Build your own Drawer unit. D3 / D4

1: Introduction.
This guide will give you the plans, materials and how to information to build your own drawer unit. The dimensions given will fit a D3 or D4, five or seven seat vehicle. The measurements could be varied to suit any vehicle.
The completed unit can be easily removed or reinstalled as the unit is fixed into the vehicle by turnbuckles attached to the standard tie down points.
The procedures shown should be able to be completed by a confident DIY person.
The included plans do not utilize commercial drawer slides as they encroach too much in to the drawer width, these plans use simple laminate strips for the drawers to slide on.

2: Tooling.

- If you have access to a 7 ¼ " power saw or even better a Festool Track saw you will be able to cut all the pieces necessary. (Note: some plywood suppliers can offer a cut to size service)
- A drop / slide saw (optional)
- A router or trimmer – to router grooves (straight cutter & small rounding bits)
- Power drill or cordless drill / driver, assorted drill bits and countersink bit.
- Stanley knife or similar
- Belt or Orbital sander
- Saw horses or Trestles.

3: Materials.

- Plywood – 2400 x 1200 x12mm either exterior grade (more expensive) or construction grade (CD ply, cheaper) 2 sheets.
- Pine – 185 x 19mm – 1 x 3.0m, 1 x 2.1m.
- Laminate – 8 strips 1000 x 50mm.
- 40mm chipboard screws, assorted other screws for handles and edge trim.
- Epoxy adhesive. (waterproof and strong) Note: PVA glue is not strong enough.
- Contact adhesive – the choice is up to you, spray cans, gel or spray gun application if you have access to one!
- Stainless Steel turnbuckles x 4, similar to this - https://www.whitworths.com.au/main_itemdetail.asp?item=91392&search123=turnbuckle&intAbsolutePage=1
- Stainless Steel saddles x 4 similar to this - https://www.whitworths.com.au/main_itemdetail.asp?item=74062&search123=saddle&intAbsolutePage=1
- Stainless Steel Anti-rattle drawer pulls x 2 similar to this - https://www.whitworths.com.au/main_itemdetail.asp?cat=149&item=38117&intAbsolutePage=1
- Stainless Steel Bolts and Nuts to fix the saddles to the unit 8 x 1¼ x ¼ https://www.whitworths.com.au/main_itemdetail.asp?cat=151&item=303976&intAbsolutePage=2
  Nylock Nuts 8 x ¼ https://www.whitworths.com.au/main_itemdetail.asp?cat=151&item=305912&intAbsolutePage=1
- Masking tape / 25mm wide
- Acetone for cleaning adhesives
- 1.2m Aluminium trim similar to these: I used the bottom section.

808736	EE3388 6060 T1 4.0m Mill Finish	TABLE EDGE 27.7X12.7 RAD
808372	EG6454 6060 T1 4.0m Mill Finish	J-TRIM 23.8X12.7

4: Plans.

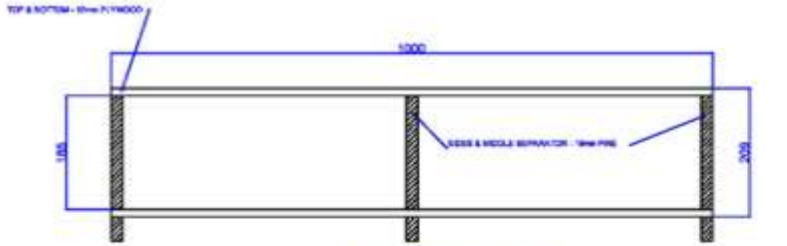
Many thanks to Alan for his plans as below, I made three changes that differ from these plans.

1. The Centre division I have offset from centre 25mm to the right. This makes one drawer approx 496mm wide and the other 446mm wide. This allows a hole to be cut directly over the spare wheel winch and access to drop and raise the spare tyre.

