Charlie’s MCM Poject

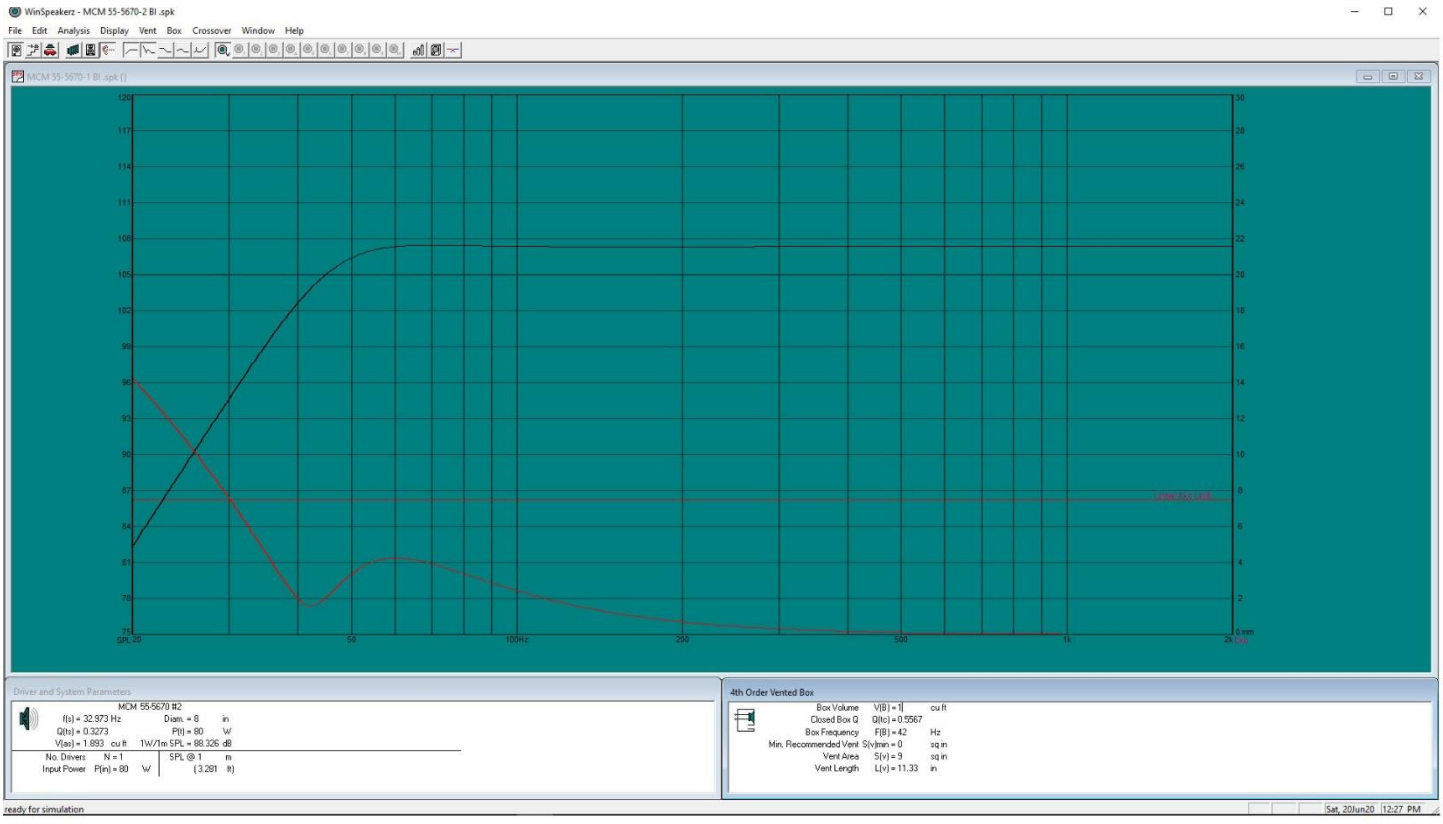
I gifted a good friend a pair of small 2 ways a couple of years ago which he was very happy with. He recently retired and moved from his townhouse to a much larger house and asked me to build something bigger.

I started with the MCM 55-5670 from Newark. It’s a cast frame 8” woofer with a generous 7.5mm Xmax. I chose the HiVi DMB-A dome midrange and Fountek NeoCD1.0 tweeter to round out the drivers.

https://www.newark.com/mcm-audio-select/55-5670/8-die-cast-woofer-8-ohm-rubbber/dp/95Y2936
https://www.parts-express.com/HiVi-DMB-A-2-Fabric-Dome-Midrange-297-716
https://www.parts-express.com/Fountek-NeoCD1.0-Ribbon-Tweeter-296-701
https://www.parts-express.com/miniDSP-2x4-HD-USB-DAC-Digital-Signal-Processor-230-324

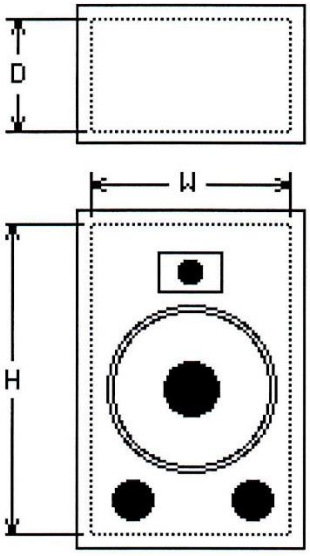
The system uses a passive crossover between the midrange and tweeter and a MiniDSP 2x4HD to cross between the woofer and passive mid/tweeter passive crossover. The DSP is also used for baffle step compensation and some minor EQ.

Simmed woofer in a 1 cu. ft. box tuned to 42Hz.



Box design with port specifications. 2” x 4.5” port was substituted to ease construction.

TA



Box Dimensions and Gross Internal Volume

Internal Height:	H =	21	inches
Internal Width:	W =	10.75	inches
Internal Depth:	D =	7.75	inches
Gross Internal Volume:		1.013	cubic feet

Adjustments and Net Internal Volume

Driver Displacement =		0	cubic feet
Bracing Displacement =		0	cubic feet
Other Displacement =		0	cubic feet
V(B) increase due to filling =		0	%
Net Internal Volume:	V(B) =	1.013	cubic feet

Notes

S(v) = 9 square inches (Vent Surface Area)
L(v) = 11.33 inches (Vent Length)
External 22H X 11.75W X 9D
Charlie's MCM 8" 3-way

My Company
My Address, line 1
My Address, line 2
My Country
My Phone

System Name:

4th Order Vented Box

Designer: My Name
Title: My Title

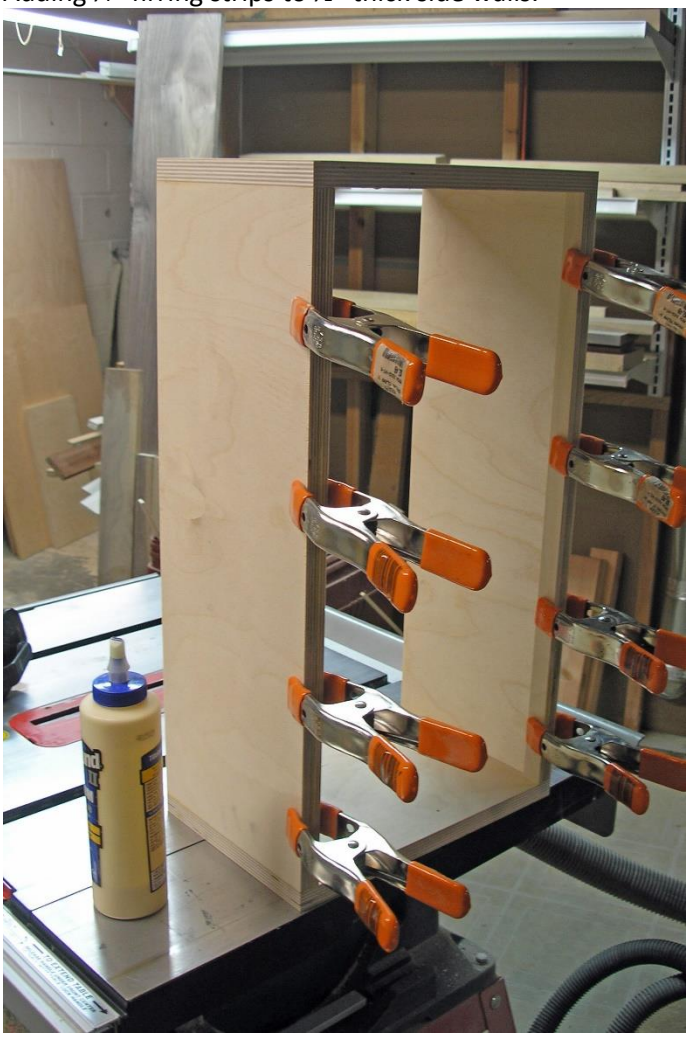
Rev Date:
Rev:

Drivers on a cardboard template used later to layout the drivers on the baffle.

Cut up Baltic birch panels.

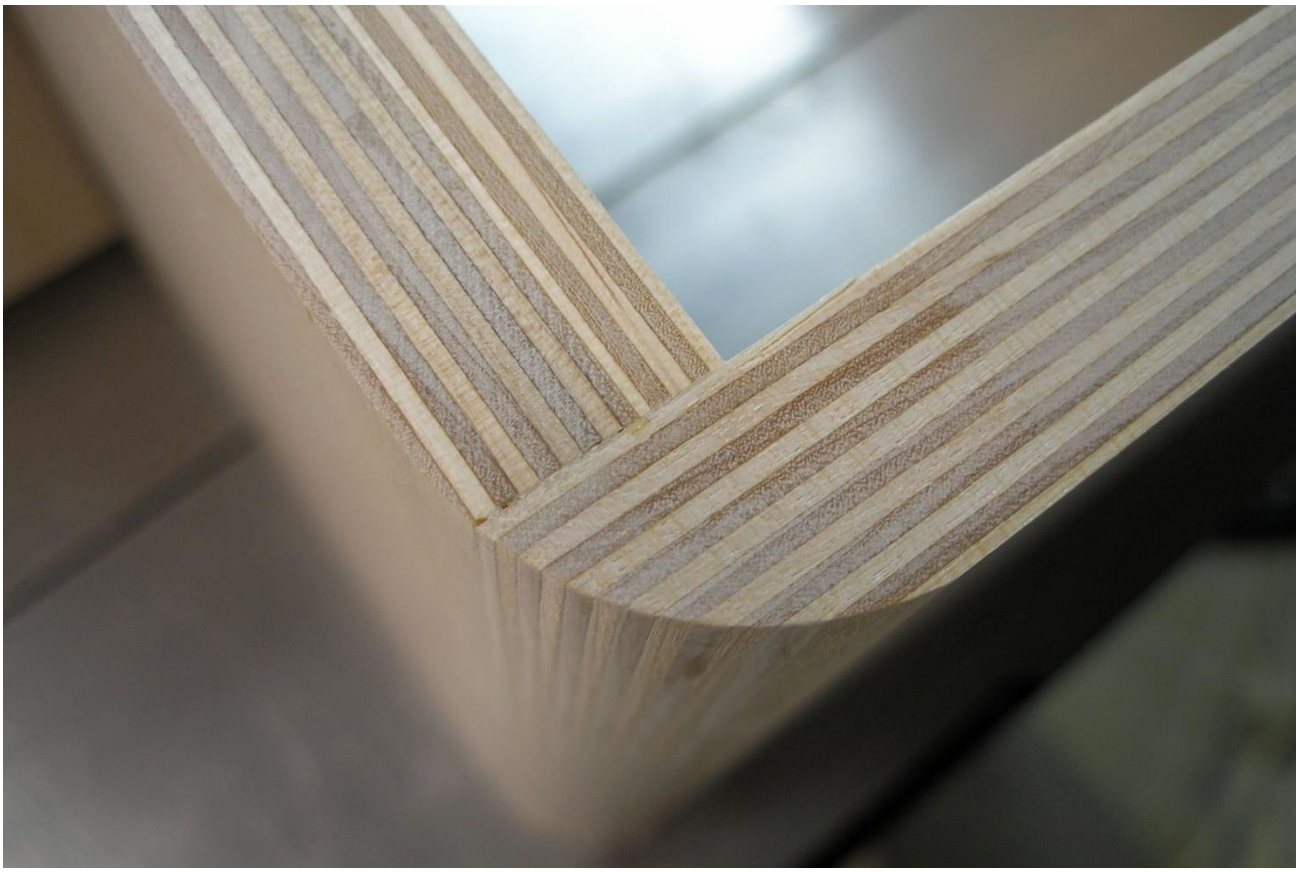
Gluing up the sides, top and bottom.

Adding ¼” firring strips to ½” thick side walls.

