

# ***Vultus***

November 2015 by John Hollander

## Project Description

This project is a 15 liter, 0.53 cubic foot, 3-way stand mount speaker.

## Design Goals

The goal of this design is to use an Air Motion Transformer speaker/ tweeter.

## Driver Selection

The drivers are the Dayton AMT 3-4 Air Motion Transformer mid- tweeter, and the Dayton RS180-8 woofer. Because the AMT3-4 rolls off at the top end a Dayton ND20FB has been added as a supper tweeter.



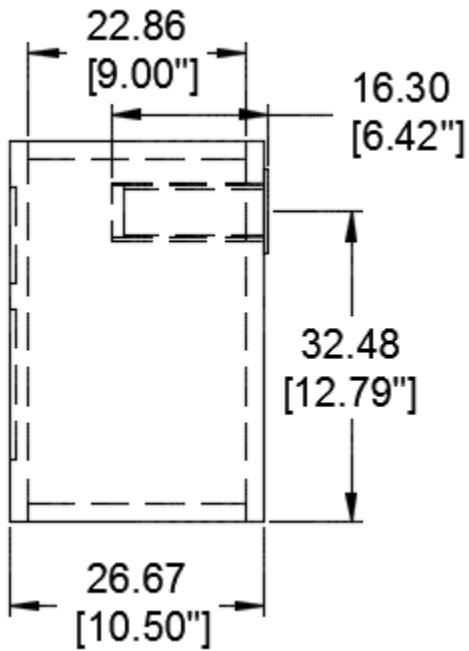
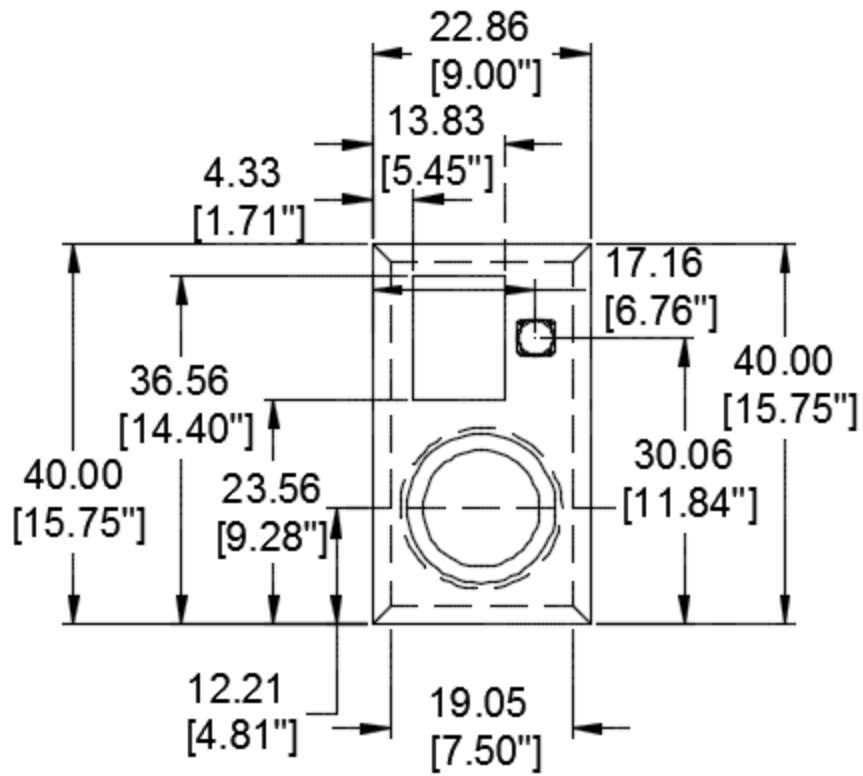
The design started by selecting the AMT 3-4 as it could play below 3,000 Hz and would mate well with a larger woofer. The RS180 was selected to get a F3 near 45 Hz. To fill out the top end the Dayton ND20FB was added. The ND20FB worked well with the simple aesthetics of the front baffle.

## Enclosure Design

The design is a simple 15 liter MDF box that can be painted or veneered. The .53 cubic foot Denovo knock down MDF box would work well for this application. The port is a Dayton adjustable 2 inch port mounted on the back of the cabinet. The port outer sleeve is completely closed and glued to the inner tube. This gives a box tuning of about 45 Hz, and a F3 of 43.