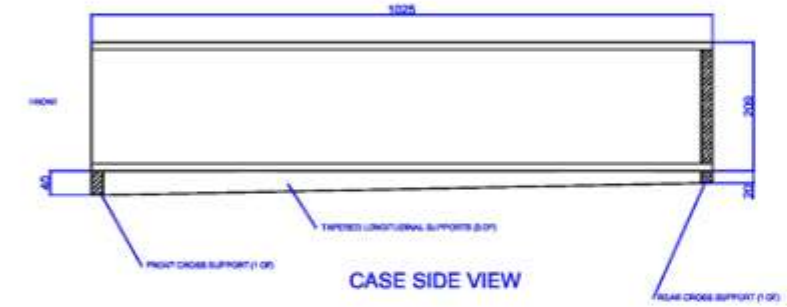

Above is the detail of the fitted socket and extension, I carry a ratchet handle underneath my drawers ready for use. I have removed the centre trim caps off the rear seats to give clearance for the extension.

2. I have cut out large holes out of the bottom of the case. This is for three reasons:
    - It cuts down weight.
    - It helps allow air to escape on drawer movement.
    - It allows access to the space below the drawers. If you have a seven seat model you may in fact remove these before fitting your drawer unit to gain valuable space.

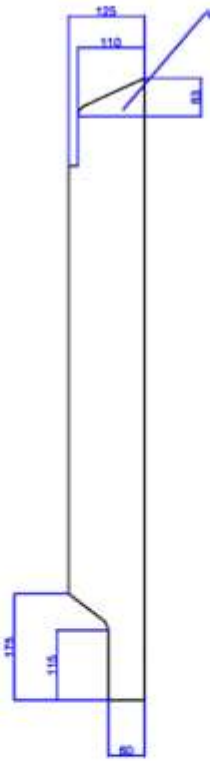
3. I have routered the drawer fronts to fit in front of the sides and base. This is to allow the smaller drawer front to hide the centre division.