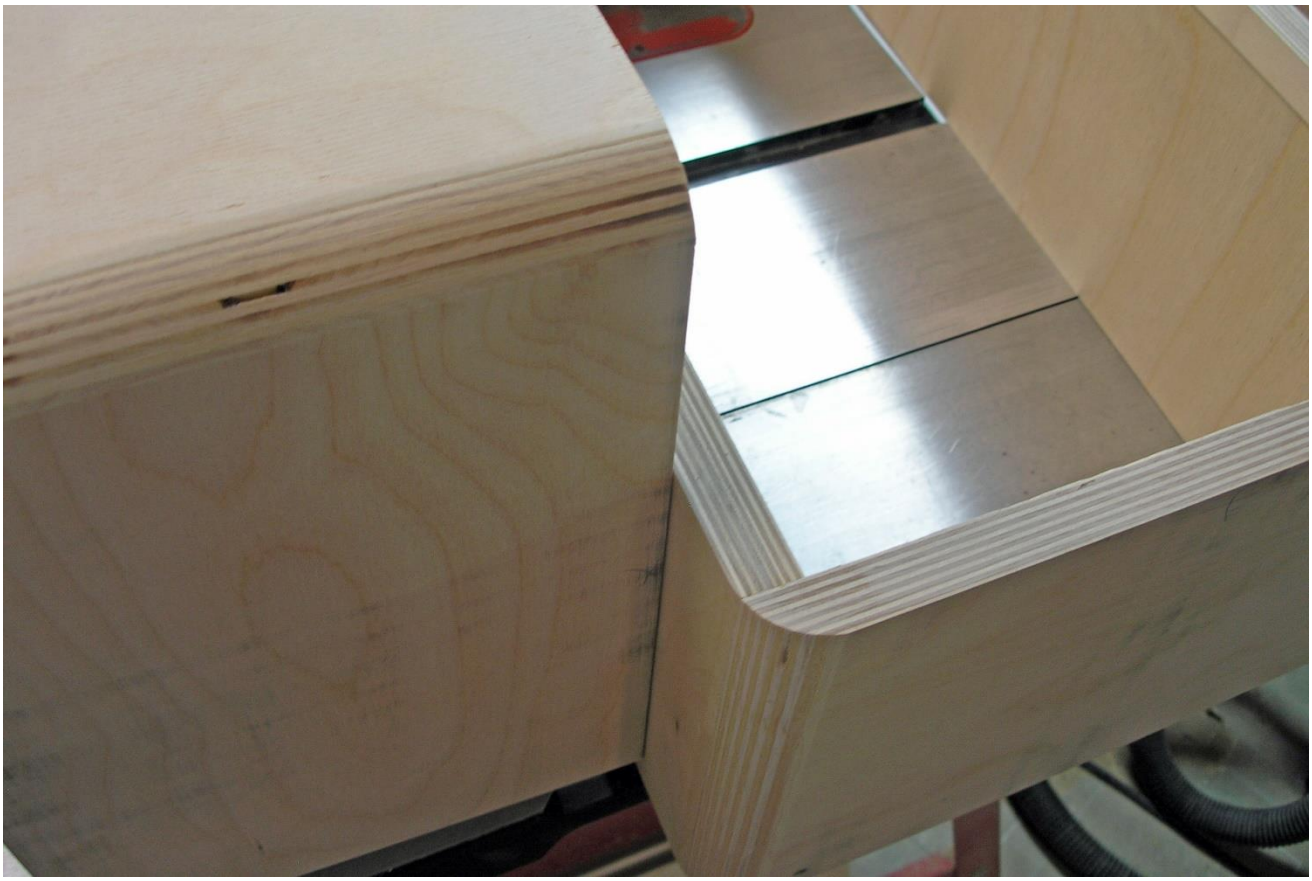


Round overs were applied with a scrap piece of wood clamped to the box to prevent tear out.

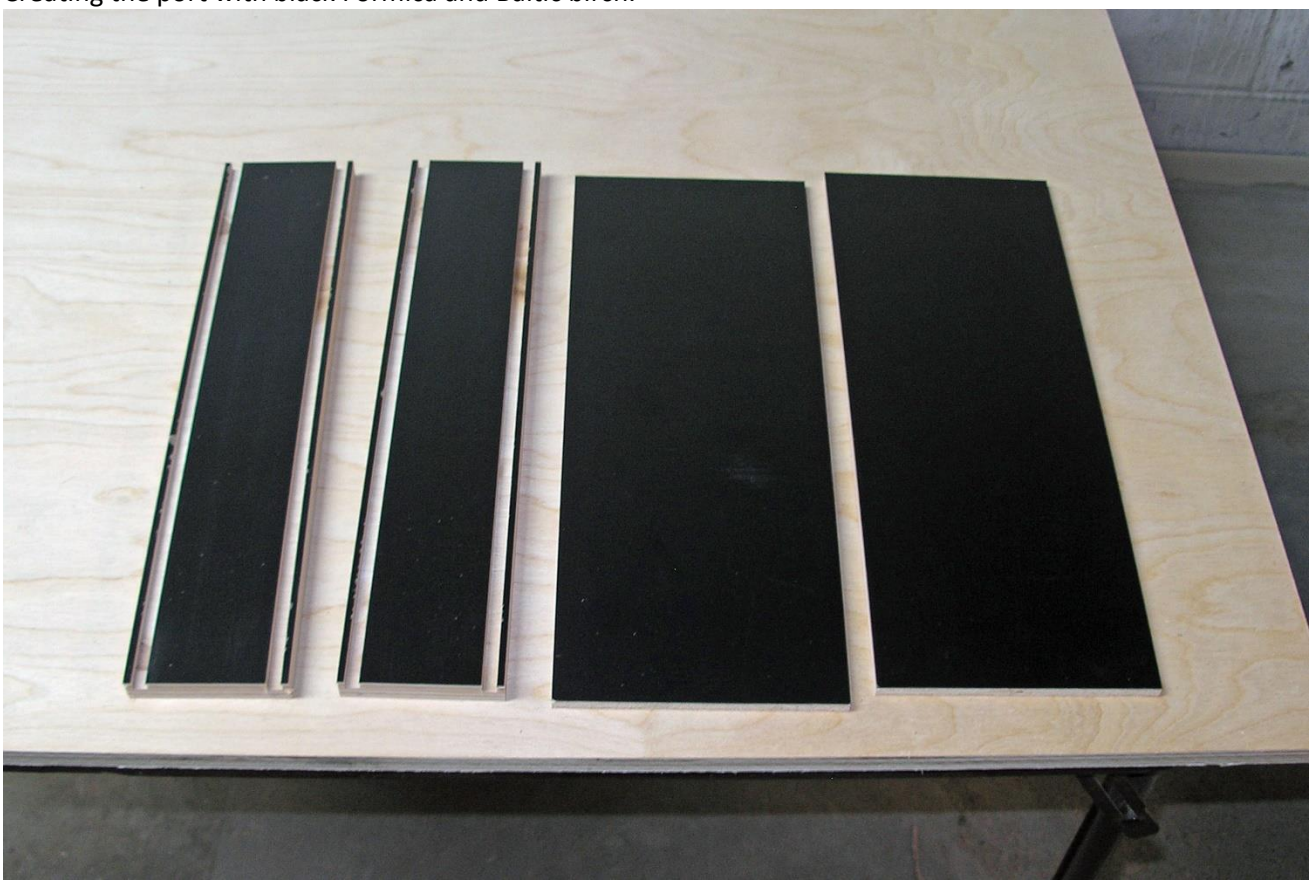
Finished round over.

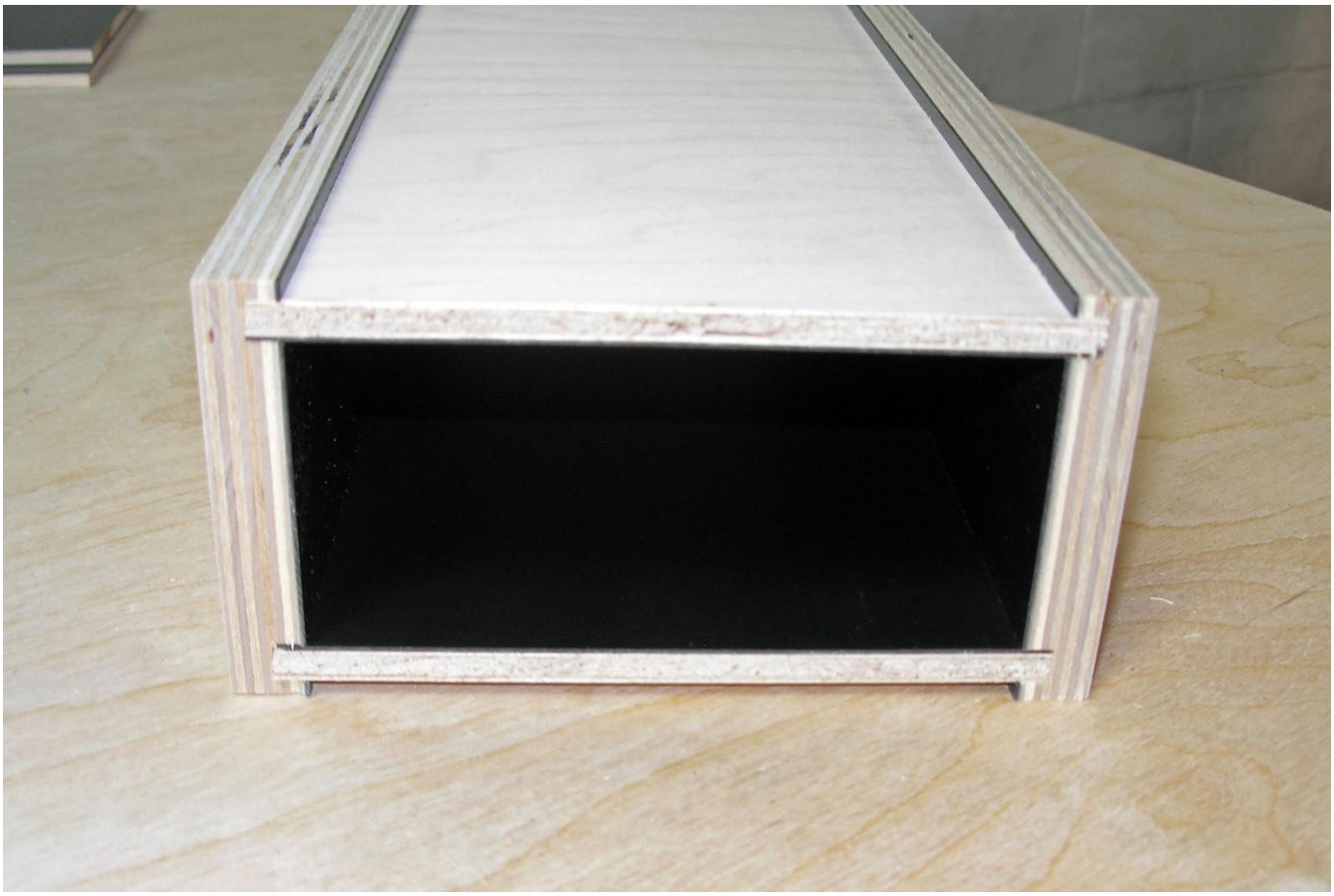


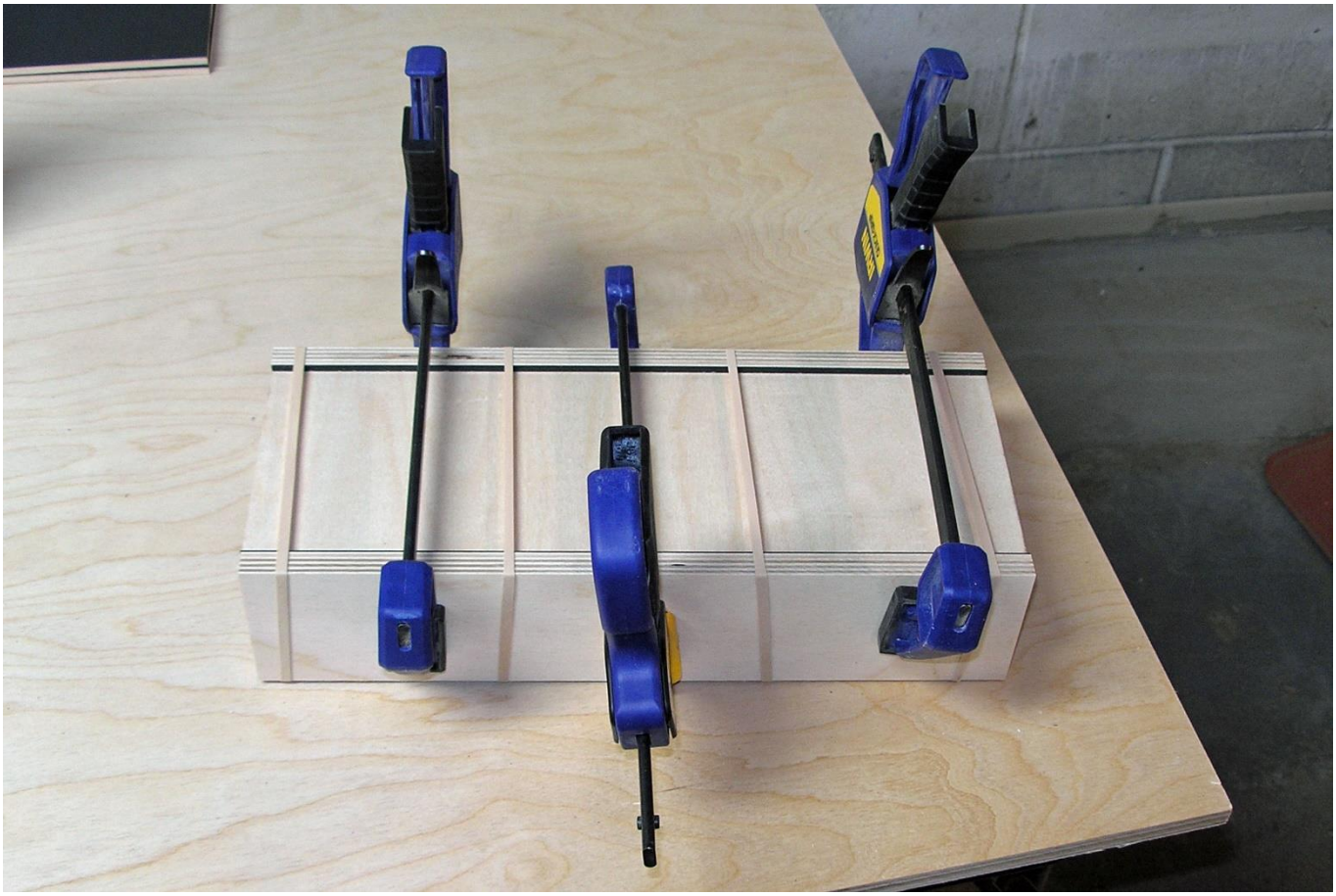
Round overs.

