlier 90



I wanted to convert this from 4 x side-facing seats to 2 x forward-facing seats as per Puma 90s, in order to be able to use child seats legally. I looked at both the Exmoor Trim option and fitting Land Rover seats. The Exmoor Trim option is undoubtedly simpler to fit, but I did not like the fact that the seats end up with virtually no gap between them, so climbing in and out was not as easy. Also I think they sit a bit higher than Land Rover seats, so headroom might become an issue later.

First thing is to buy the conversion kit from CSK Land Rovers. Without this, or something similar, you cannot adjust the tub from the square edges style to the stepped style on the Puma 90s. Full marks to CSK for offering this kit, but they were changing suppliers when I bought it, and the kit took months to arrive! I assume this has all been sorted now.

Once you have this (two pieces of 3mm thick aluminium shaped, formed and welded to drop into the tub), you can sell off your original seats on Ebay. You can get rid of the seats, the seat belts and the reinforcing bar that goes behind them, as well as the tube underneath the tub. This lot in fact:



The only thing not shown in this photo is the tube that goes from the rear chassis cross member to the tub/seatbelt mount, which I also got rid of at the same time. The one you will now need is longer.

Now remove the carpet from the wheel arches (held on with double sided tape) and the tub floor (gravity, and caught under the lip of the door sill), and start marking up the tub for cutting out with a jig saw. The CSK kit is a little shorter than the full length of the wheel arch (by 15cm or so), so just fit it in the middle. The exact position is not critical. You can transfer the measurement of the kit to the tub to create your cut lines. Note that the kit has a lip which needs to sit on your tub, so only cut out the stepped part!





You can see the reinforcing U-channel strips on the underside of the tub in the above photo. Careful of brake lines, fuel lines and electrical wires underneath while doing this. None were close on my Td5, but models and manufacture do vary – this is a Land Rover Defender after all! I did disconnect the fuel lines, covering the ends with tin foil, and removed the filler cap assembly altogether (once you have disconnected the fuel filler pipe, you can just pull out the filler cap assembly).



The next photograph shows the kit dropped in on the nearside. Prior to fitting it, I had coated it in the Hammerite Special Metals Primer and a couple of coats of Hammerite black. You can see the paint runs in the photo, but I wasn't bothered about finish; it will be covered in carpet anyway, and the thicker the better for protection! You can also see it is held in place by 10 rivets (You can drill more or fewer; it's up to you). Note also the holes left by the original seat and seat belt mountings.

As you put it in place, apply a liberal coating of Tigerseal to the lip of the kit and the tub. It should squeeze out, but hopefully more underneath the tub than inside. (Less messy if it's underneath!)

The next step is out of sequence from the photographs (i.e. I would do it differently if I had to do it again.) Although the seat belt mounts take the strain in the event of an accident, I wasn't happy with the fact that the seat would be bolted to something that was only held to the tub by 10 rivets. In the end after completely installing the whole thing, I went back and added some huge spreader plates underneath the tub, so if you want to do the same, now would probably be the easiest time to completely remove all the U-section reinforcing channels underneath the tub that you think will be in the way. See later on for the huge spreader plates I used.