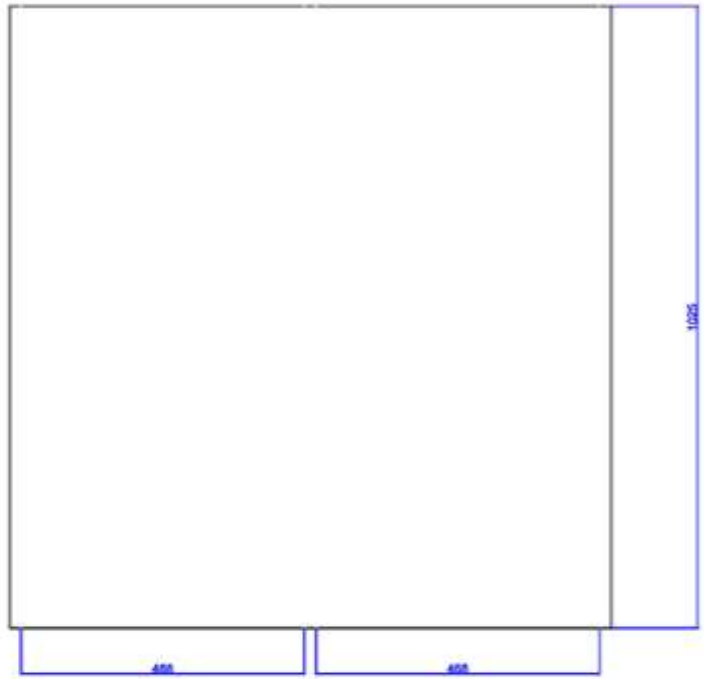


CASE FRONT VIEW



CASE SIDE VIEW





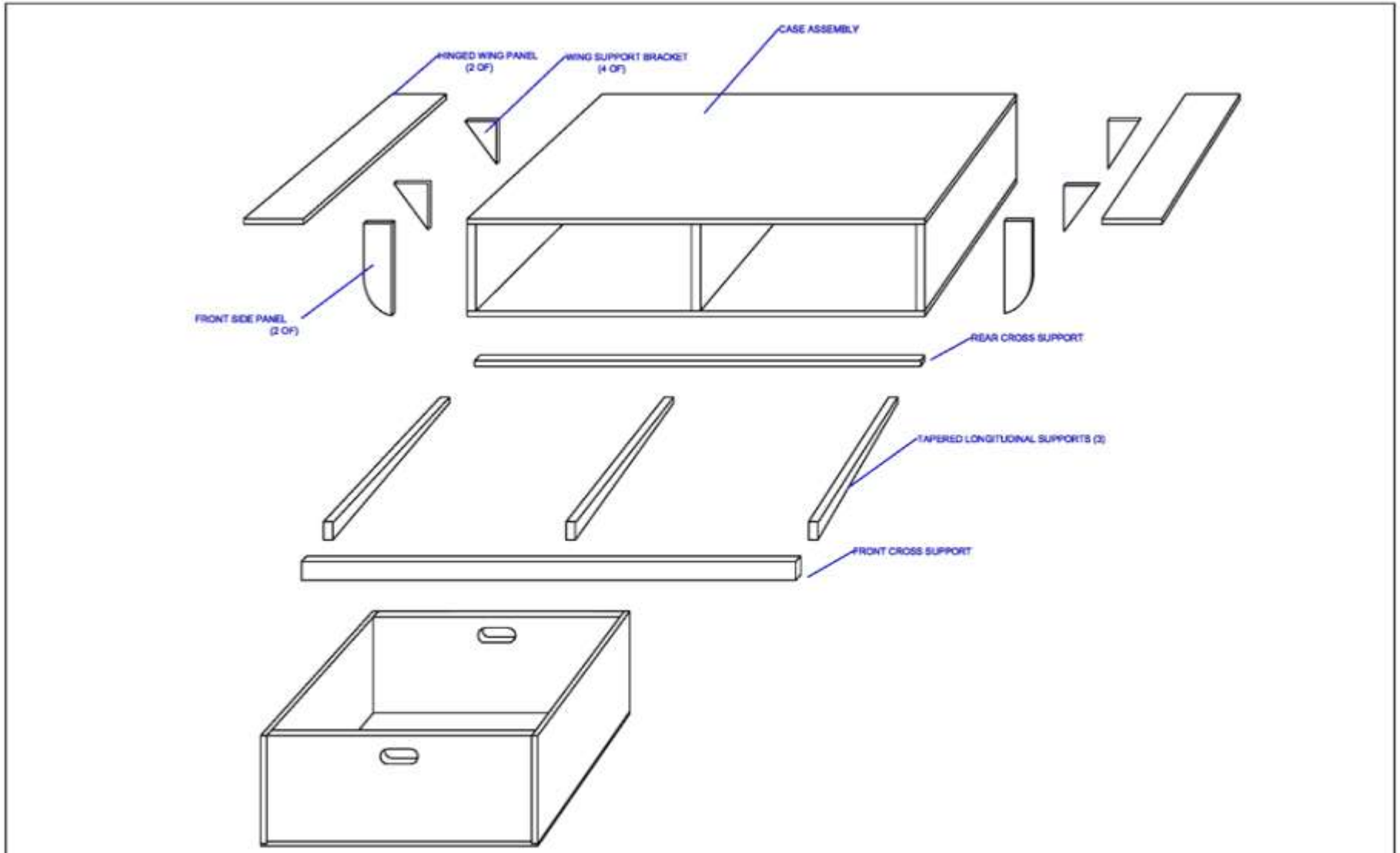
CASE TOP VIEW

Discovery 4 Rear Drawer Unit

Notes:

