How to: Build a Fibreglass Sub Box

I thought I would post here the work I have been doing to my 1 Series to help anybody else who may have the same ideas and take the guesswork out of stuff.

The Plan - Create a flush fitting Sub box in the wheel arch space in the boot. To maximise boot space whilst allowing the use of an aftermarket Subwoofer.

I managed to get the box built with around £50 of materials and 2 days of work. (Mostly time was spent waiting for drying between layers)

(Disclaimer: This is the technique I used, and not necessarily the best method, just the way I decided to do it.)

You will need: (I can tell you where to get the materials needed but I didnt want to be advertising)

Materials:

2Kg of 450GSM Fibreglass mat
5Kg of Polyester resin + Catalyst
1 Tub P38 Fibreglass Putty
1 Tub P40 Bodyfiller
1m x 1.5m Boot Carpet to match your boot
1 roll of 3" Masking tape
100cm x 75cm 16mm MDF (Thicker = Stronger)
Spray Adhesive

Tools:
Drill
Jigsaw
Screwdriver
Sandpaper \ Electric Sander

Box of 20+ surgical gloves
Sharp Scissors
5 or so Mixing cups
5 Assorted paint brushes

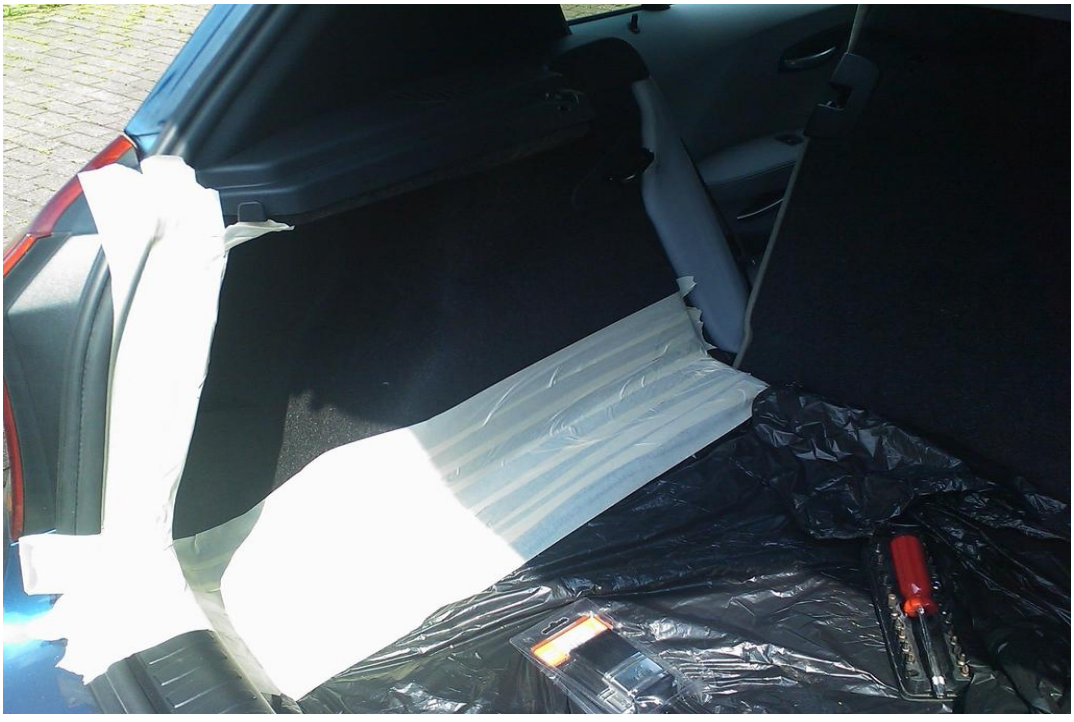
AV:
Line-output convertor (LOC) (If you want to go with OEM Headunit)
Amp
Subwoofer
Wiring kit

Method:
Firstly apologies for the poor pictures or lack of, they were taken with my phone and initially I wasnt going to be making a tutorial so dont have pictures of every stage.

Stage 1:

If you have got this far well done. It takes guts to start splashing fibreglass around the boot of an expensive BMW.

Line the boot section with masking tape to provide the mould. Start from the lip to the boot floor and start from bottom and work upwards to avoid any resin going through the gaps (I didnt spill 1 drop).



Use bin bags or plastic sheet taped down to cover the rest of the boot floor incase you get those inevitable drips.