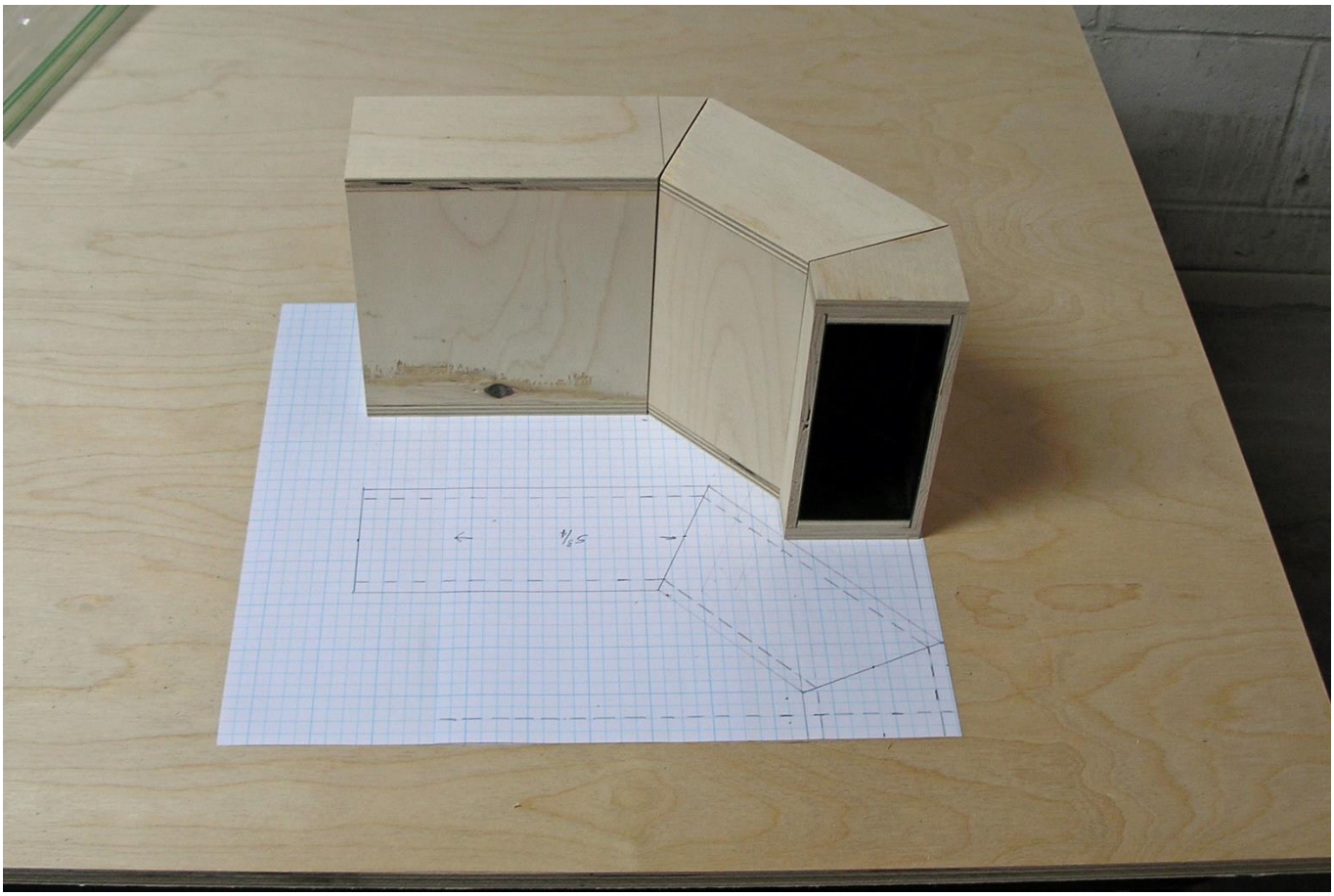


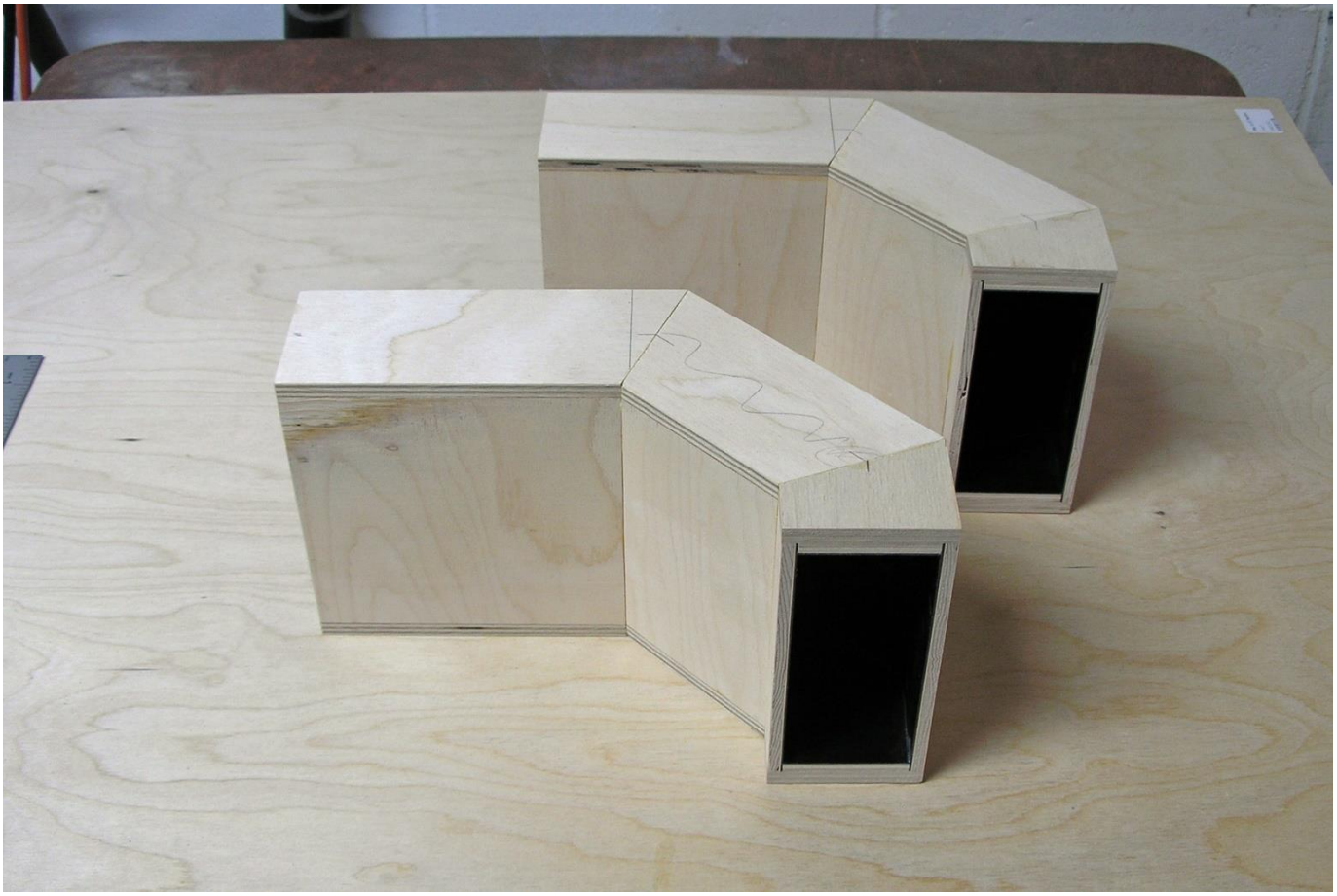
Creating the port with black Formica and Baltic birch.