The front baffle is 9.0 inches wide by 15.75 inches high with a 3/4 inch round over on the vertical sides. The enclosure is 3/4 inch MDF with a front to back and side to side post brace.

The AMT3-4 is completely enclosed and does not require a separate chamber.



Enclosure Assembly

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When cutting out the driver recesses remember there are left hand and right hand front baffles.



To cut the holes for the AMT3-4 one method is to make a model of the outside flange shape with a flush cutting router bit. Using a router with a  $\frac{1}{4}$  inch spiral bit and a  $\frac{1}{2}$  inch bushing cut an oversized rectangular template. Using the template,  $\frac{1}{4}$  spiral bit, and changing the router bushing to 1 inch, cut the recess for the AMT3-4. Cut a through hole with a jig saw or another router template to fit the back of the AMT3-4.



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The ND20FB is mounted from behind. Recess the back side of the baffle so the ND20 is flush with the front of the baffle. The front baffle is not removable so add hanger bolts and a bracket to hold the ND20 in place.

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Mount the crossover on a board and screw to the bottom of the cabinet.



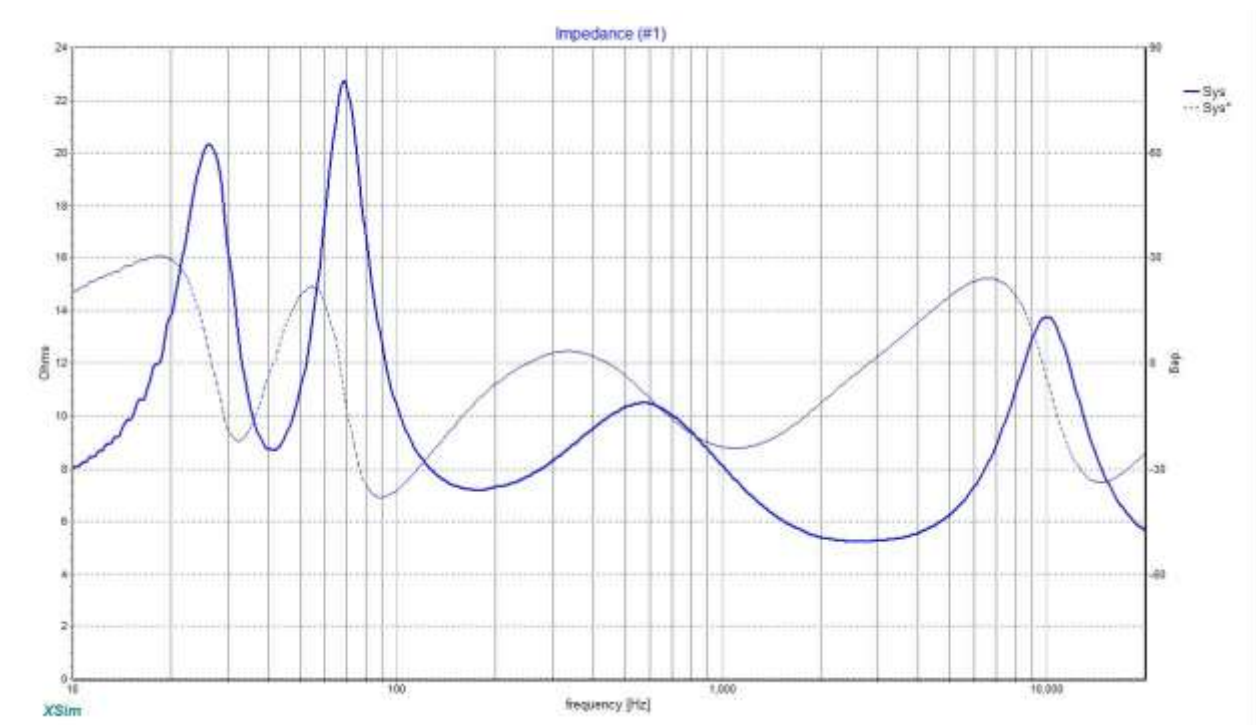
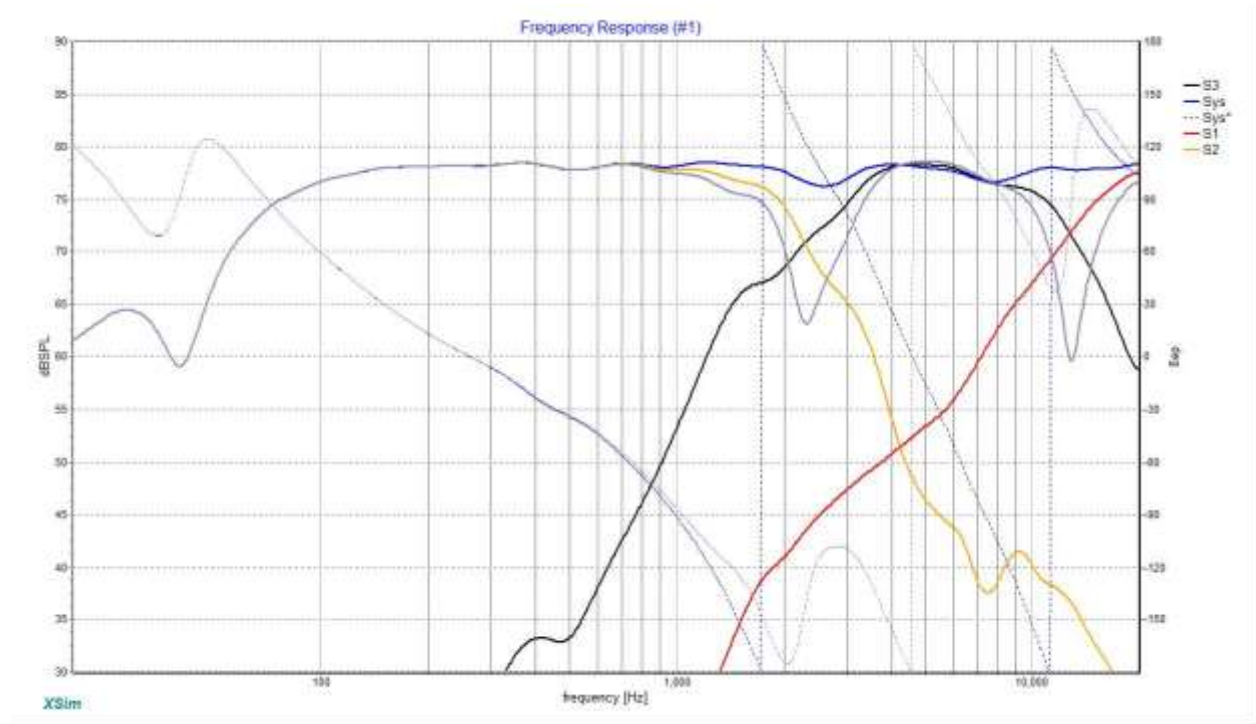