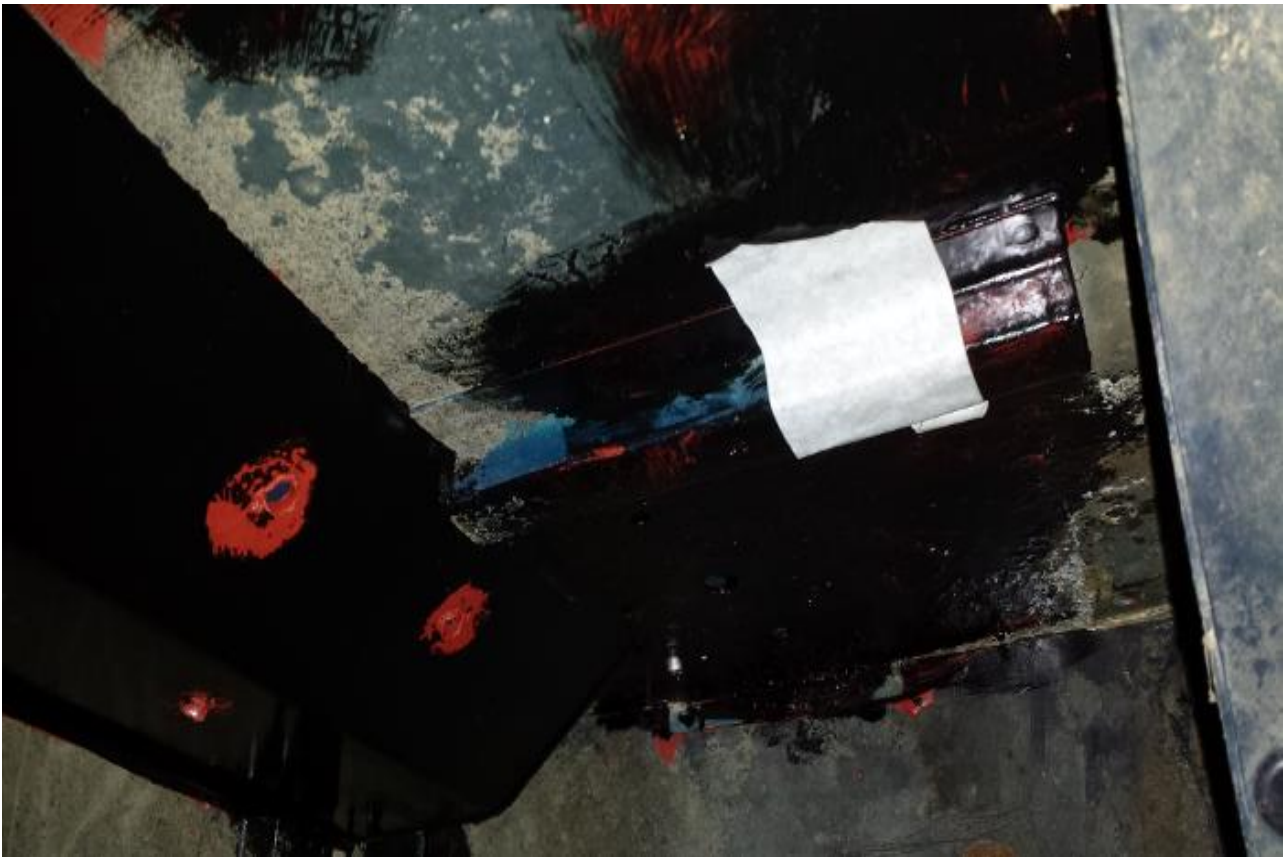
Whether or not you intend to remove all the U-section reinforcing or just part of it (you will definitely need to remove the bit where the rear cross member-to-seat belt bracket goes), here's how to do it. They are spot welded on every 5cm or so, so each length has three or four spot welds along it, on each side, so 6 or 8 per channel section. I marked each spot

weld with Tippex, to make it easier to see while wearing safety goggles and lying upside down on a dark evening. I then used a specially butchered drill bit (6mm) which had had the end cut to resemble a wood cutting drill bit (flat bladed end with a central spike). There are special drill bits for removing spot welds available, but I had the advantage of a friend knocking one up for me out a a blunt 6mm drill bit. Once the spot welds are removed, use an old chisel to force the U-channels away. There is a satisfying clunk as each spot weld finally gives up the remnants of its weld and allows you to go on to the next one. The easiest ones are the horizontal ones at the top. The vertical ones fold under the tub, so require more brute force to remove, but once the spot welds are removed, they will go too.

Here is a photograph showing the tub where the vertical sections used to be fixed.



In this next photograph you can see the kit from underneath with the U-channel still in place. You can see one at the top of the photograph with some masking tape on it, and a small bit of the same one just underneath the kit. In fact the masking tape shows where I originally cut away the U-channel to allow the fitment of the rear chassis to seat belt reinforcing tube, before changing my mind and removing it all to fit the spreader plates.



More on the spreader plates later, and if you don't decide to fit them now, but change your mind later, don't worry, because that's what I did, and you can make this choice at any point without needing to back track or undo anything you have done.

The eagle eyed among you will have spotted some holes drilled in the kit in the above photograph, and that is the next step. It doesn't really matter where you put the seats in the back; a little further forward, and you get less leg room, but more storage space behind the seats, and vice-versa. In the end I managed to measure up a Puma 90, and placed the seats more or less exactly where Land Rover intended. In fact, that leaves you with a minimal amount of leg room, and a similarly minimal amount of storage space. Well if you want more of both you should have bought a 110!

I shan't give measurements here, as there is the risk for too much confusion with regards to the reference points, so see if you can find a Puma 90 and take your own measurements. Then offer up the seat (not the base/leg bracket) to the kit, and drill the six holes to hold down the seat. The photo above shows the three holes nearest to the rear of the vehicle. The photo below shows that I put masking tape in the general area of the holes to be drilled, and then marked this with pen.