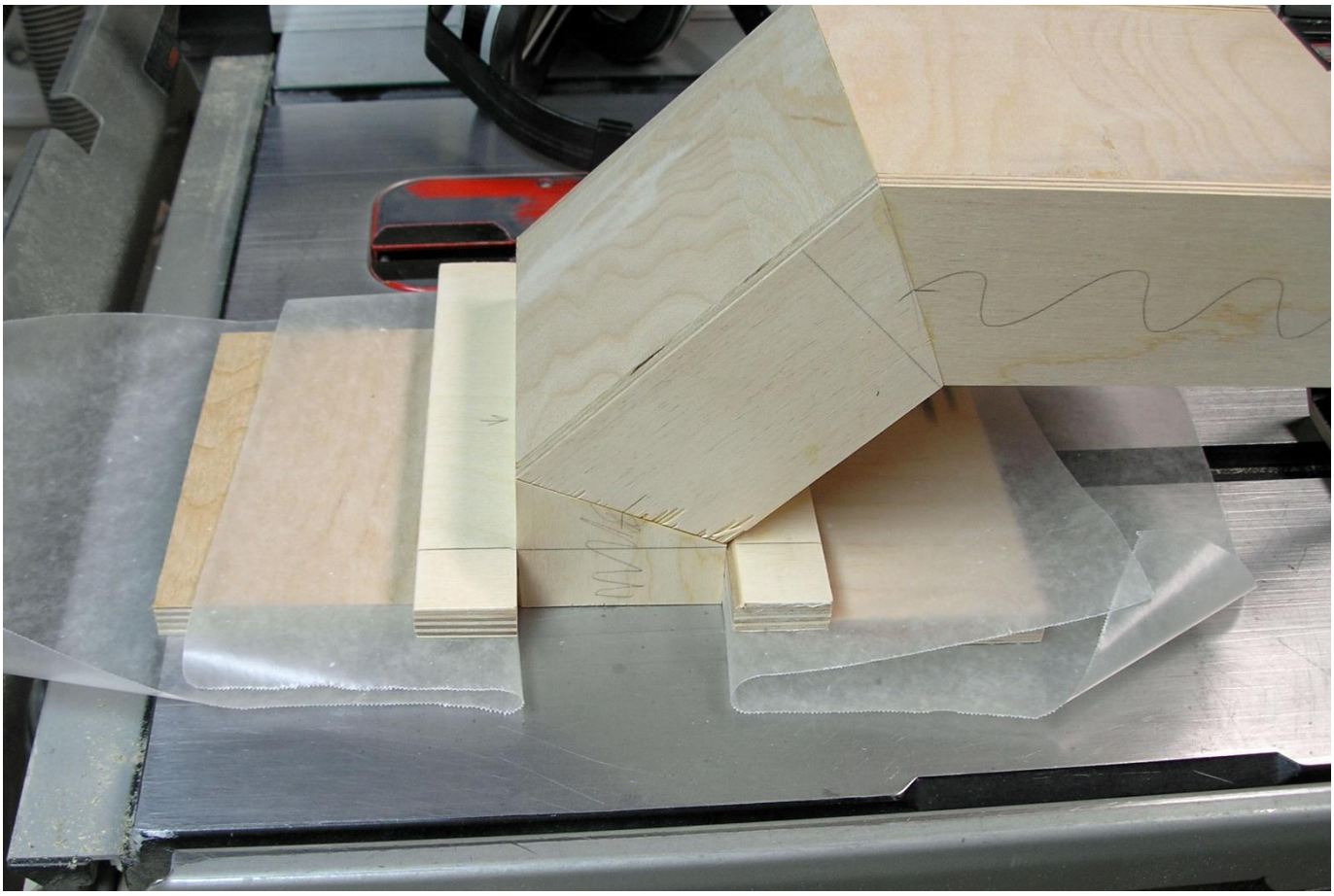




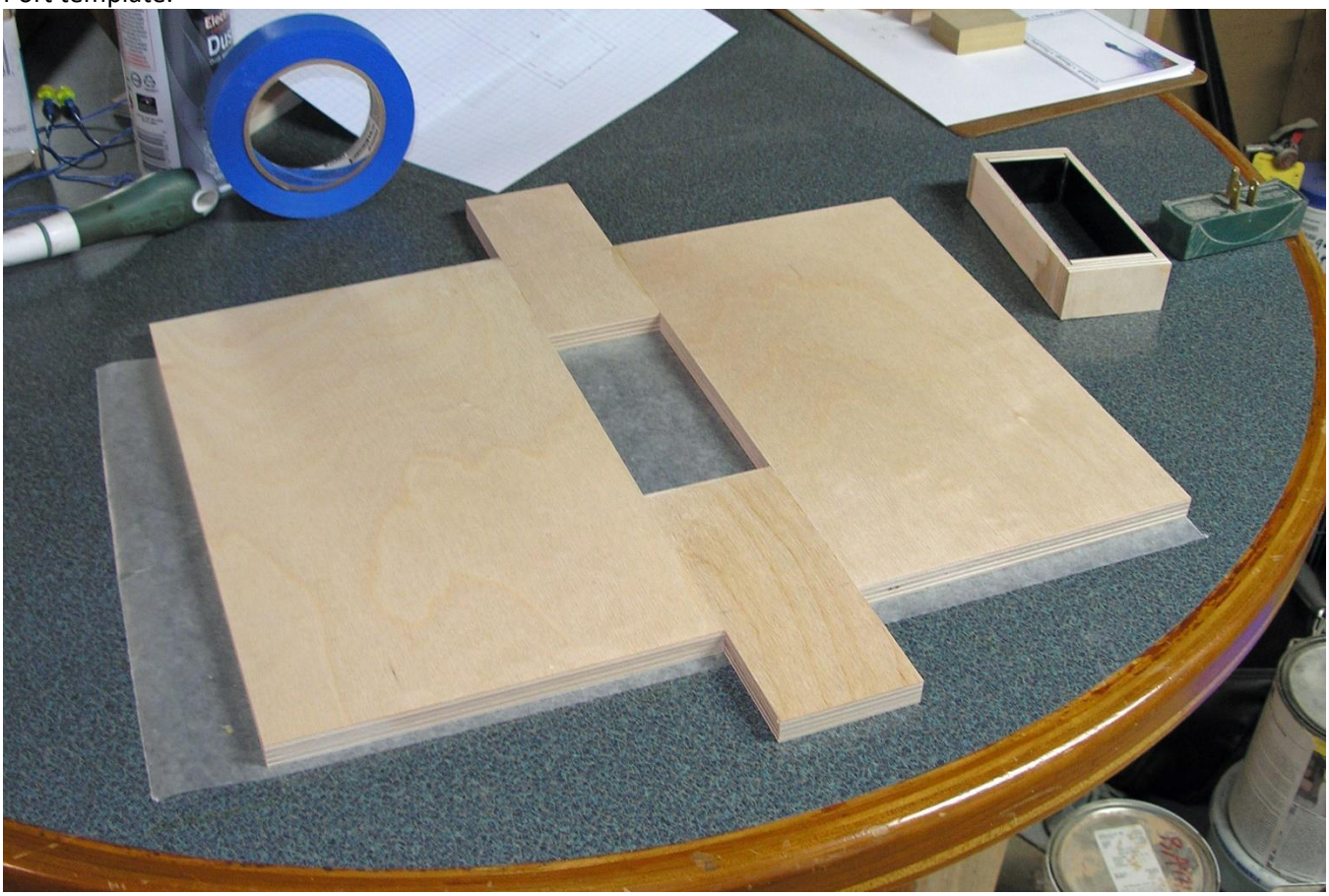








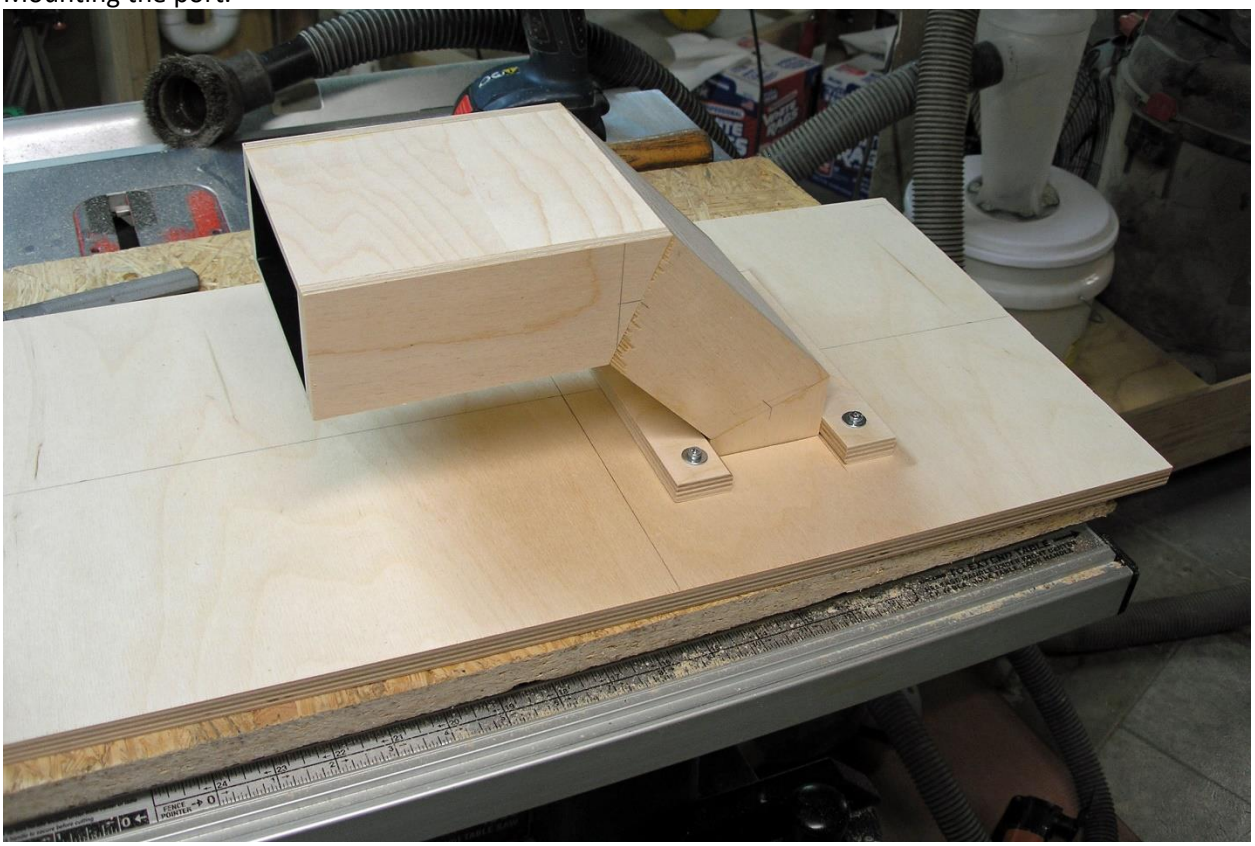
Port template.



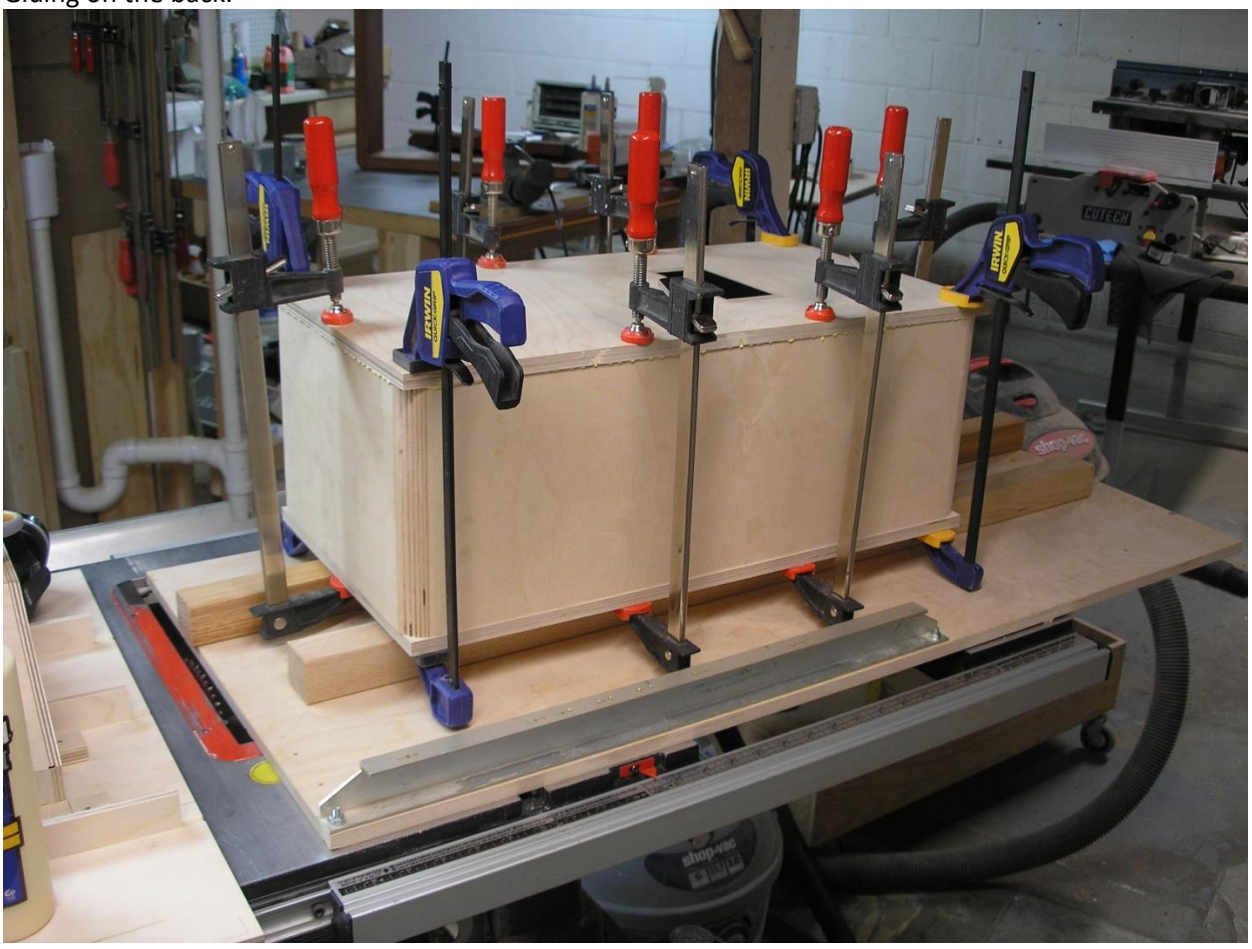
Cutting port cut out with a top bearing bit.

Squaring the corners with a corner punch.

Mounting the port.



Gluing on the back.



Back installed.

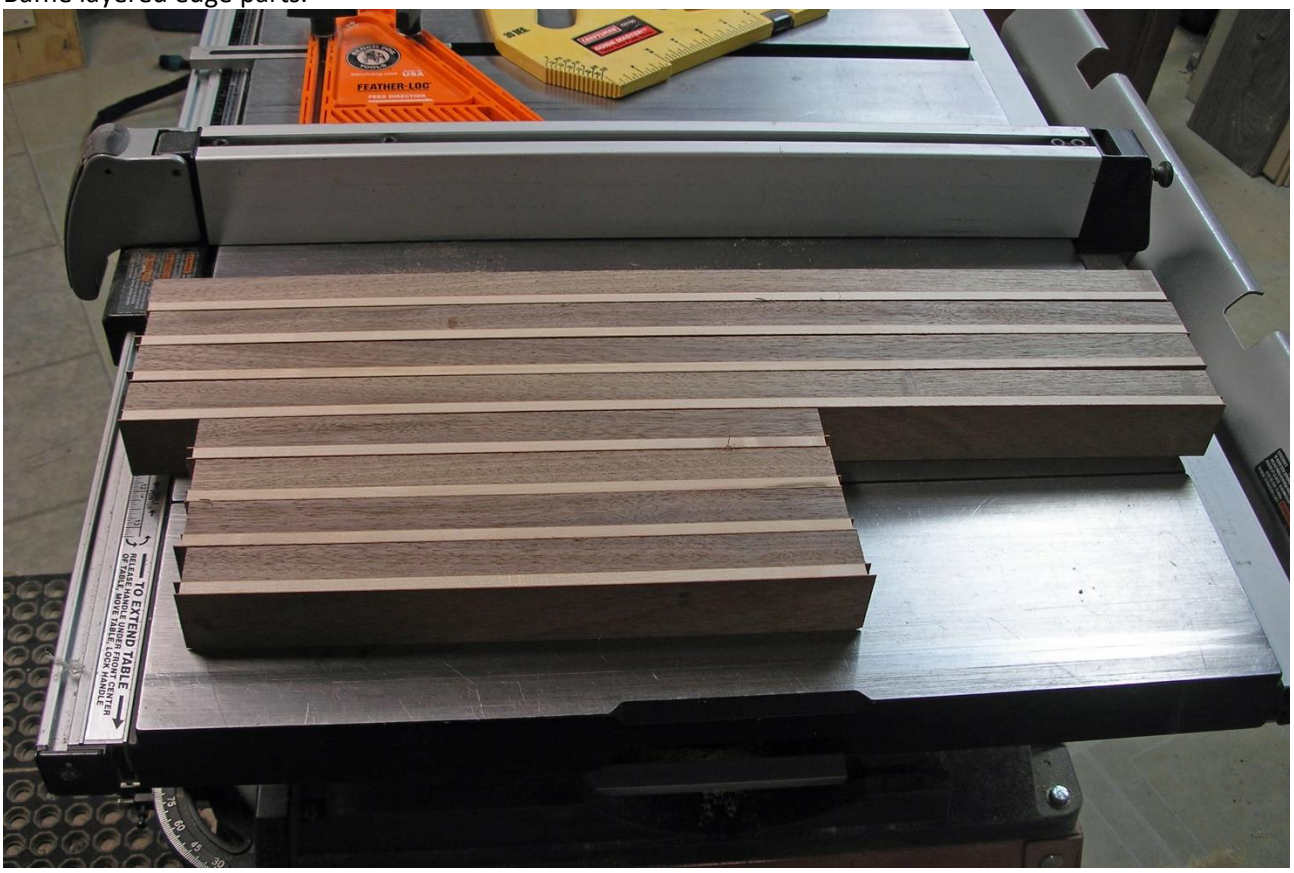
Applying quarter sawn walnut veneer.

Clamping veneer seams.

Applying Watco natural finish.

Creating front baffle layered edge detail with ¾” walnut, mahogany veneer and ¼” maple.

Baffle layered edge parts.



Gluing up baffle edge detail picture frame.

Gluing baffle edge detail picture frame to box.

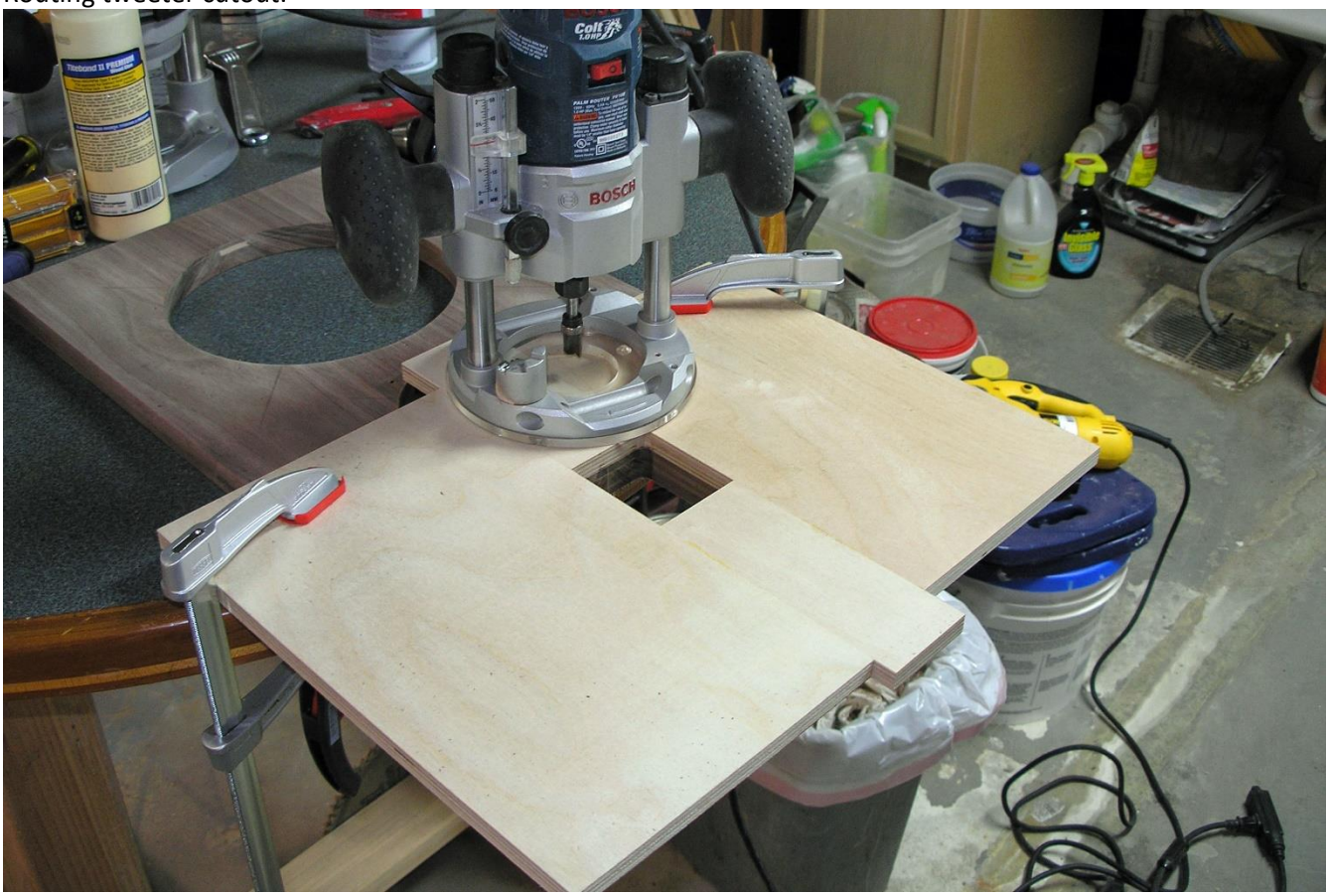
Picture frame trimmed with flush trim router bit.