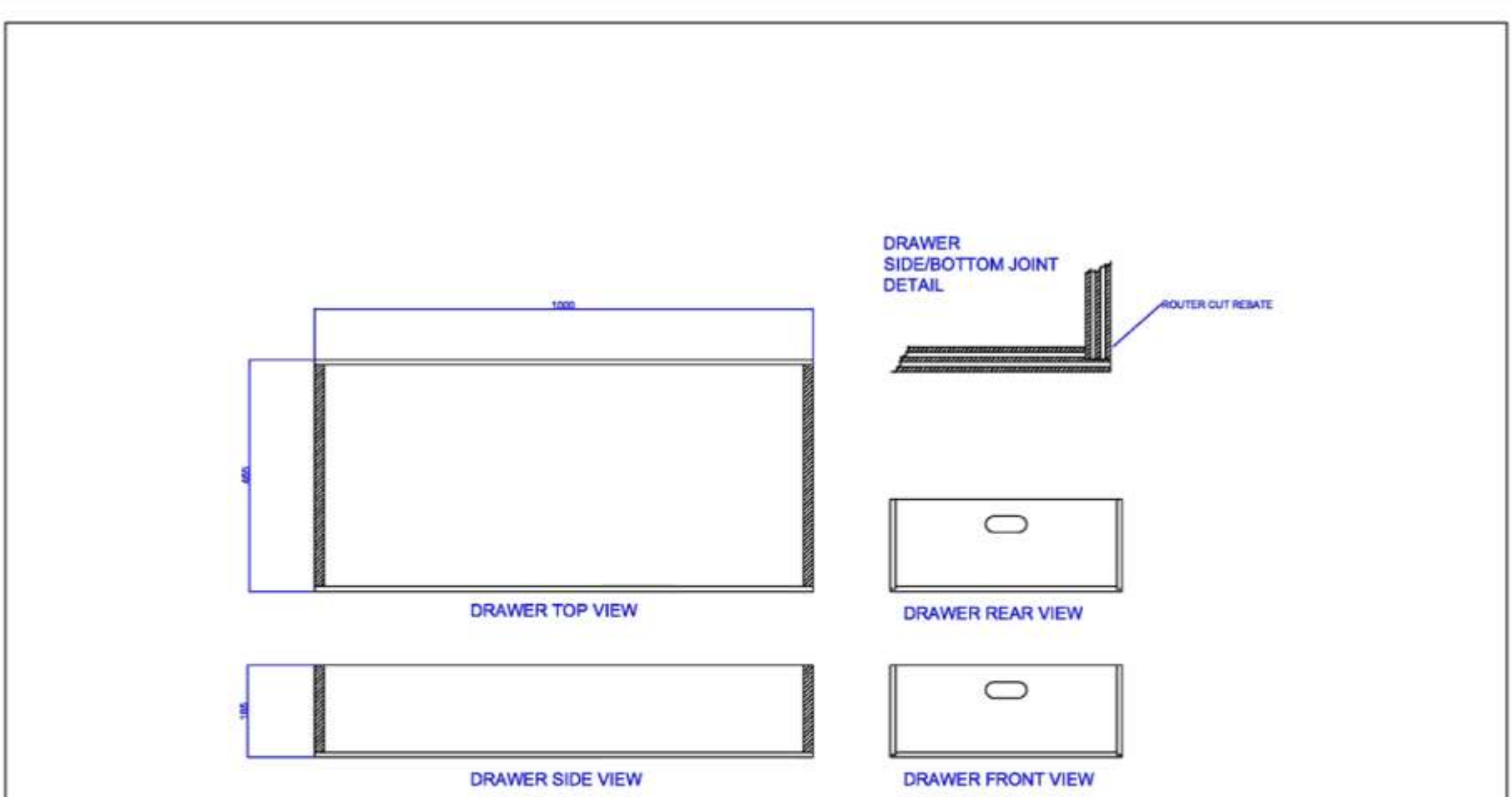
- Case sides, back & separator from 19mm x 185 pine. The 185mm is an off the shelf size and the shelves may be made deeper.
  - 235mm would work well with the D4
- Front/side panels should be trimmed to fit car after fitting case assembly
- Wing paanel dimensions are approximate and should be checked on vehicle after trial fitting case.
- All case joints glued and nailed or screwed
- Drawer joints epoxy glued - rebate joint can be tacked with small nails or secured with cable ties until glue hardens
- Note that "front" and "rear" refer to the unit, as viewed from the drawer end, not the front and rear of the vehicle!