Once you have drilled the six holes (per seat), bolt down the seat.





Once the seat is bolted down, you can hold the base/leg bracket up to it while you fold down the seat and then use this to mark out the holes to drill for this (8 in total per side). I find Tippex very useful for marking holes. These can then be drilled out.

Once the seat and base were fixed loosely in place, I took the whole lot out again, so I could apply primer and Hammerite to the holes.

At around this stage (or indeed at any point up to here when paint was drying or I couldn't make any other progress), I started filling up the original holes. I did this by using some thin (0.2mm) aluminium penny washers bought off Ebay. I first painted them in primer, then Hammerite, and then applied one underneath, and one above each hole and then riveted them in place. To hold them in place while I was riveting, I used a dab of Tigerseal (also to waterproof the "repair").

That's the seats sorted out. Now for the seat belts.

This is the photograph of the rear brackets that should in theory simply bolt in to the rear corner of the load bay area between the tub and the roof line.

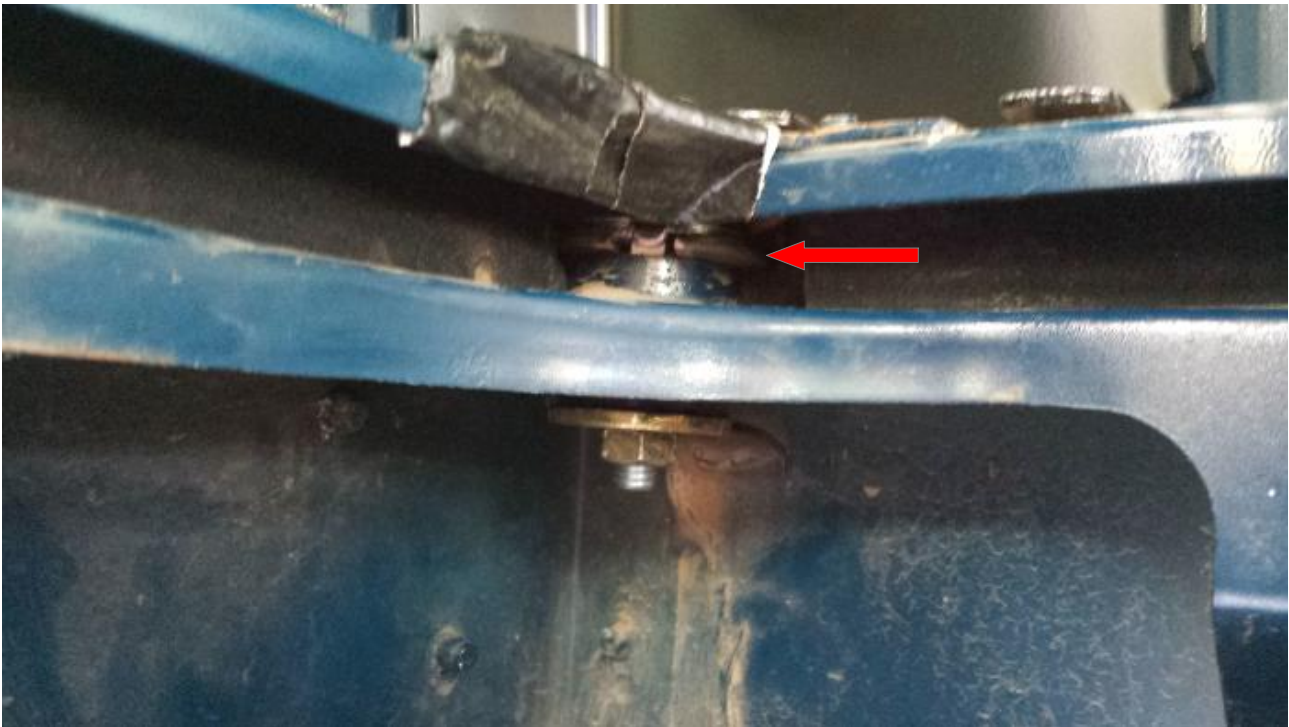


Two issues with this concept – the first was that the bolt that holds the roof to the tub, shown below with a nice thick penny washer and the bracket in place. The only problem is that the bolt does not stick up far enough at this point to allow a washer to be fitted, and I really believe this needs a washer here, so I actually ordered a pair of Puma bolts, thinking they might be different. Apart from being a different colour, they aren't a different shape. Perhaps the different colour means they're a stronger (high tensile?) steel. They aren't marked as high tensile steel, but they could be, so for the couple of quid they cost, I changed them – part number AYR500100. In any case, you have an unnecessarily awkward job raising the old or new bolt to accept a washer.