Gluing in bracing.

Midrange cutout in ¾” solid walnut front baffle.

Routing woofer cutout.

Routing tweeter cutout.



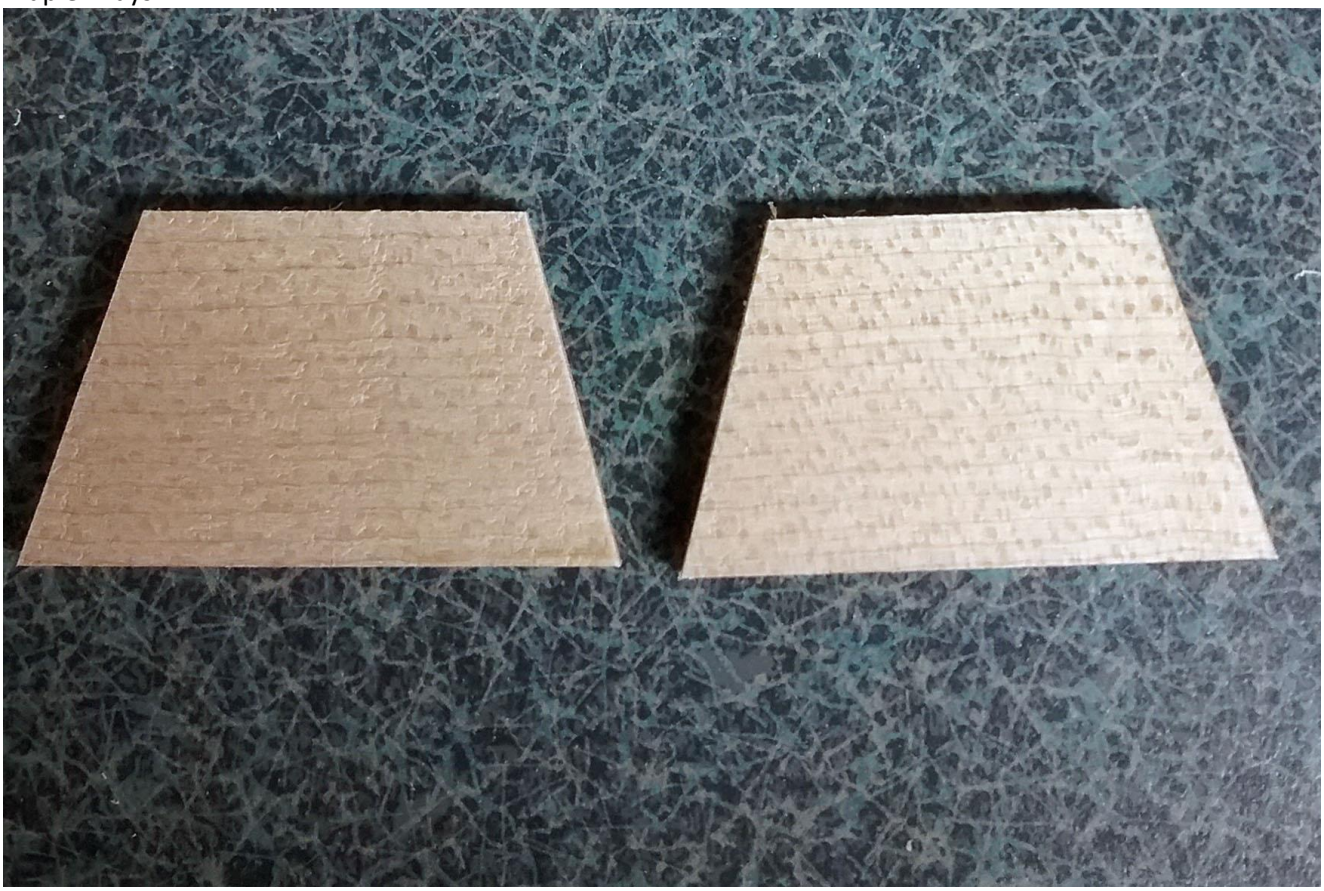
Front baffle with cutouts.

Gluing front baffle to box.

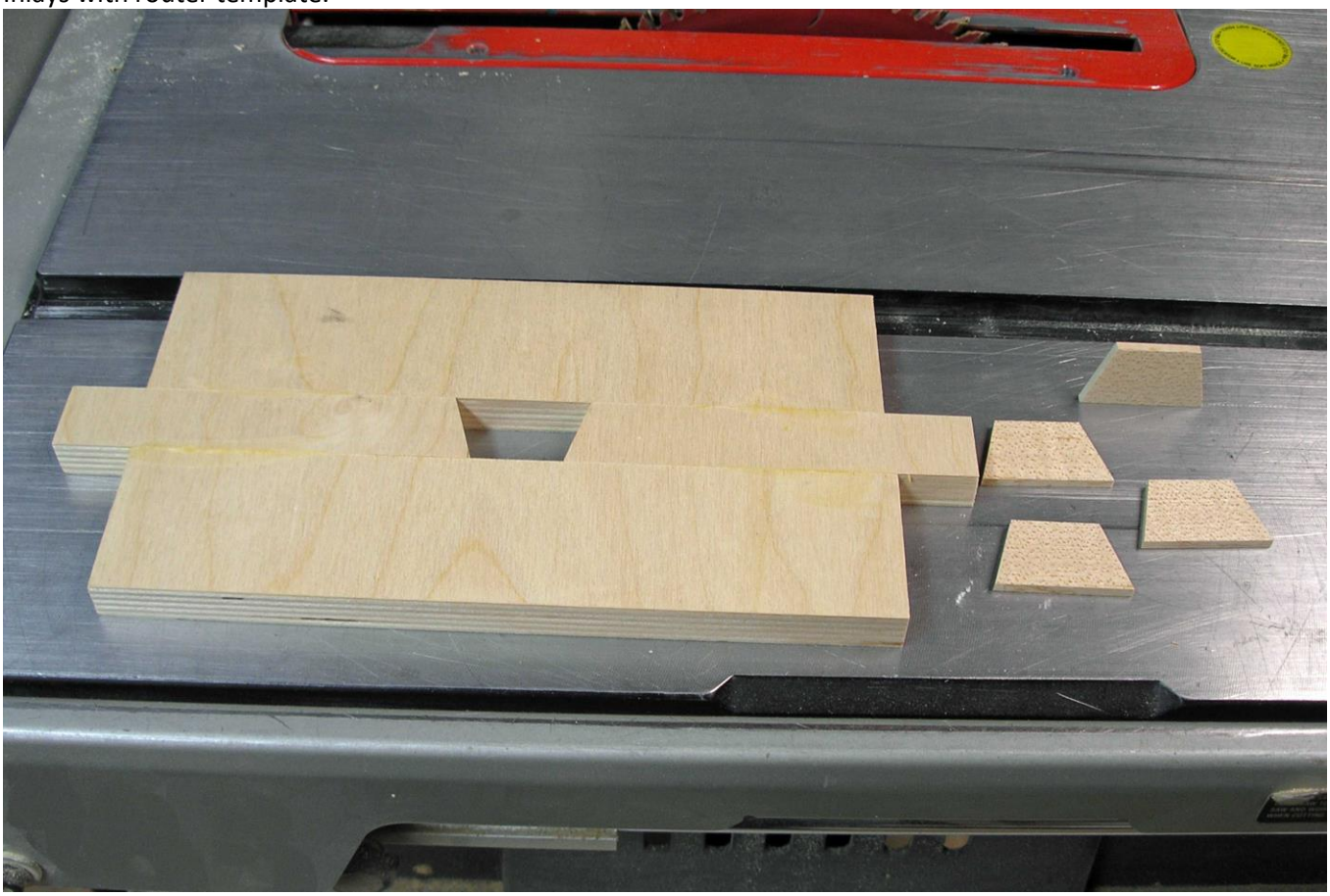
Cutting 1 ½” bevel on front baffle.

Box with 45-degree bevels cut. Oops, the biscuits used to join the two-piece walnut baffle are exposed. Time to learn how to do inlays.

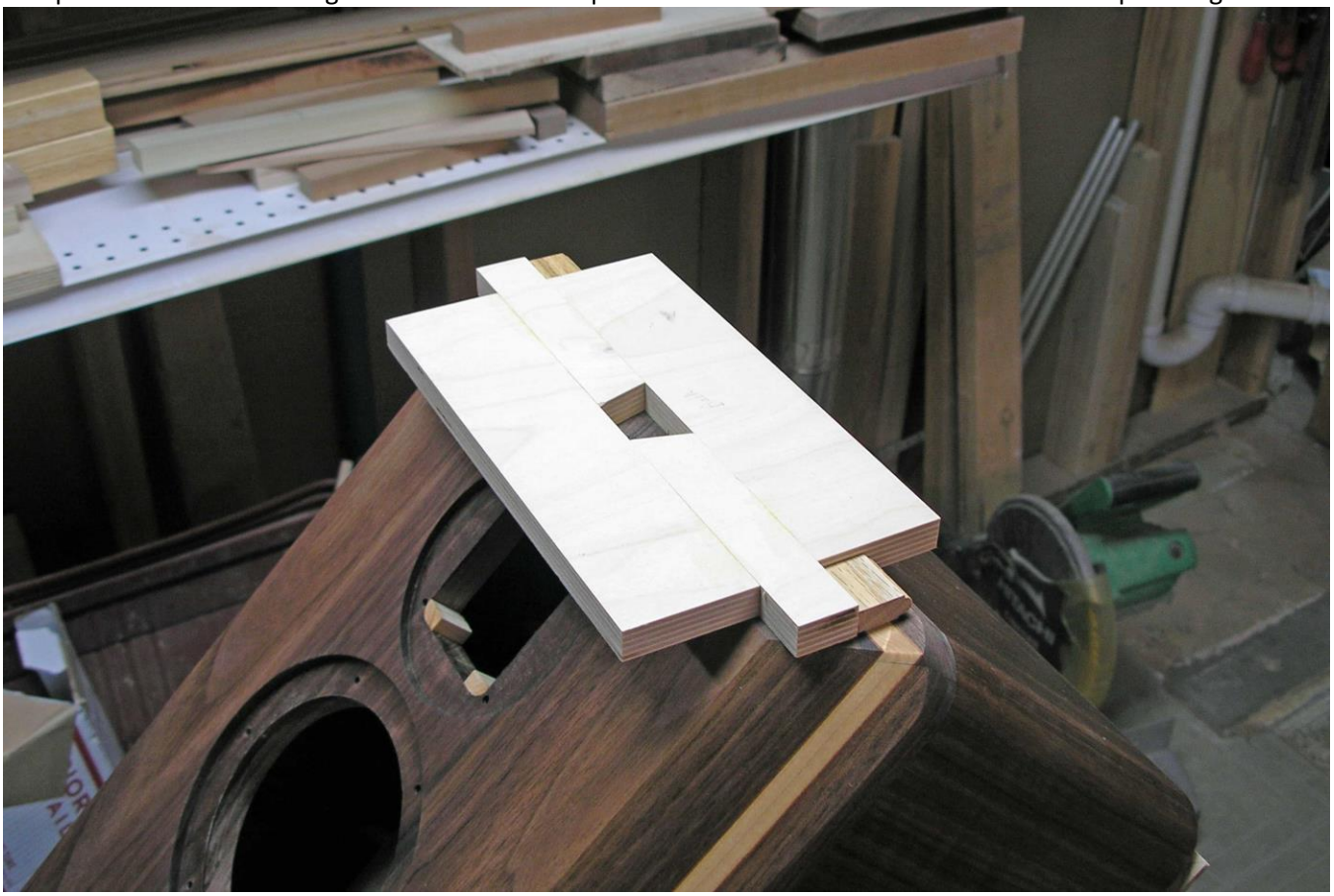
Maple inlays



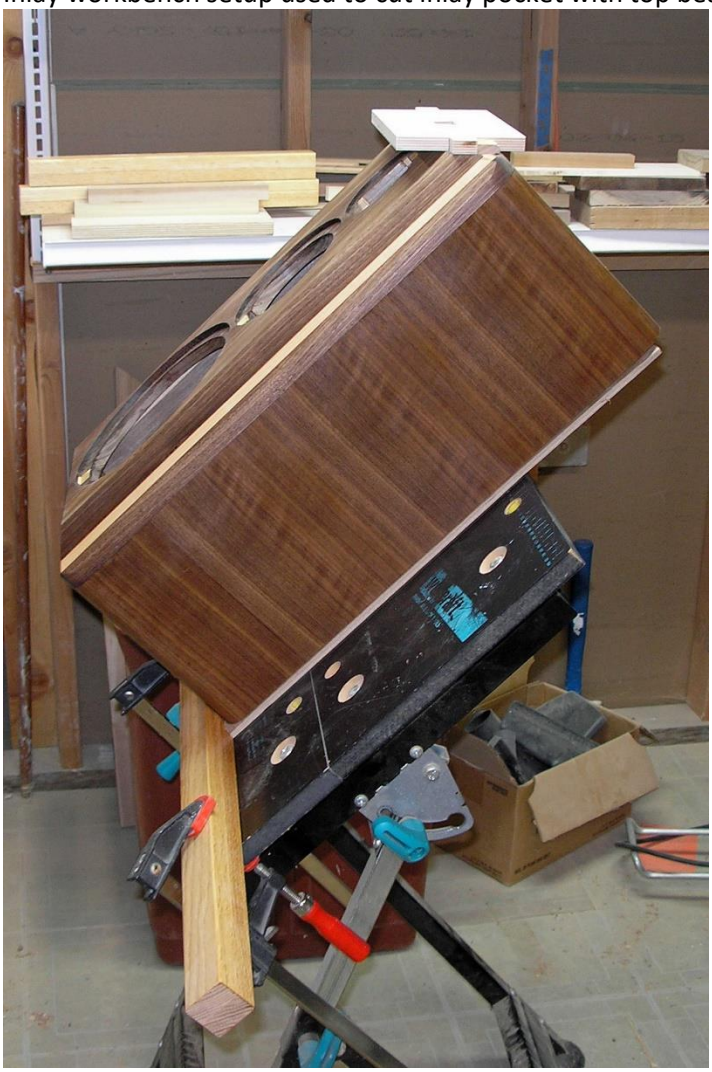
Inlays with router template.



