

# DODEC Speaker Construction for Pastry Cook's

*By Peter Patrick*

If you've checked out the price of the B&K unit, noted the compound mitre joints in DIY instructions and decided neither is attractive, this process could be for you.

The "Stitch 'N Glue" process is well known to plywood boat builders. If it works for boats (mine is an 18ft trailer sailer) it will work for a DODEC speaker box.

The outcome is definitely more certain to be successful from the outset than a compound mitre affair and it will definitely be stronger by several orders of magnitude. Strength & Beauty are like any project ... you get out fair measure of what you put in but at least you don't need deadly accuracy in the joints.

Ingredients are :- hardwood plywood 9mm (3/8") \* 1 small sheet, Epoxy resin \* 1 Litre at the most, 2" Fibre Glass tape \* 1 roll & microsphere filler \* 1/2 a pound. Soft Copper wire (Mine was from an old transformer) Very low cost paint brushes for applying epoxy ( they will be sacrificed)

9mm Plywood can be obtained at most hardware stores.

System West have a great display at [www.sterndrives.com](http://www.sterndrives.com) I suggest 403 Microspheres, 105 Resin & 206 Hardener. The slow hardener gives time for the wet epoxy to be absorbed into the surface of the plywood and form a strong bond. Polyester resin is not recommended.

Most boat builder supply / hardware / ships chandler shops can offer the glass tape, the epoxy resin & microspheres in small quantities that won't break your bank account.

So here we go:-

Mark out a pattern Pentagon from scrap plywood. Start by inscribing the circle for the speaker front mount hole with a compass. (In my case this was exactly 100mm or 4"). Using the same centre scribe a larger circle within which to construct your Pentagon. ... I used trial & error methods to subdivide the circumference into five equal portions & it didn't take long. ( I recall there was a method for this when I was in high school but that was 37 years ago). Make sure there is a nice solid patch of "Land" around the speaker hole & cut the Pentagon out from the scrap ply. Drill a pilot hole (1/8" or 3mm) in the centre of the pattern ... leave the speaker hole intact.

Use the pattern to mark out twelve pentagons. Cut the Pentagons from the 9mm sheet & use the pattern as an overlay to pilot drill the centres of all twelve sides.

Note: I used a metal cutting blade in my jig saw for this to ensure I had a nice clean edge. Don't rush the cutting out & you will avoid ragged edges.

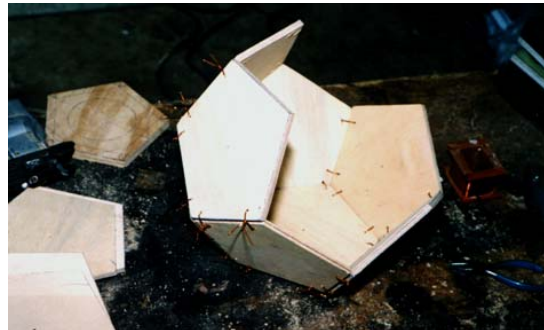
Once you have assembled twelve nice clean centre drilled pentagons you will note this is not necessarily a fast process.

Drill two pilot holes (using the same drill as for the centres) along each edge of each Pentagon in about the same location in all cases.

The Pentagons in the picture were drilled about ½” or 12mm from the corners of each & about 6mm or ¼” from the edge. I started by marking each adjacent side but this proved unnecessary.



In this picture the partly assembled DODEC is taking shape. The pattern piece is visible top left of the assembly and fresh cut pentagons bottom left. The copper wire was cut into short pieces (about 100mm) & used to tie the pentagons together.



Here is the assembled DODEC minus one Pentagon face. (Opposite the camera) The copper wire twist ties have no need of neat & pretty. Tight & even are important. Keep the pentagon edges aligned at the inside edge & keep an even gap all around the “ball”



Next mix a batch of about 10 table spoons of epoxy & 2 of hardener (If using system west proportions) & add microspheres a little at a time until a wet putty consistency is obtained. These microspheres are FGI (I think) which gives the red ochre colour. Note that it is counter productive to mix a large batch of epoxy & hardener. The chemical reaction generates heat which initiates premature curing of the epoxy. ( It gets really hot to handle)



Please note the manufacturers material safety data sheets & apply whatever precautions are recommended for the sake of your health  
Some people might contract dermatitis from epoxy and breathing the vapours might not be good for ones health.