First a photograph of the finished work above, then I'll explain how I did it.





I have highlighted a spacer in the above photograph which is what you need to insert to raise up the bolt to accept a washer at the top. As you can see there is plenty of spare at the bottom! To do this you unfortunately need to lift the roof off the tub by about 5cm in order to get the bolt out. I was able to do this without removing the roof completely, but by removing all the bolts from the front door (B post) backwards. I then removed the back door. I then used a bottle jack standing on an ammo crate and various bits of wood to jack up the roof one corner at a time to remove the bolt. You could possibly use a high lift, but a hydraulic jack gives you much more precise control, and I didn't want to overstress the roof or crack a window.

Once the bolt is out, you can fashion a spacer washer 2 to 3mm thick to raise the bolt. It will need some bits nibbling out of a normal washer to allow the legs of the bolt to fit. You can just about make out in the photo that I have used two spacers.

Below is a photo of the bolt, so you can see what it looks like. The little tabs that fold down are to locate it in the tube in the tub. You need to put the spacer washer(s) between the flat part and the tub, i.e. where the tabs fold down – so you need to take a washer and file out three recesses so that it is the same diameter as the original, but locks into place in between the tabs. You can just about see what I mean from the above photo.

Then insert back into the tub where it came from. This may make the gap between the tub and the roof too wide for the old rubber to fill. This was the case just in the rear corners immediately around the bolt where the rubber has to do a 90 degree bend at the same time as filling a gap. I remedied this by simply inserting a piece of random rubber/plastic I had lying around and which I cut to shape.



Now you can put the bracket in place. Place a large penny washer under the nut at the top. I thought I would take the easy route, and simply order a couple of washers identical to the ones at the bottom of the bolt. According to Microcat this is WC108051L, but Microcat is wrong! This turns out to be a much smaller washer. My local dealer phoned Land Rover technical department, and they were flummoxed too, but eventually gave me part number AYF500020.



A photo of the right and wrong washers!

Even though I had bought a Land Rover badged bracket from LRI Solutions. I still did not like the fit at the top seen in the first photo below, so spaced it out with washers, as in the second photo below. I do not know if it needs washers here, but I did not like the gap.



Note that you will need to drill an extra hole in the roof to accept three bolts. There were only two holes on my Td5 roof. You can see the missing hole in the first photo (or rather, you can't!)

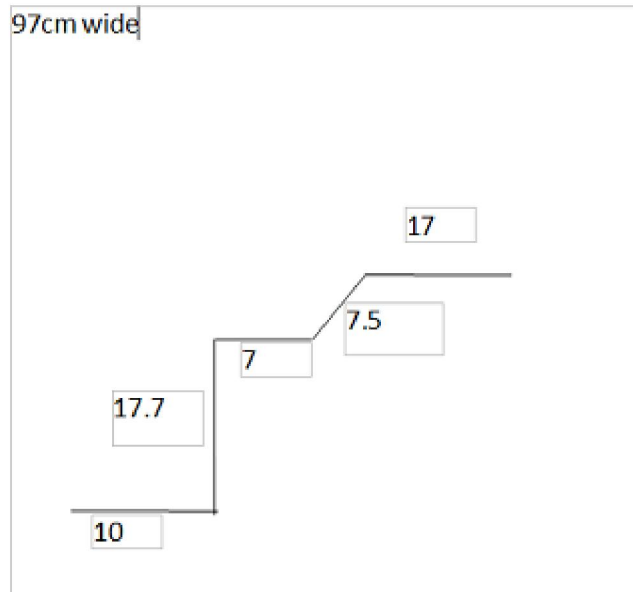
Now onto the (optional) reinforcing/spreader plates underneath the seat tub. I had a look at a Puma rear tub, and saw that Land Rover have reinforced the tub to take the seat and seat belt mounting points as per the photograph below. (I was lucky enough to spot a tub for sale at a Land Rover show).





You can see the six holes for the seat mounting and the eight holes for the base mounting. All but two have captive washers which I had intended to copy to make removing the seats easier (difficult to loosen and tighten non-captives alone), but I never got round to this. Anyway, that is always an option for the future. So... I bought a sheet of stainless steel 0.9mm x 2m x 1.2m and chopped this into six pieces, with a maximum width of 600mm, as I was going to bend this using a Machine Mart sheet metal bender which has a jaw width of 600mm. I used stainless steel (a) because I had ready access to sheets of it, and (b) because mild steel would have needed all sorts of rust protection. I reduced the risk of galvanic corrosion by leaving on the protective layer of plastic on the stainless steel and by the liberal use of Tigerseal.