Alan Gluyas Marine Design	date: 14/07/2011	drawn: ag	DRAWER UNIT FOR LANDROVER DISCOVERY 4
	drawing:	scale: NO SCALE	CASE CONSTRUCTION



Alan Gluyas Marine Design

date: 14/07/2011	drawn: asg	DRAWER UNIT FOR LANDROVER DISCOVERY 4
drawing:	scale: NO SCALE	EXPLODED PERSPECTIVE VIEW



Alan Gluyas Marine Design

date: 14/07/2011	drawn: aag	DRAWER UNIT FOR LANDROVER DISCOVERY 4
drawing:	scale: NO SCALE	DRAWER CONSTRUCTION

5: Method - Case

Cut and fabricated the case unit. I recommend that you screw the unit together completely then mark the side and centre divider position before dismantling to fit the laminate strips and then Epoxy gluing the whole case back together again. This will at least ensure that the unit fits correctly in your vehicle before gluing for good!

In the above photo note that the centre division is flush with the front, I decided before I dismantled and glued the case together to trim this back by the thickness of the drawer front to hide this. The sides are also trimmed back 12mm for the infill panels to screw to the ends of the sides.
Note the hole to access the Spare Wheel winch.

These triangles are to support the hinged side infill panels, be aware they cannot extend any wider than the front of the case. If not you will not be able to either slide the unit in or out!

The saddles are bolted from the inside of the case fitted with nylock nuts, they are angled forward and backwards from the factory tie down points. It is easier to fit these with the top of the case removed. The angling of these saddles helps provide additional stability of the case.

Note the turnbuckles have lock nuts on their threads, you will need to use these to stop the turnbuckles loosening over rough roads.

Here you can clearly see the angled saddles.
I have used kitchen cabinet zero overlay clip on hinges (These are BLUM brand). These enable the side infill panels to be removed easily. They are adjustable to make alignment easy.
I would however recommend moving the front hinge (front of case) further back for easier access as this position shown is close to the narrowest section of the side panel.

You may prefer to use other hinges, the choice is yours.
Note the hole drilled in the base for access to the spare wheel winch.

Check your measurements for your infill panels, mine did NOT match the plan measurements.

Depending on you year and model they will be different. Ensure clearance of 5mm minimum to allow the panels to hinge upwards.

In this photo you can see I have 20mm clearance where the infill steps back to the wider width. This is to allow me to slip my fingers in to lift the infill from the back of the vehicle.

Next step is to dismantle the case and fit any fridge slide mounting “T nuts” before the next step. These are fitted to the underside of the top, of course you will have needed to figure out where the slide and fridge will sit prior to removal / dismantling of the case.

Next glue the laminate slide strips to both the case bottom and top with contact adhesive.
This is because when a drawer passes it's centre point it will slide on the front bottom point and the point the back of the drawer is sliding against the top.
I used masking tape as in the last photo to mask the position that the sides sit as we do not want contact adhesive to interfere with the adhesion of the epoxy glue we will be using shortly.
I used a router/ trimmer with a small radius bit to round off the cut out edges.

Ready to start reassembly using the epoxy glue!

Epoxy glue you will find is available in standard grade and a fast set grade.
I used a fast set grade but you need to work very quickly as you may only have 5 min to apply the glue and fasten the sections together. For most people I would recommend the use of the standard grade. It will take overnight for the epoxy to set before proceeding any further.

Be careful not to apply too much epoxy as it is messy to remove excess adhesive.
Clean up any excess with a scraper first followed with a rag and acetone or cheap white vinegar!

Note in this photo you can see the centre division 19mm back from the front.

Also note the side infill's have sit up to finish flush with the top once fitted, a block is also glued on the back of these to support the top infill panels these are level with the sides.

6: Method - Constructing the drawers:
You will need to calculate the drawer height measurement depending on the internal finish height of your drawer case less the laminate strips less 2 / 3mm clearance.
Note: check this measurement in numerous spots to ensure your drawer will slide easily throughout its travel.
Measure the width and required again leaving 2 / 3mm clearance.
The length of the drawers should finish flush with the front of the case.

