

miniOnken Assembly Suggestions

Chris Bobiak, Notes: REVISED May 2014

General:

- 1/ High quality multi-ply is highly recommended. Cut plans are laid out for both 5x5 (Baltic Birch), and 4x8. Also note that parts are sized for butt joints tops and bottoms "planted-on" and back panel inset - use of dados, lock-mitres etc, will require resizing of parts.

Craftsman experienced with such joinery techniques should have no problem making required adjustments to part sizes.

- 2/ Walls lined with $\frac{1}{2}$ " (12mm) cotton or wool felt – we recommend $\frac{1}{2}$ " fabric backed UltraTouch denim insulation. Centre side of holey brace lined with lower density layer of poly batting. Be careful not to occlude the internal openings of port slots.
- 3/ There is no "best" sequence of assembly of parts, but do ensure that wall lining materials are installed before final panel is attached – with drivers of this size class, access to the inside of assembled enclosure is very difficult.

RECTANGULAR BOXES (rectangular with single side chamfer)

There will be a total of 3 layers of material in which this chamfer is cut – front baffle, slot port spacers and outside panel of wall "sandwich" Depending on tools available, the individual parts can be pre-cut before assembly, or after enclosures are fully assembled. See Chris' build tips

The trapezoid boxes present a couple of additional challenges, most particularly the keying of back panel to port slot spacers if inset, and cutting of the second section of chamfer on side panels. This will be 90° to front baffle, and can be cut on table saw after assembly, but requires a very deep cut and powerful saw. See Chris' build tips

Chris' build tips – REVISED May 2014 — *see special notes below re trapezoid shapes*

- 1/ As noted in General notes 1 – the detailed drawings and cut plans are laid out for overlapping butt joints, with top and bottom overlapping all vertical panels. The 3 layers of side wall "sandwich" provide substantial glue surface area, as well as opportunity to inset tops and bottoms with dados, or mitre / lock join all external panels. If so, part sizes on cut plans will need revision. Craftsman experienced with such joinery techniques should have no problem making required adjustments to part sizes, and revise assembly steps as chosen.
- 2/ Use whatever sequence of cutting bevels for the large chamfers and assembly of parts that best suits your tooling. My own practice is to cut parts for side panels slightly oversized (3mm), assemble the 3 layers, and trim to finished size before cutting chamfer on outermost 2 layers. Use bench jigs and spacer strips to ensure accuracy of slot port spacer blocks, which extend to the inset back panel to provide extra glue surface contact area.

If your final plans include painting / finishing of port slots, do so before attaching the final layer of sandwich, regardless of assembly sequence.

- 3/ I recommend cutting driver hole in front baffle before assembly to allow precise dry fitting of holey brace where it contacts driver magnet. As per General Note #3, internal access to enclosure for measuring / dry fitting this part will be very difficult after assembly.

After dry fitting the 2 wall assemblies, inset back and bottom panel, I cut the driver panel to the extent of the internal port wall panels and machine the driver cutout. Mark Audio and other full range drivers with thick cast flanges should be recessed for flush mounting.

- 4/ Note that cutting the chamfer on fully assembled cabinet with full width front panel requires very careful marking and test cuts, since the slots will be covered and you'll be working blind – it's very easy to cut past the edge of internal slot wall - once the chamfers are cut, the square edge of internal port wall is the primary vertical joint surface for front panel. In addition, you're cutting at a 45 angle through 4 layers of material which can be a heavy load on saw. For those reasons, and as fully assembled floorstanding versions can be very heavy and hard to accurately manipulate on table saw, and it's easier to see what you're doing with the front panel not attached, I've revised my procedure to cutting the bevels before assembly. This is a relatively simple 45deg cut with the 3 layered panel facing up.
- 5/ Bevels on driver panel can be cut either before or after assembly – cutting this single layer of material separately is less of a strain on saw, and it's easier to measure when sides, bottom and back are assembled.

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- 6/ Sizing vertical driver brace is next. By now all previous parts should have been dry fit, and it's time to start assembling. Attach (glue & clamp or nail) the back, 2 sides and bottom, and clamp dry fit the driver panel to ensure snug fit of brace panel. Temporarily install the driver in front panel and lay face down on protected surface. Use sliding tri-square to measure depth from back of magnet to inside of panel, then remove driver from panel.

Align brace panel off vertical center line of driver panel and mark approx. $\frac{1}{4}$ " inside of the driver cut out. Use the T-square to scribe a line on the long edge of panel. These define the extent of the notch in brace for driver & motor assembly (can be rectangular, or trapezoid shaped – if the latter, the surface that contacts magnet should be $\frac{1}{2}$ " or so wider on each side. Cut with band saw or jig saw, and reinstall driver to ensure dry fit of brace to lightly contact back of magnet. Note that a slight gap is preferable to a forced fit. The molded resin and stamped metal frames of Mark Audio and Fostex drivers are susceptible to bending if mounted too tightly to this brace, which can cause misalignment of their close tolerance drive trains. Once this fit is confirmed, machine the series of holes approximately as seen on drawings.