The Machine Mart sheet metal bender says it has a capacity of something like 0.8mm mild steel, so I was worried about the tougher and thicker stainless, but it coped with this no problem. 600mm is about the maximum width you can angle into place anyway in the wheel arch, so that worked out fine. I had one piece 600mm wide and two pieces 300mm wide on each side, overlapping to form the spreader plates. I wanted to match the profile of the tub, which ended up looking like this:



Once the six pieces are bent to shape they can be slid into place. Before you can do this, if you haven't already, there are U-channel reinforcing sections underneath the floor of the tub, and you may find that the ends are spot welded to the tub, in which case you need to cut away these spot welds. (You don't remove the U-section here, just the spot welds on the ends.) I found I had to use a right angle attachment to my drill to access some of these spot welds. If your reinforcing plates match my dimensions, you need to slide in about 10cm of steel in between the U-channel and the tub floor, so you'll only have had to remove the first spot weld. Mine was still wedged tightly together, so I used a lever (tyre lever or large, strong screwdriver would do) to hold them apart while I pushed in the steel.

I put the two smaller, 300mm wide pieces at either end of the CSK kit, and the 600mm wide piece centrally overlapping both pieces. Once there, I then punched the sheets before removing and drilling them. I refitted them with plenty of Tigerseal covering the edges and the overlaps and bolted the seats in, with large spreader washers (belt and braces!) Here is a photograph of the underneath in its finished glory (I didn't bother painting it.)



Now a photograph of the plates underneath the rear tub. As mentioned above, I slid in about 10cm of steel under the floor, removing one rivet per rib to enable this to happen.



Now onto seat belts. You need to attach the new rear cross member-to-tub reinforcing tubes, as shown in this photograph.



This bolts to the rear cross member using the two long torx-headed bolts at each end of the cross member. Once this bolts are fairly well tightened up, this naturally brings the top of the bracket up to the tub. I used a bottle jack to force it right up to the tub (actually up



against the spreader plate now), marked punched and drilled the holes. Here is a photograph showing them in place (on a Puma Defender – Legion on [www.defender2.net](http://www.defender2.net) – see one of the thread links below):



Now you can fit the seat belt. It has three attachment points; two are on the bracket you fitted inside the cab, and one is on the bracket just fitted underneath the tub.

Once the seatbelt is fitted, on to the interior lining. As you can see, I basically held up the lining to the corner, marked where I thought I needed to cut with Tippex and took it away to cut with a jigsaw (very easy). I worked on the principle of cutting a little away at a time, as you can always cut more away, but can't (very easily) stick stuff back on! The large side panel and the small rear panel with both need cutting.



As you can see from the above photo, you will end up cutting away the mounting brackets for the small, rear panel. This will still clip on nearest the rear door, and in fact, losing the brackets in the corner doesn't seem to matter at all.

After that, I added the edging trim from Woolies, partly to finish the edges nicely, and partly to reinforce the edges and prevent cracks starting. The below photograph shows the parts in place, not quite lined up perfectly yet. The cut appears to go up too much at the right, but it is in fact necessary to cut this much away to avoid it catching against the newly fitted bracket.



Now, tidy away your tools and put the carpets back in. One point of warning regarding the carpets. I initially had the floor carpet covering the bracket feet on the tub. When I folded the seat down, it didn't want to drop without a bit of force, and then really didn't want to come back up. The extra couple of millimetres of carpet get in the way of the seat mechanism functioning properly, so cut this away, and allow the seat to fold down and the legs to drop onto the metal of the bracket rather than onto carpet. The carpet over the wheel arches goes back in first, after a bit of trimming, and then using double sided tape. The floor carpet just drops in, and can be tucked under the rear door ledge.

Further reading, and thanks to all these previous posters.

<http://www.4x4community.co.za/forum/showthread.php?t=85073>

<http://www.4x4community.co.za/forum/showthread.php?t=109862>

<http://www.defender2.net/forum/topic10928.html>

<http://www.landyzone.co.uk/lz/f16/defender-90-rear-forward-facing-seats-seat-belts-48742.html>

<http://www.nickslandrover.co.uk/fitting-forward-facing-rear-seats-belts/> (on fitting Exmoor Trim seats)

<http://www.rescroft.com/web/> (appear to manufacture seats for a lot of the Transit-type minibus conversions you see. Have been fitted by at least one Defender owner, although as far as I can tell, you can't get a reclining, fold away model that will fit a Defender.)