In Alan's drawings his sides are the full length of the case with the front and back fitting internally between the sides and bottom.
In my photos my drawer fronts are routered to hide the centre division of the case as well as the sides and bottom of the drawer itself. This of course will make the sides and bottom shorter depending on the depth groove cut in the drawer front.

The height of the plywood side will be the calculated finish drawer height less the remaining thickness of the drawer base.
In my case I worked on 6mm remaining on the base.

The solid timber back will be the calculated finish drawer height less the drawer base thickness. In my case it is -12mm.

Left is a detail of the drawer front showing the rebate and extended front to conceal the case centre divider. The depth of the routered rebate is 6mm as per the drawer base.

When all the components are cut you can epoxy glue them together.

This is the side being adhered to the bottom, note I have not used any fixings. (Screws / Nails etc)

A good tip is to use a quality masking tape and stretch it across the join to pull it together while the epoxy dries.

This is 25mm wide tape spaced about 50mm apart, ensure the surfaces are clean prior to using the tape.

The back of the drawers may be screwed and epoxy glued, the front if internal may be as well.

If the front is routered as in my above example again just use epoxy glue.

The reason to not use screws down the sides is to assist in the drawers sliding easily.

Note: Remember to remove any excess epoxy from inside the drawer as it is difficult to remove when cured.

Once the epoxy glue has cured remove the masking tape, sand off excess epoxy easily if you have either a belt sander or orbital sander. Otherwise make best with what you have!

I used a router / trimmer to put a pencil round on all corners of the drawers again to assist in the sliding. But not on the drawer front.

Next test if the drawers fit and slide well, if they are tight in places sand the drawer box to help. The application of "Candle Wax" on the bottom of the drawers where they slide on the laminate will also assist.

Prefit your drawer pulls prior to adhering the carpet then remove.

You are now ready to adhere the carpet!

How you do this it is up to you.

Option 1:
Whether you wish to do the outside of the case all at the same time and use a Stanley knife and straight edge to cut the joint lines is possible but needs patience. This is how my joins are so tight.

My method included having the drawers inserted and side infills attached prior to the application of the carpet, accurate measurements must be made together with a plan prior to the adhesion of the carpet.

This is done of course out of the vehicle on a set of saw stools or trestles.

Method 2:
Otherwise you may wish to do all sections one by one.
Note you may have to be careful to match the "Grain" of the carpet to ensure you do not have colour variation between sections.

In both methods the carpet is cut oversize and trimmed flush after adhesion.

I have used charcoal colour outside the case and light grey inside the drawer, this is so at night it is easier to see what is in the drawers.
Refit your drawer handles, trimming the carpet as required.

Fitted across the top back corner is an Aluminium trim, it is a "U" shape section with one side longer than the other. This is screw fixed to the case and of course cannot interfere with the drawers.

Fit the completed unit including your fridge slide to your vehicle. ☺

As you can see in these photo's I have fitted a qubelock frame as well for two other reasons:

1 – To store my tent and table up above the fridge securely.

2 – To stop items falling behind the fridge and therefore stopping the fridge from sliding back in.

Qubelock:
http://www.spacepac.com.au/Brochures/Shelving/Qubelok/Aluminium_Tube_and_Nylon_Joints_3pg_np.pdf

The Qubelock aluminium sections come in plain box section and lipped sections, I have used a mixture of both for this installation.

The Qubelock aluminium sections can be cut to length either using a hacksaw or with care a dropsaw.

Plastic corner sections hold the frame together.

Note the centre division and fridge back panel have carpeted ply panels fitted to stiffen up the top structure.

The top structure is held down to the case unit using 75mm roofing screws (into the sides and centre divider)

I have a 20ltr water tank strapped to the fridge rear panel, there are two locating blocks fitted either side (not fitted in this photo fitted post)

A tap and hose is fitted and fixed using a Stainless Steel hose clamp and cable ties to ensure it cannot come loose.

The hose at the other end has a garden irrigation inline tap, I ensure both taps are off during travel.

Instructions by ~Rich~ 30/10/2011.