Insulate the box interior with 8 oz. of insulation (fiberglass or Fiberfill). Take care not to block the woofer rear vent or the port opening. My preference is to make pillows of insulation and position them against the rear of the box.

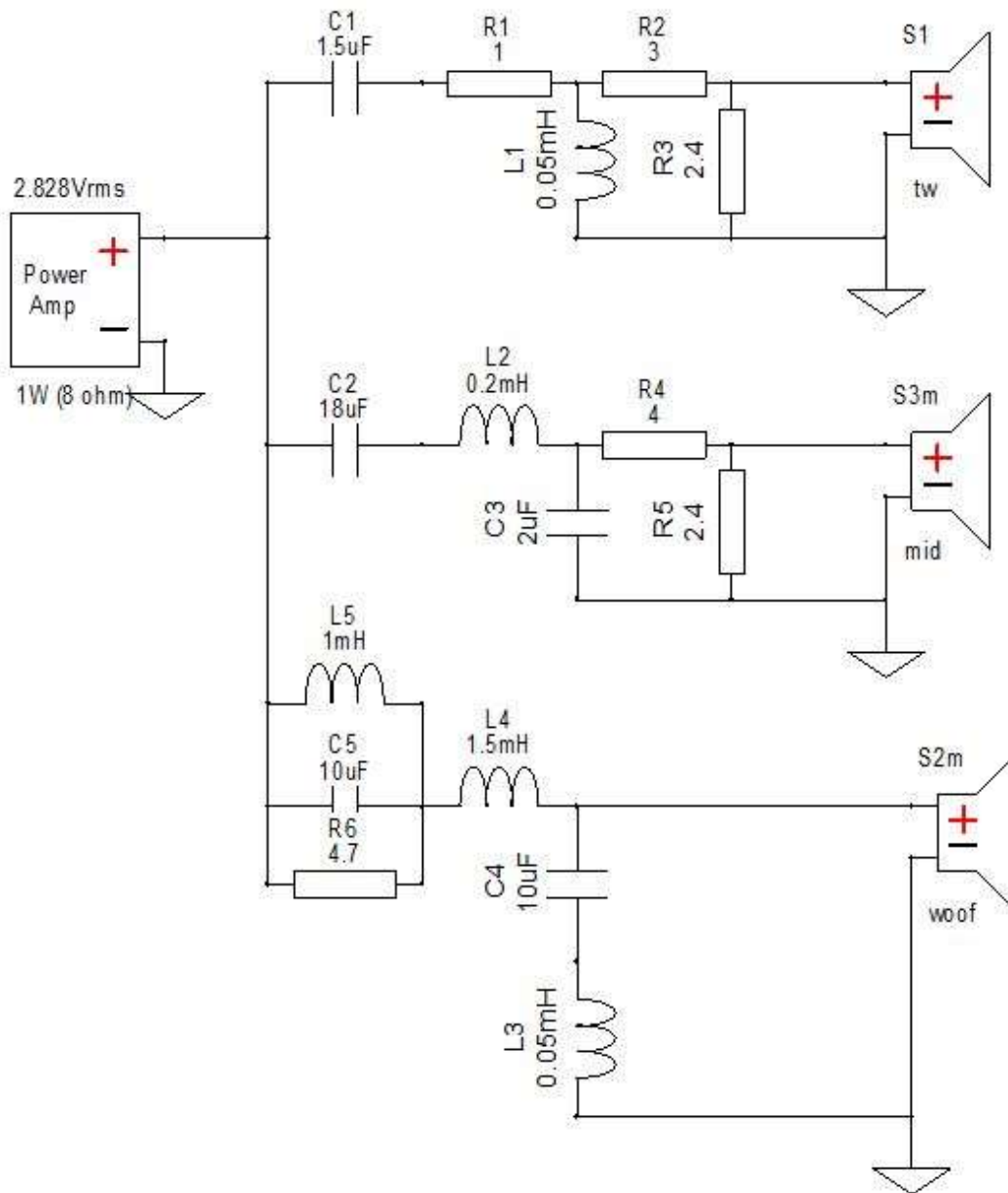
#### Crossover Design

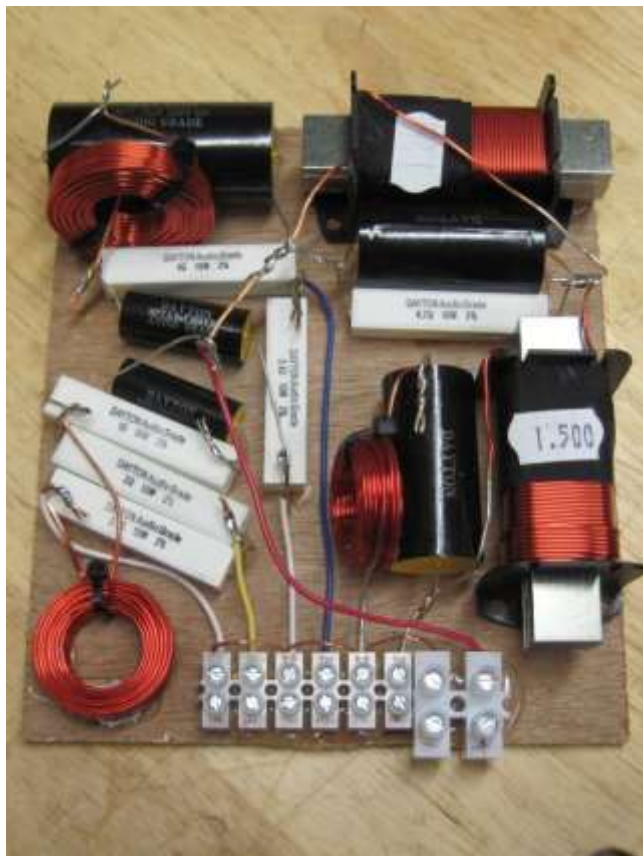
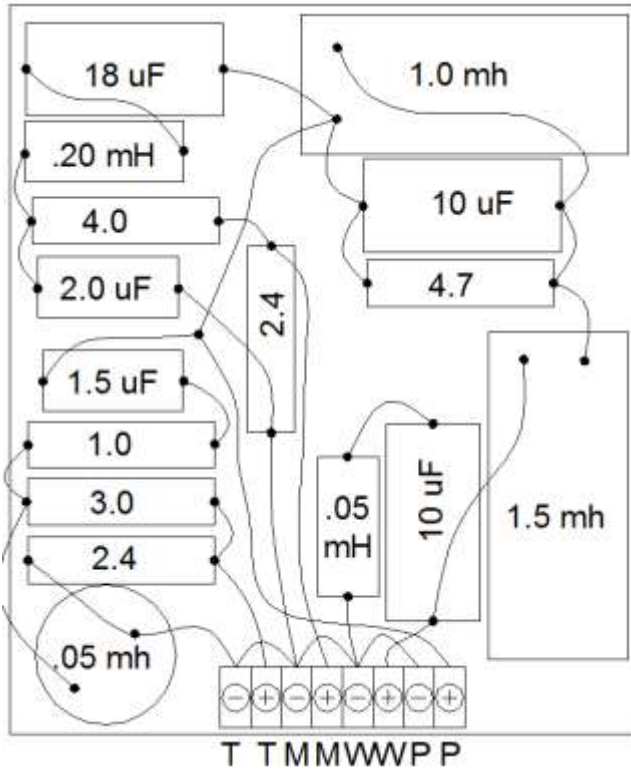
The crossover is a parallel configuration. The woofer to mid and mid to tweeter all use Linkwitz Riley 4<sup>th</sup> order slopes.

The crossover points are 2,200 and 12,000.









Parts and Products Used

<b>Part #</b>	<b>Description</b>	<b>Qty</b>
295-355	Dayton Audio RS180-8 7" Reference Woofer	2
275-035	Dayton Audio ND20FB-4 Rear-Mount 3/4" Neodymium Dome Tweeter	2
275-093	Dayton Audio AMT3-4 Air Motion Transformer Tweeter 4 Ohm	2
260-387	Speaker Cabinet Port Tube 2" ID Adjustable	2
260-317	Acousta-Stuf Polyfill Speaker Cabinet Sound Damping Material 1 lb. Bag	1
091-340	Gold Binding Post Banana Jack Pair Extra Long Shaft with Solder Tabs	2
300-7064	Denovo Audio Knock-Down MDF 0.56 cu. ft. Bookshelf Speaker Cabinet	2