Template stuck to baffle edge with double stick tape. Note the small blocks of wood to aid template registration.



Inlay workbench setup used to cut inlay pocket with top bearing router bit.

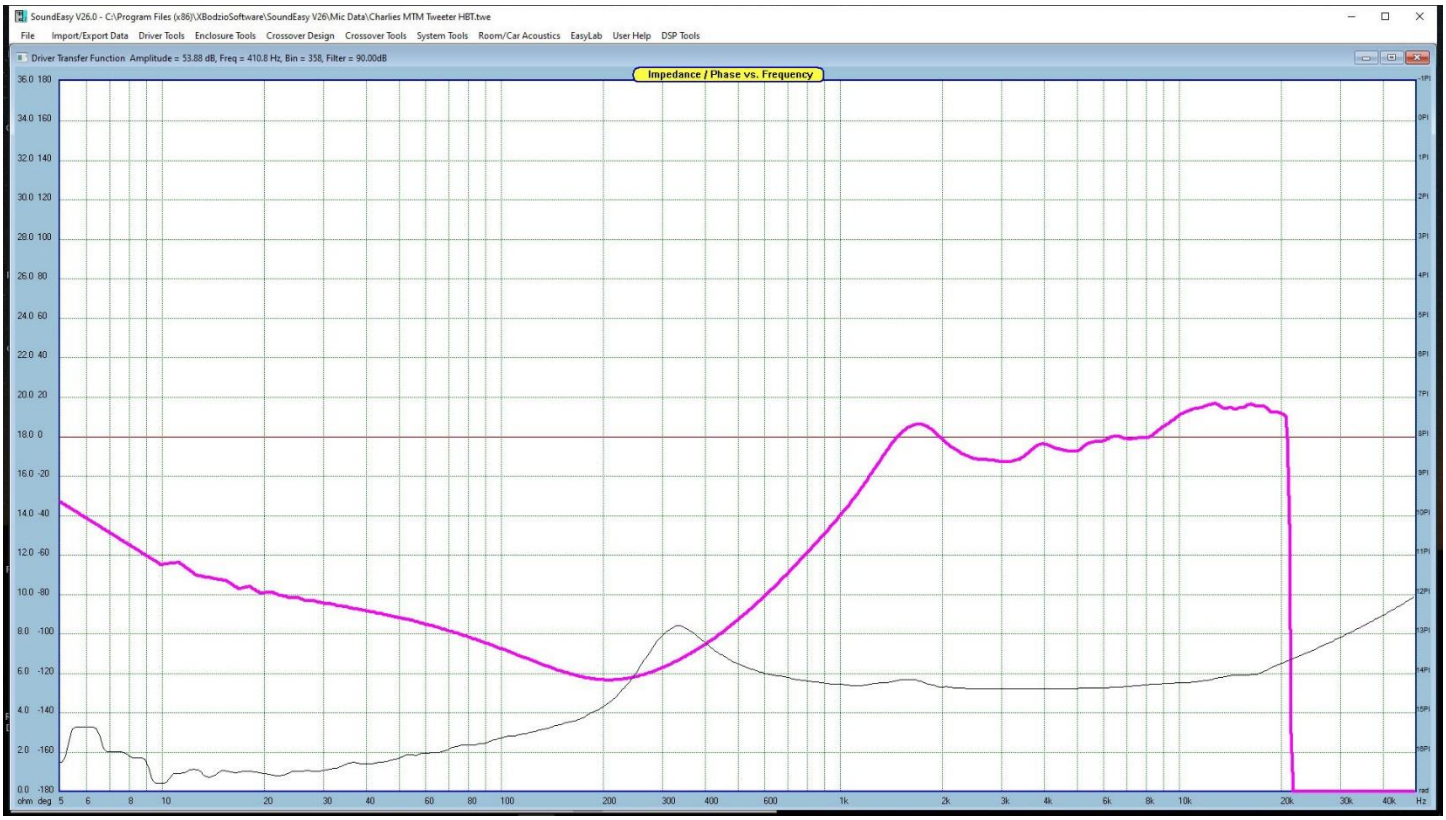


Inlay installed.

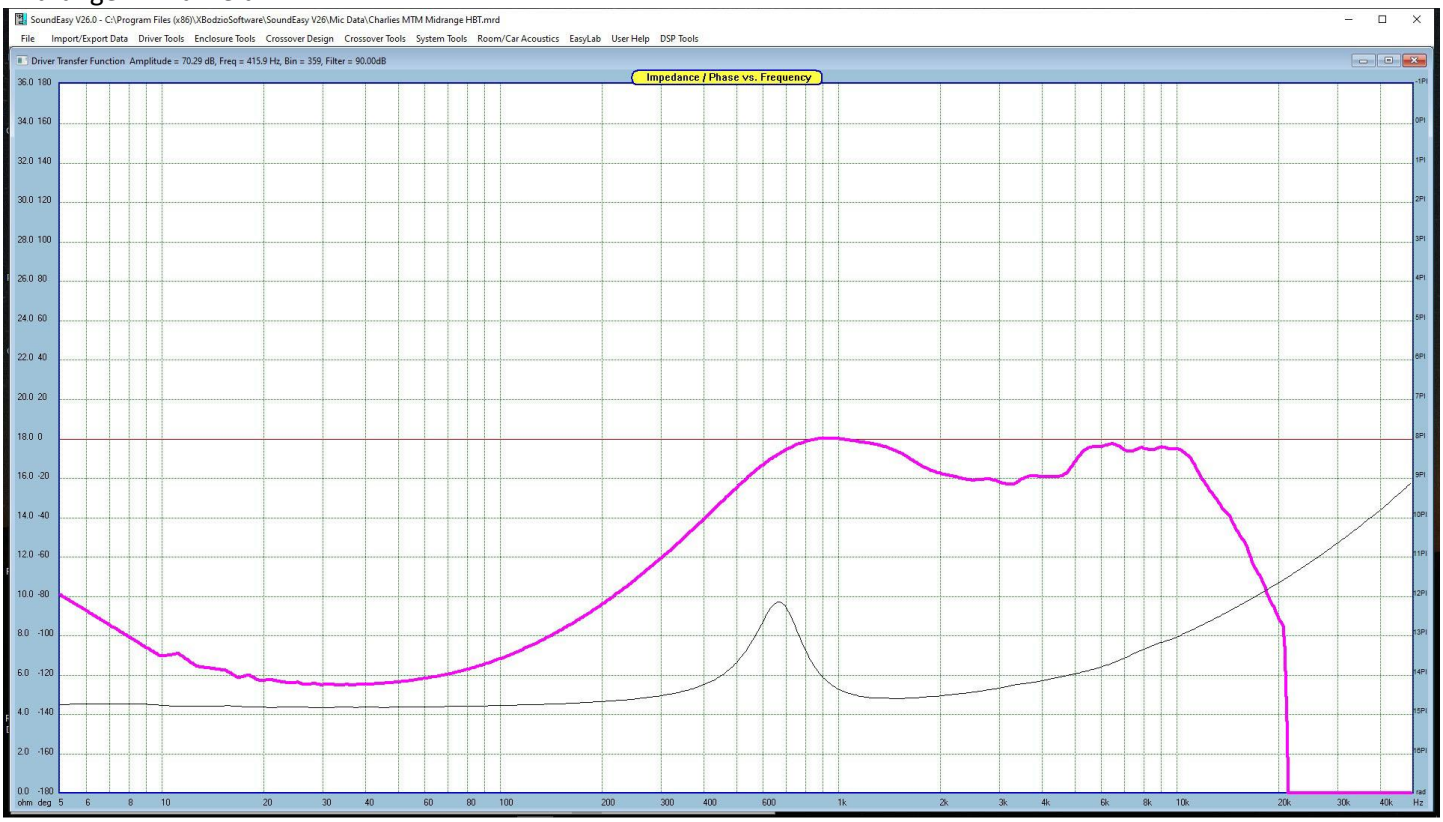
Finished with a coat of Watco natural danish oil followed by multiple coats of wipe-on poly.

Bench setup to apply finish to 45 degree bevels.