Once you have the boot lined, you are ready to get messy. Get the gloves on. Cut or rip the mat up into small manageable pieces, 20cm x 20cm ish and put in the boot ready to go. Now mix up the resin (WARNING! resin goes harder quicker in warm temperatures and you have limited working time, therefore only mix up small amounts at a time. I did it in 250ml batches @ 1% ie 2.5ml catalyst.)

Paint a layer of the resin onto the tape, this will provide the base and be sticky for the first layer of mat, and mean the backside of box is smooth when finished.

Once the first layer is tacky (10 mins) Apply another layer of resin, then put the first piece of mat onto the tape. You need to dab the resin into the matting and not brush it, otherwise it starts to fall apart. Its takes a minute of so for the mat to start to disolve, so just keep dabbing it with plenty or resin, dont be shy, too much is better than not enough, you will get used to how much to use as your progress. (My first layers were rubbish but I really got the hang of it towards the end.)

Tip: When you are putting the matting on the upper level, if you paste some resin on an wait for it to go tacky, the mat will stick better and be easier to work and not fall down.

Now continue all the way around the inside, around 2 - 3 layers and then wait for it to dry, 30 -45 mins. You can then go back and do another 2 - layers.

Once the second set of layers has dried, you should be able to feel it has some rigidity (pull on the top section gently). If it doesnt you need more layers.

Now you can fold the seat back down and start prising the shell out of the car. It will come away with the tape attached which is fine, you can remove this later.

Stage 2

(Photos missing)

Once you have the shell out you can start putting more layers in. Continue this until the shell is stong enough to take your weight (disclaimer: do so at you own risk). Concentrate around the edges as these will have the fewest layers.

Once you have finished and are happy the structure is stong enough you need to get the right shape and cut off the excess. So line the boot with a piece of tape along the floor and up the seat where you want the box to sit. Then put the shell back into the car, and draw with a marker pen from inside the box along the tape lines. The box should still be semi transparent enough to do this.

Now cut along these lines with the jigsaw (wear long sleeves as the

fibreglass splinters will have you itching for days)

Now you have the finished shell its time to see how big it is. Fill a bucket of known capacity ie 10 litres with water and then fill up the shell to work out the capacity. My box ended up being around 25 litres. My Sub needs 1.25 Cubic feet which is 35 litres, so we need to add polyfill (more on that later).

Now lay the shell face down onto the piece of MDF and draw around it with a pencil. You can then cut out the odd shape for the front baffle. Then test the fit of this. Then place the sub in the shell and move around till you have it where it sits best. Then put the mdf on top and draw around the speaker. Cut out the hole, and test fit.

Now you have the front baffle squaring up with the shell its time to get the P38 out to fill the gap between them. Using masking tape secure the front baffle to the shell all the way round from the outside.(sorry no pictures of this stage).

Mix the P38 putty with the catalyst and spread around the join from the inside using the hole for the speaker to get into the box. Its awkward for the deepest shallowest part of the box but i used the back of a wooden spoon to get it in there. I also used this opportunity to fill any imperfections or cracks in the shell.

Once this has hardened you can remove the masking tape from the outside and then fill the outside of the join with more P38 using your finger to run around the edge.

Once this is dried give it a quick sand with coarse sandpaper, then fill over it with the P40 body filler.

Once this has dried (again!) get the belt sander or sand paper out and take back the rough edges all the way round leaving the whole box smooth and fully prepped

Test fit into the car again. All should be well

Now all you have to do is carpet the box with the boot carpet using the spray adhesive. This is quiet tricky due to its unnatural shape but you should be able to do it neatly. I just kept stretching the carpet around corners and cutting off the overlaps, leaving me with almost inivisble joins.

Now the final stage is the Polyfill. Remember my Sub is designed for use in a 35 litre enclosure but the enclosure i built was only 25 litres. The idea here is that as a sub moves it has to pull the air inside the box behind it creating a vacuum on excursion. A bigger box has more air and is therefore harder to pull the air. So what you do is stuff the box with Polyfill (polyester filling, you can get from hobbycraft etc used for stuffing pillows.) This then makes it harder for air to move inside the box, fooling the sub into thinking it is in a larger enclosure and an virtual appearance of more space. This allows your sub to hit lower notes and cleaner bass at low frequencys.

Various sources suggest around the same figures. But you can achieve a potential 30% increase in enclosure volume (cubic capacity, not how loud it is) by adding around 1.5lbs of polyfill for each 1 cubic foot of box size. I added around 500g to my box.

Bear in mind an enclosure can be too big and so only add polyfill if your box is too small for your sub.

Final look minus the speaker grill

Its a sealed box and so doesnt have a port (air port to release the air from the rear of the sub when in action). A ported enclosure would have to be bigger in volume and I was already limited for space