Now plaster the “putty” into the gaps. I recommend both inside & outside for maximum strength. Fibreglass tape is weakened by sharp bends or kinks so fill the inside with a radiused curve and ensure as much as the outside gap is full as you can get it.



Once the “putty has set, cut out the copper “stitches” & sandpaper the outside flat. Sand the inside smooth also. Cut about 30 fibreglass tape strips to the length of an inside edge of the DODEC & paint the inside joins with epoxy / hardener mix. The fibreglass strips are then applied along each join with the join roughly centred along the strip. Paint over the strip to ensure it is well filled with epoxy. Any left-over resin should be mixed with microspheres & used to plaster up remaining stitch holes.



Note:- cut the fibreglass strips well before mixing the epoxy & hardener. Otherwise you risk getting epoxy on the tape & thence epoxy on the scissors. When epoxy hardens between blades they refuse to cut well.

Trim the final pentagon to fit the last hole with a hand plane or sandpaper & “Putty” it in place.

Once the epoxy has set in the last pentagon, sand it flat on the outside for taping.

Note that rebating the outside edges is optional. I did this with a router set to about 1mm depth for slightly more than 1” from the edge of each pentagon.

Radius the edges with sandpaper and apply the epoxy & fibreglass tape along the joins, overlapping at the corner points. Plenty of clear epoxy to fill the tape with adhesive is a good practice. Here we see joins covered with clear tape / epoxy. The top veneer has been removed by the router about 1" either side of the join.

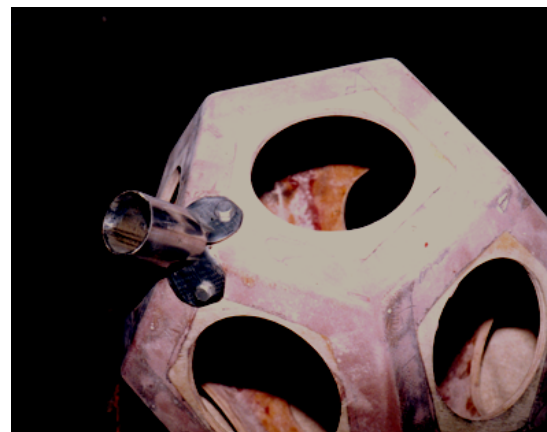


Next use the pilot centres to cut the 4" (If that's your speaker hole size) holes for the speakers. I had great results using a 4" hole saw. A skilled operator with a power jig saw might obtain a similar result. Reach in through the speaker holes to "putty" the inside of the un-taped joins of the last pentagon to be glued in place. Sandpaper this last set of five joins to a smooth radius & apply epoxy & tape as elsewhere.



Now is the time to plaster the outside rebate with epoxy & microsphere "putty" to provide a smooth exterior. Hang the DODEC on a hook in a speaker hole to avoid glueing it to the surface it stands on.

Sand the exterior smooth & radius the edges for a smooth finished product. Go easy on the sandpaper if you hit the fibreglass tape. Removing 10% of the glass fibre by weight can remove 90% of the strength. I used automotive exhaust pipe as a mounting point. Speaker stand (35mm) is an odd size (for automotive exhaust installers) so I had a piece of exhaust pipe stretched at one end to make a snug fit on a speaker stand. I cut three slots with a hacksaw at approx 120 degree spacing in the un-stretched end of the pipe and hammered, squeezed & bent the tabs to fit one "Point" of the box.



I also drilled a suitable size hole for a ¼” unbalanced socket for a speaker lead connection and found a socket fitting for an acoustic guitar that mounted properly on the 9mm ply.

All that is needed is a coat of paint and a set of speakers. I connected four sets of three \* 8 ohm speakers in series to form a 6 ohm load.

Here we are with a fine specimen, all dressed up & ready for dancin’.



“One small step for a Klingon ....” .. well it does look odd.

Please note this DODEC is air-tight & who knows how much, but lots, stronger than a compound mitre construction.

The time taken can exceed that for the compound mitre approach but the chances of a successful outcome are much higher from the outset.

In fact a Pastry cook might make a better job of it given the greater familiarity with spreading wet “putty” in the form of cake icing.

**Special Note:-**

If I were to build another specimen I would definitely rebate the edges with the router BEFORE stitching it together.

Vis.--

Secure the pentagon to a large piece of scrap with a counter sunk head screw in the centre pilot hole & keep the whole thing steady & firm. Routers have no safety guard & deserve much respect



Have fun... P.J.P.