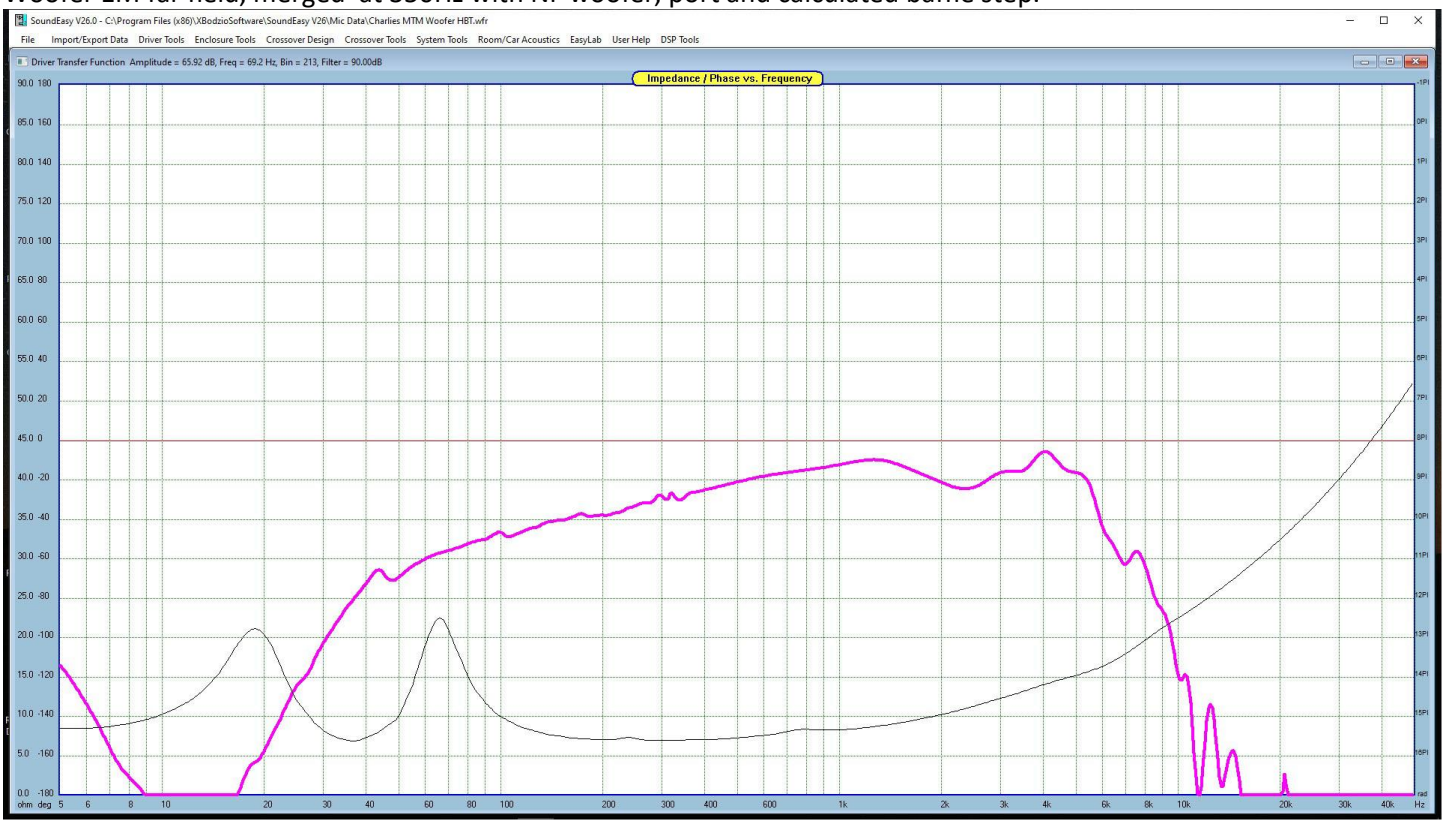
Tweeter 1M farfield



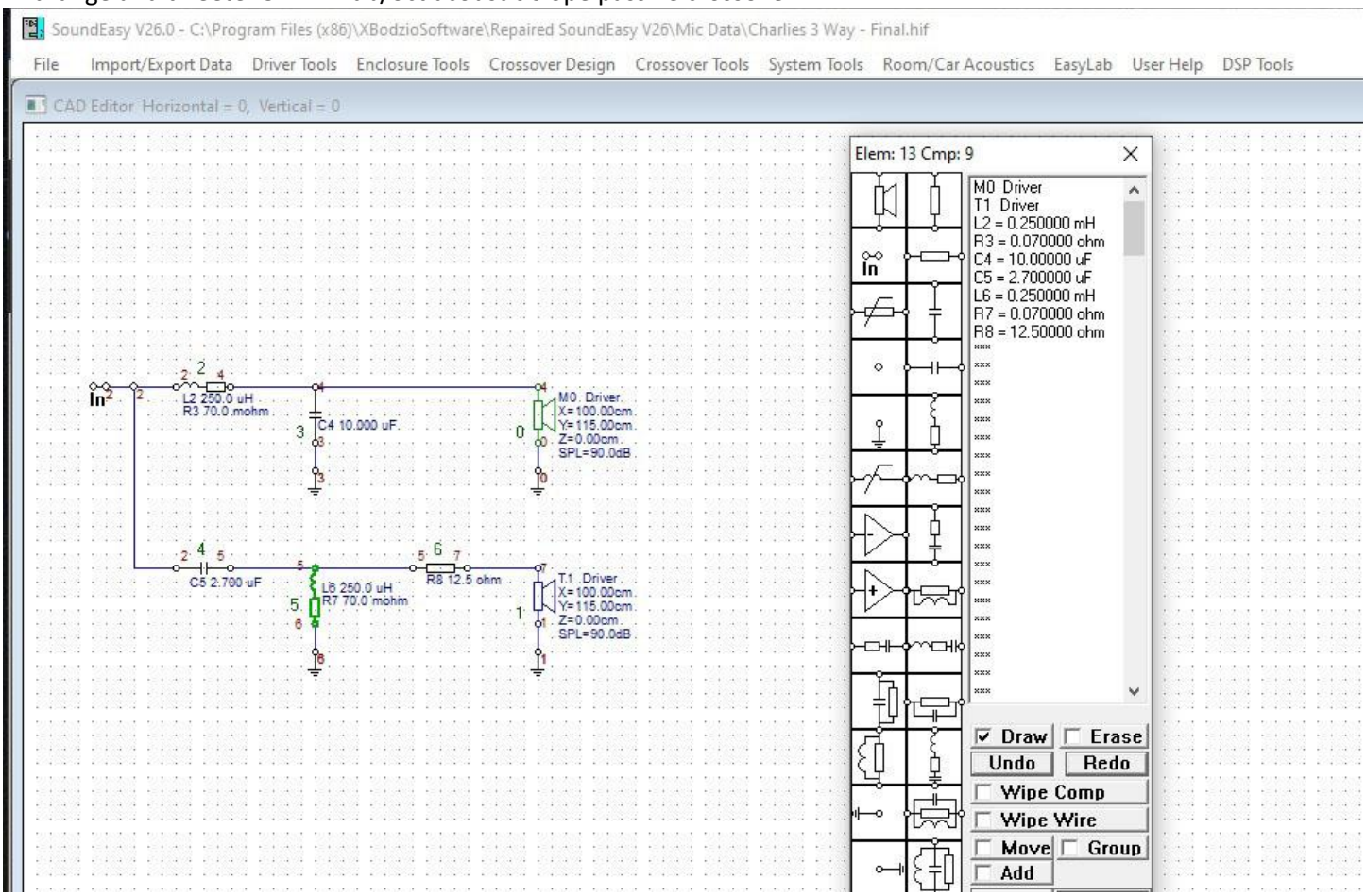
Midrange 1M farfield



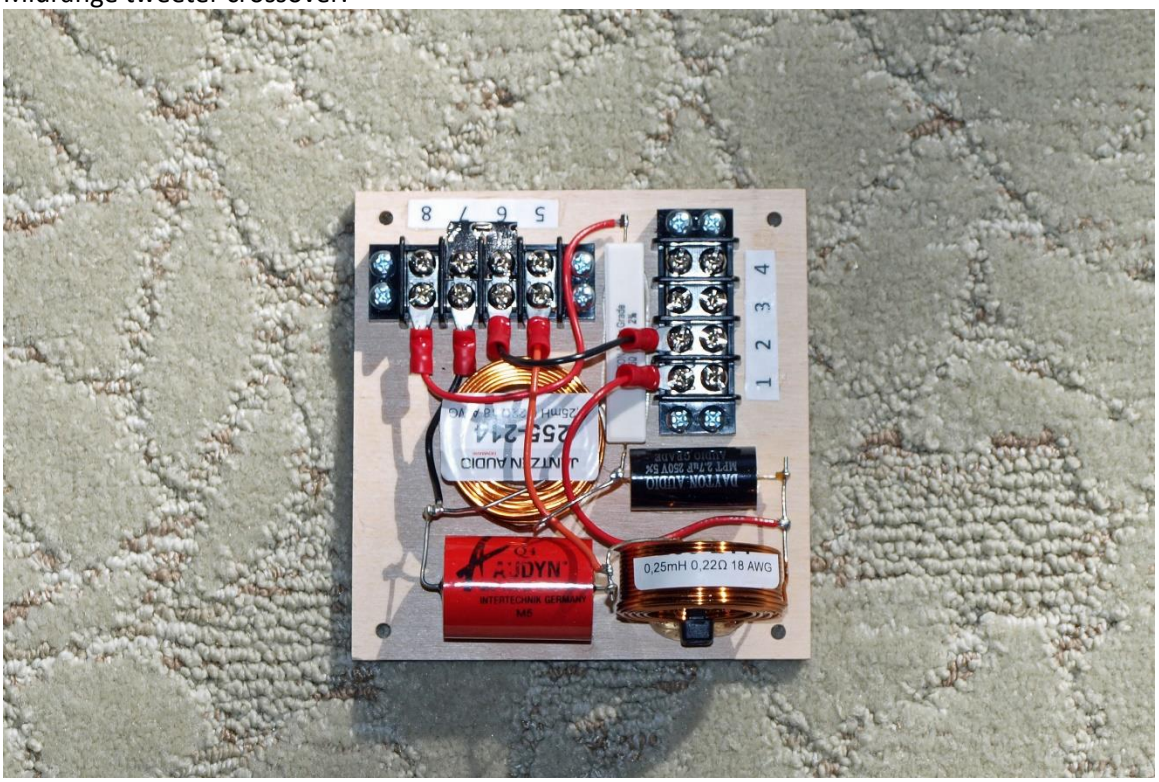
Woofer 1M far field, merged at 350Hz with NF woofer, port and calculated baffle step.



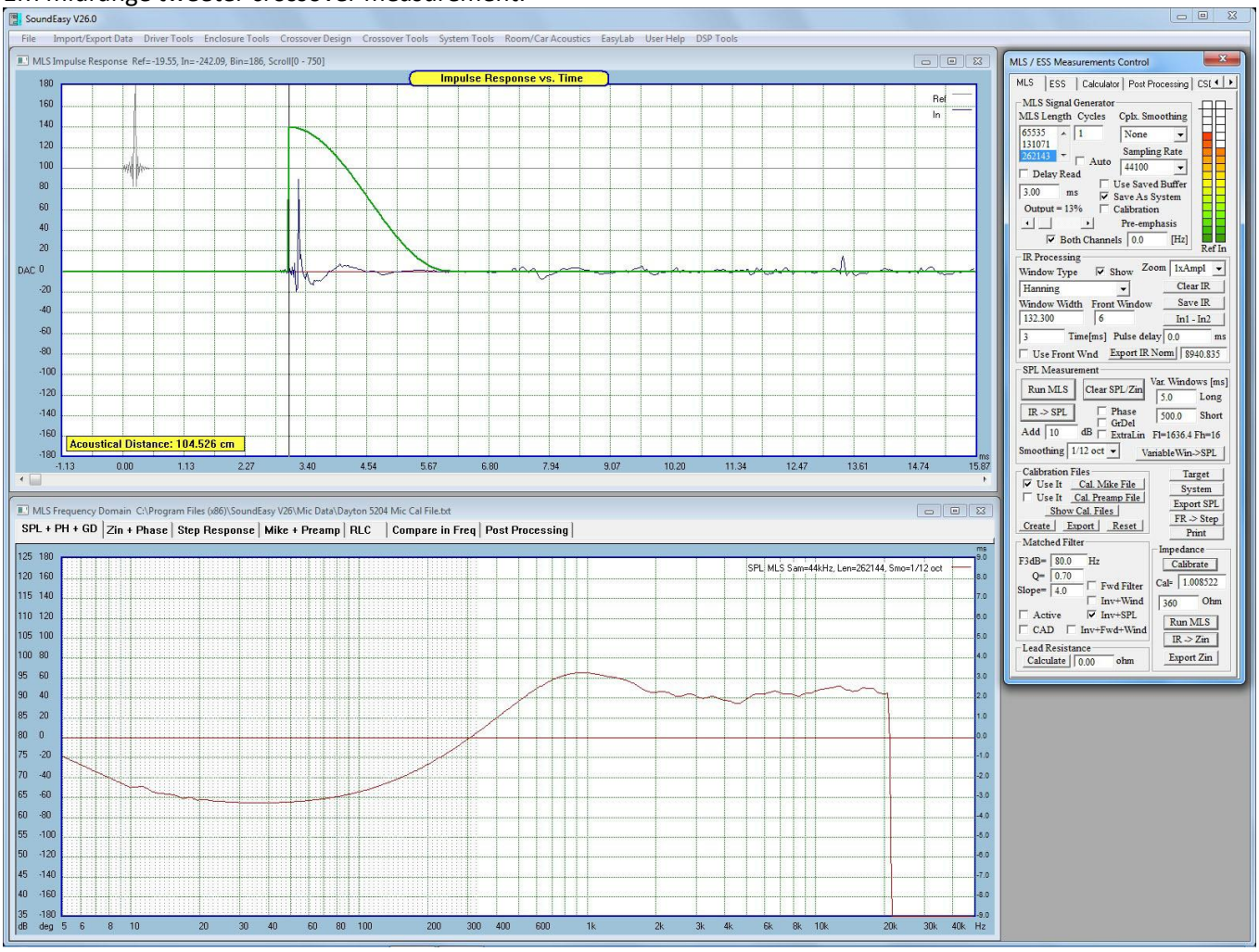
Midrange and tweeter 5Khz 24db/oct acoustic slope passive crossover.



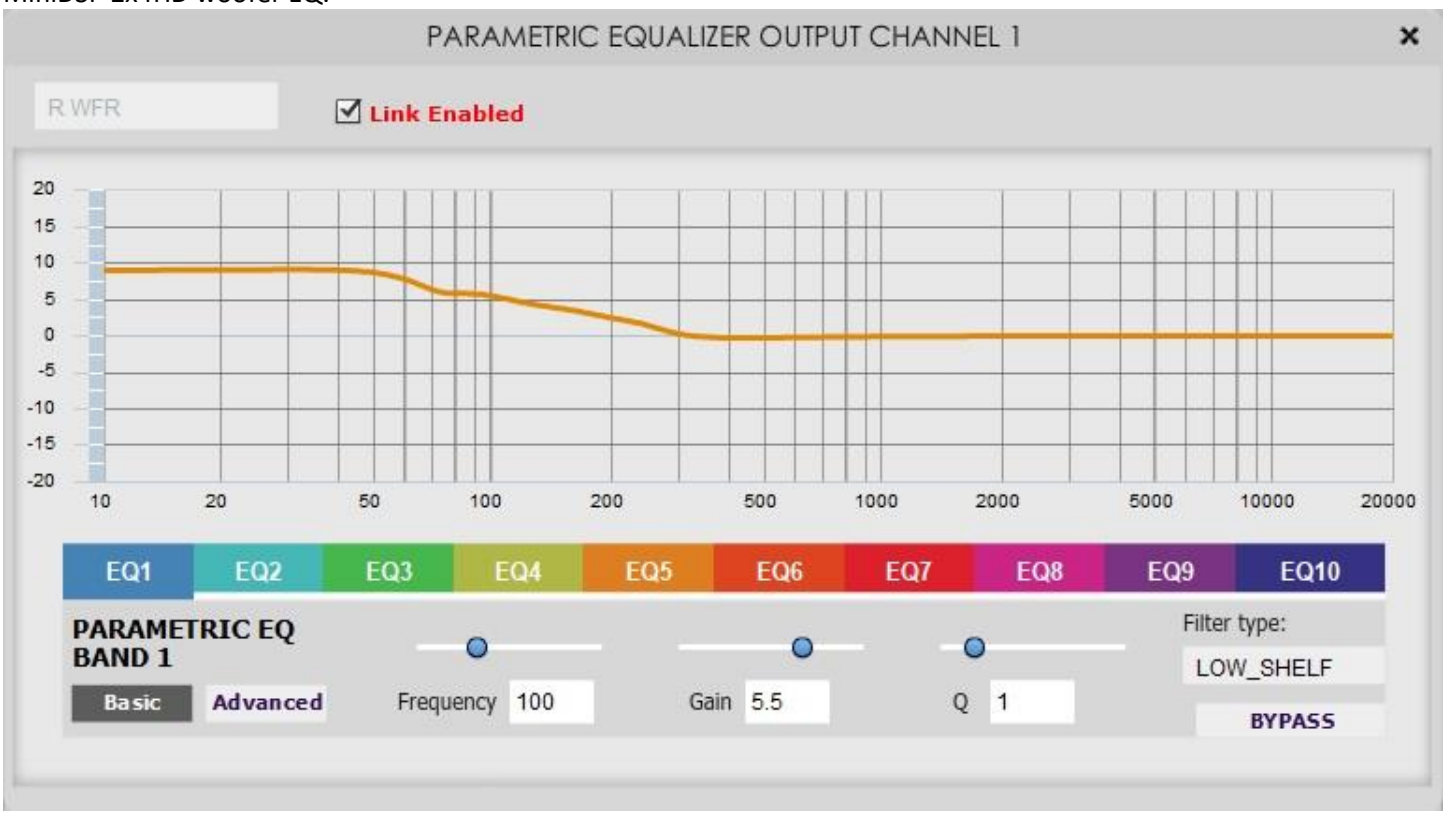
Midrange tweeter crossover.