Once brace is completed, dry fit again to ensure uniform contact of driver panel to the outside walls and brace. Use a long sanding block if required to eliminate any gaps/ high points. Outline location of brace panel on back, bottom and front panel for extents of damping pads. Cut and attach panel damping material to those surfaces before gluing brace and front panel in place.

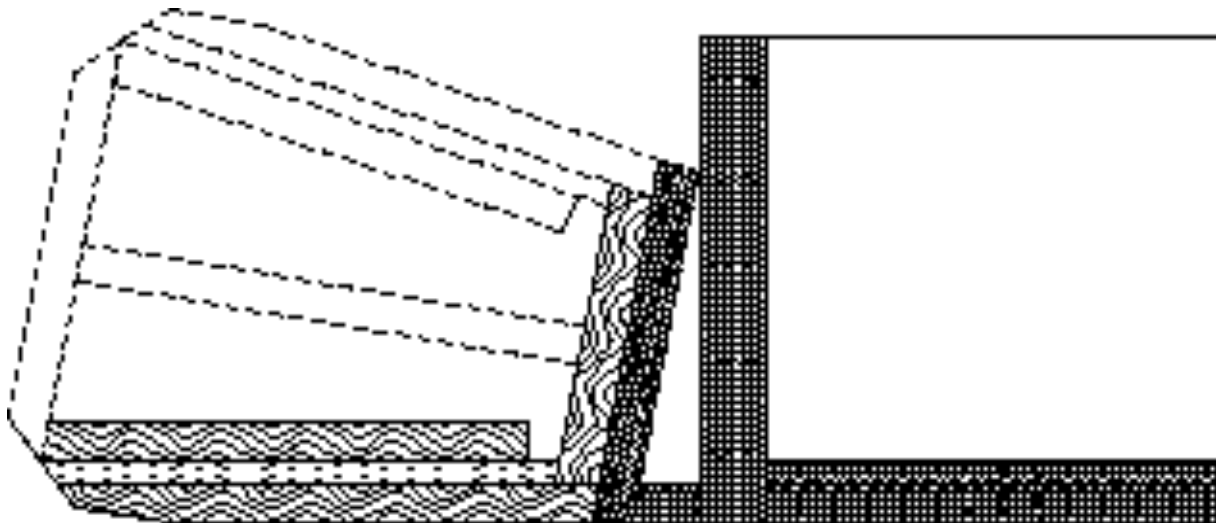
- 7/ Attach brace, driver panel and top. If driver panel has already been beveled, the diagonal cuts on tops and bottoms can be quickly and more cleanly cut with a Japanese draw saw than on the table saw – there'll be no cross grain chipping or blowout at the tail end of cut. If cutting these corners on table saw, clamp a sacrificial piece of scrap material at the bottom of cut.
- 8/ Carefully block sand and glue-size /pore fill exposed edge grain of plywood to avoid telegraphing of joints on painted or veneered finish.

SPECIAL NOTES RE TRAPEZOID ENCLOSURES

These can be very pretty, but are a bit more time consuming. Depending on your cutting sequence, and the number of table saws in your shop, it may be necessary to alternate between 90dg 45dg and 10dg angles. Unless you're absolutely confident of the accuracy and repeatability of the angle gauge on your saw, the minor investment in a digital angle gauge will pay for itself many times over.

The traps are significantly different from the regular enclosures in that all vertical edges other than the driver brace and back edge of port panels, as well as the back ends of port slot dividers, have either a 45 or 10dg angle.

As noted in #2 above, I like to inset the back panel to key into the port slot spacers. I found that an angled attachment to my 90dg bench jig greatly simplified measurement and alignment of these parts.



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Cut and assemble parts similarly as with regular boxes, with the possible exception of second angled cut on outside panel. While not as much material will be removed as with the 45dg cut, it does require a very tall effective cutting height once the enclosure is fully assembled.

The final angle of this is at 90° to front panel, and could be cut on a table saw after box is fully assembled, but requires a very tall cut (i.e. just under 100mm / 4") at 10° across the laminations of $\frac{3}{4}$ " plywood. I'd recommend pre-cutting at least the second section of this chamfer before assembly – this requires less than 72mm (2 7/8") tall cut. Set blade at 10° and set rip fence with auxiliary support panel with blade tilting away from fence, and use a more aggressive rip or combination blade rather than finishing blade. The small section of this outside panel that follows the 45° chamfer can either be cut now, or even removed after assembly. If you can think of other methods to make these cuts, then you probably don't need any advice.