004-1	Dayton Audio DNR-1.0 1 Ohm 10W Precision Audio Grade Resistor	2
004-2.4	Dayton Audio DNR-2.4 2.4 Ohm 10W Precision Audio Grade Resistor	4
004-3	Dayton Audio DNR-3.0 3 Ohm 10W Precision Audio Grade Resistor	2
004-4	Dayton Audio DNR-4.0 4.0 Ohm 10W Precision Audio Grade Resistor	2
004-4.7	Dayton Audio DNR-4.7 4.7 Ohm 10W Precision Audio Grade Resistor	2
027-434	Dayton Audio DMPC-18 18uF 250V Polypropylene Capacitor	2
027-428	Dayton Audio DMPC-10 10uF 250V Polypropylene Capacitor	4
027-414	Dayton Audio DMPC-2.0 2.0uF 250V Polypropylene Capacitor	2
027-412	Dayton Audio DMPC-1.5 1.5uF 250V Polypropylene Capacitor	2
266-806	ERSE 0.20mH 18 AWG Perfect Layer Inductor Crossover Coil	2
266-798	ERSE 0.05mH 18 AWG Perfect Layer Inductor Crossover Coil	4
266-552	ERSE 1.5mH 18 AWG I Core Inductor Crossover Coil	2
266-550	ERSE 1.0mH 18 AWG I Core Inductor Crossover Coil	2

Conclusion

The AMT3-4 gives the clean detailed ribbon sound you expect. The AMT3-4 and ND20 combination are equal if not better than tweeters in this price range

Tips & Tricks

Position the speakers so the tweeters are to the inside and the AMT3-4 are to the outside.