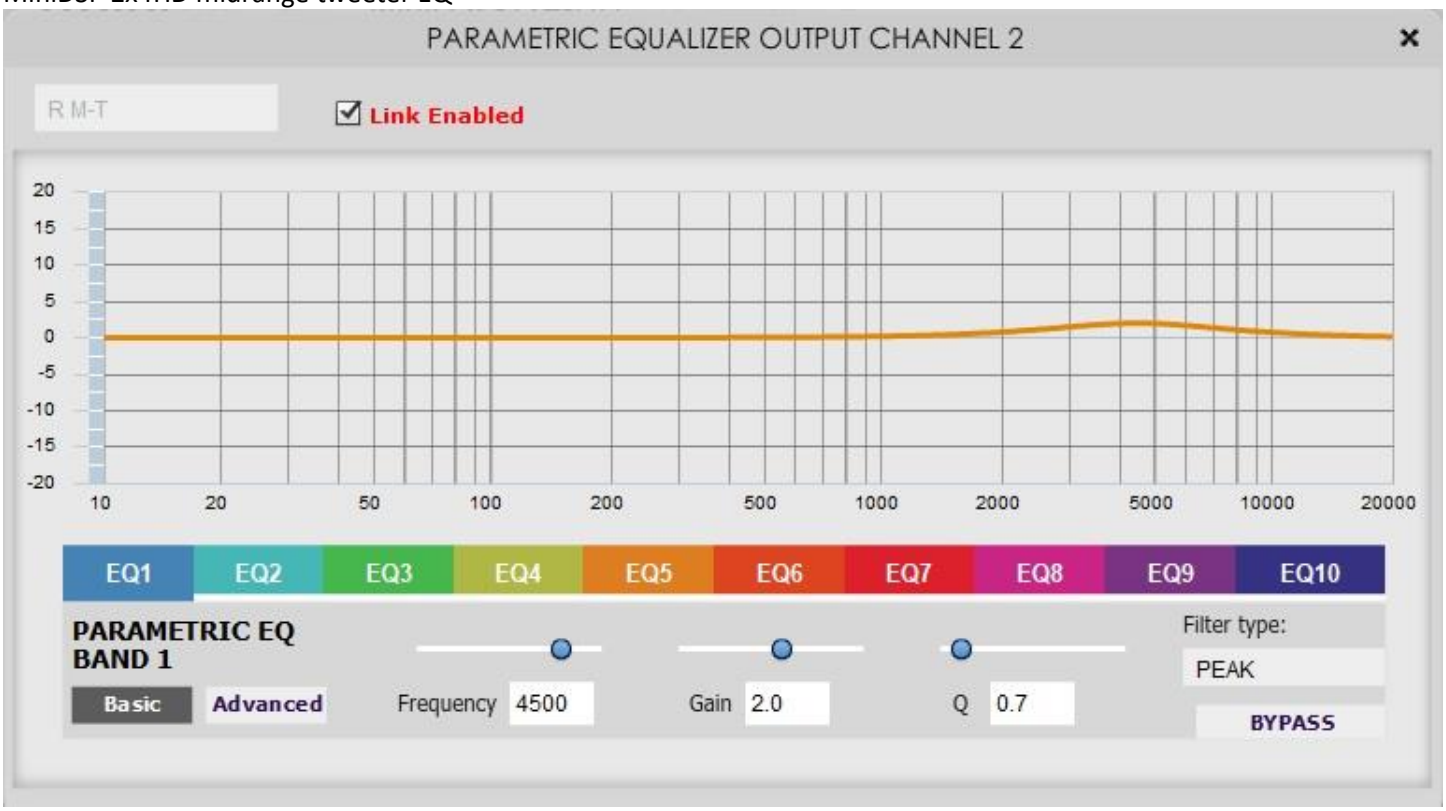
1M midrange tweeter crossover measurement.



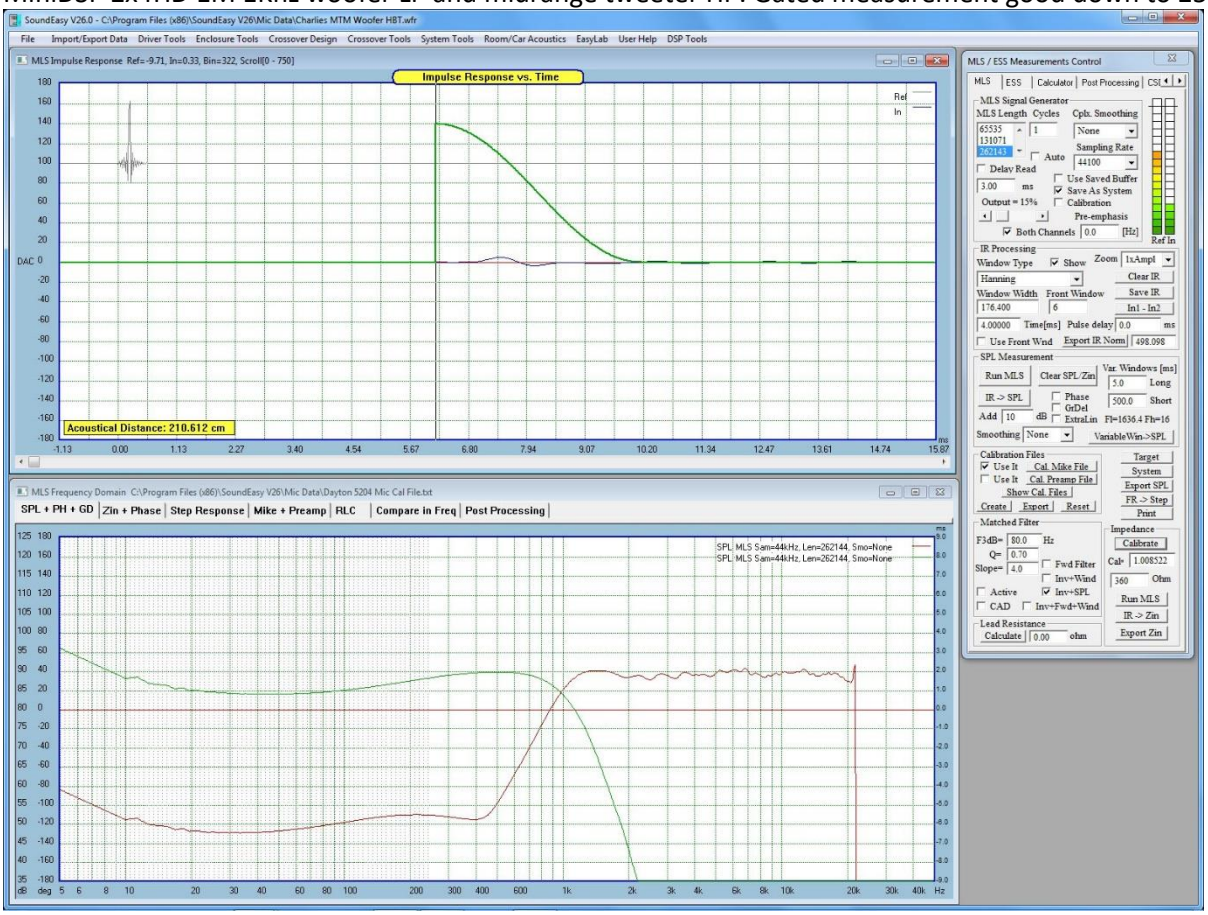
MiniDSP 2x4HD woofer EQ.



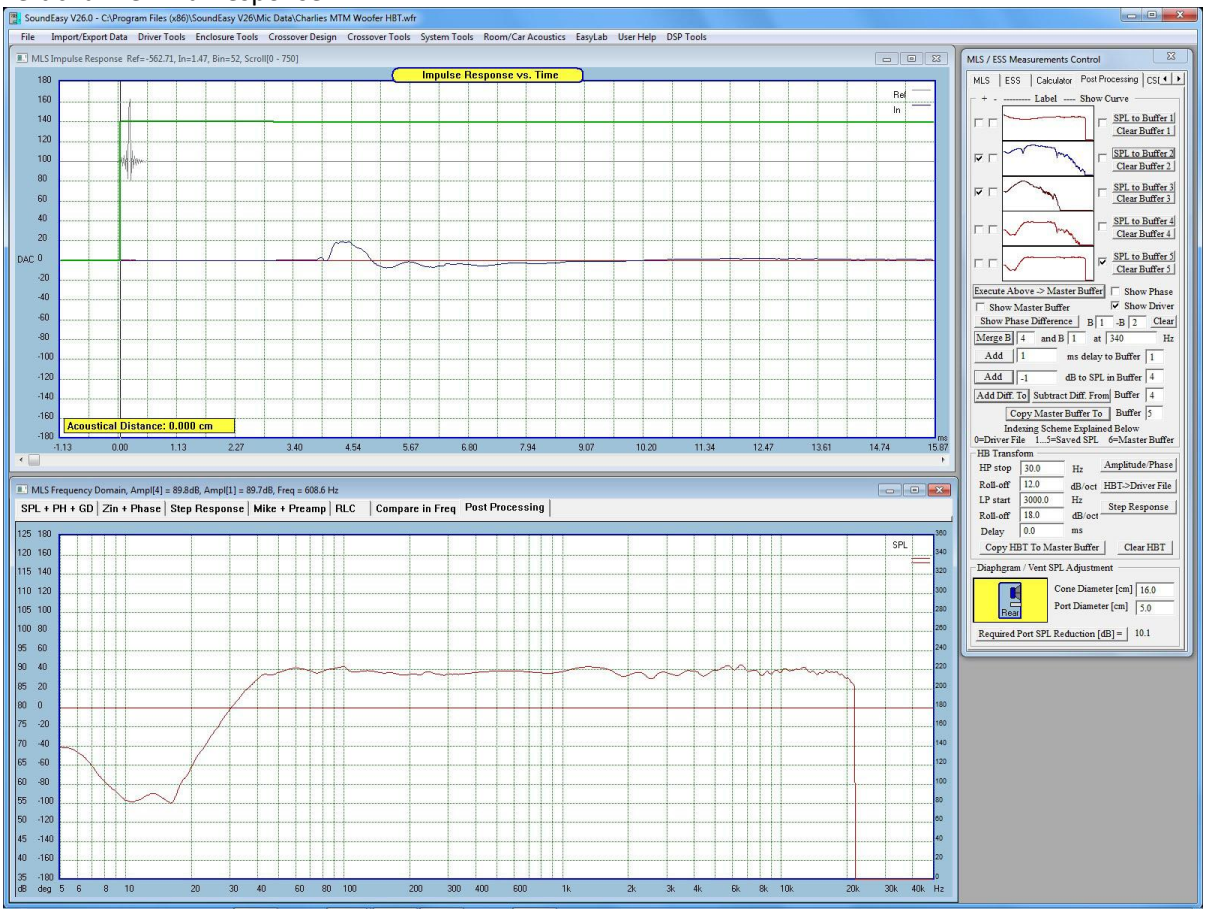
MiniDSP 2x4HD midrange tweeter EQ



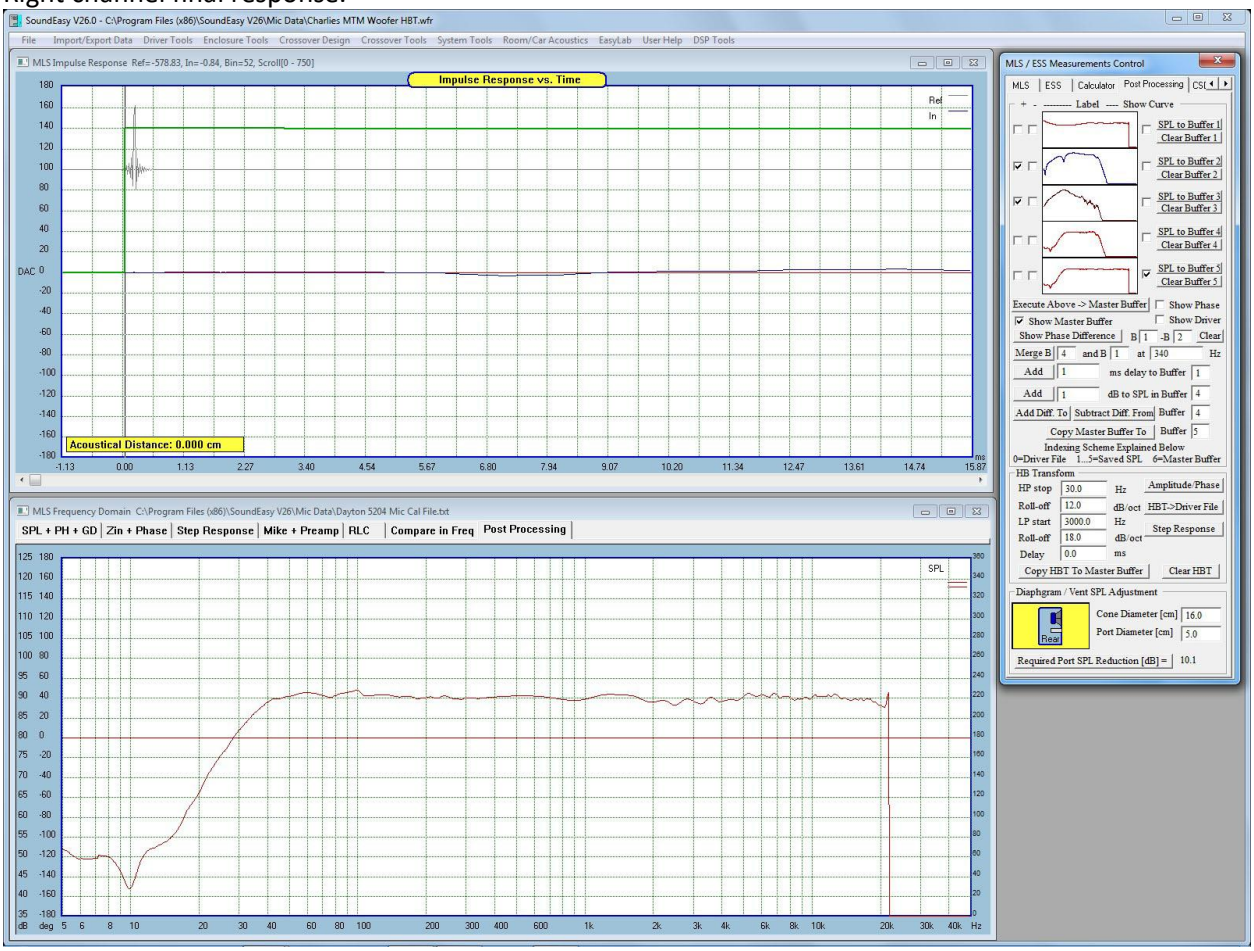
MiniDSP 2x4HD 1M 1Khz woofer LP and midrange tweeter HP. Gated measurement good down to 250Hz.



Left channel final response.



Right channel final response.



Crossover mounted in cabinet.