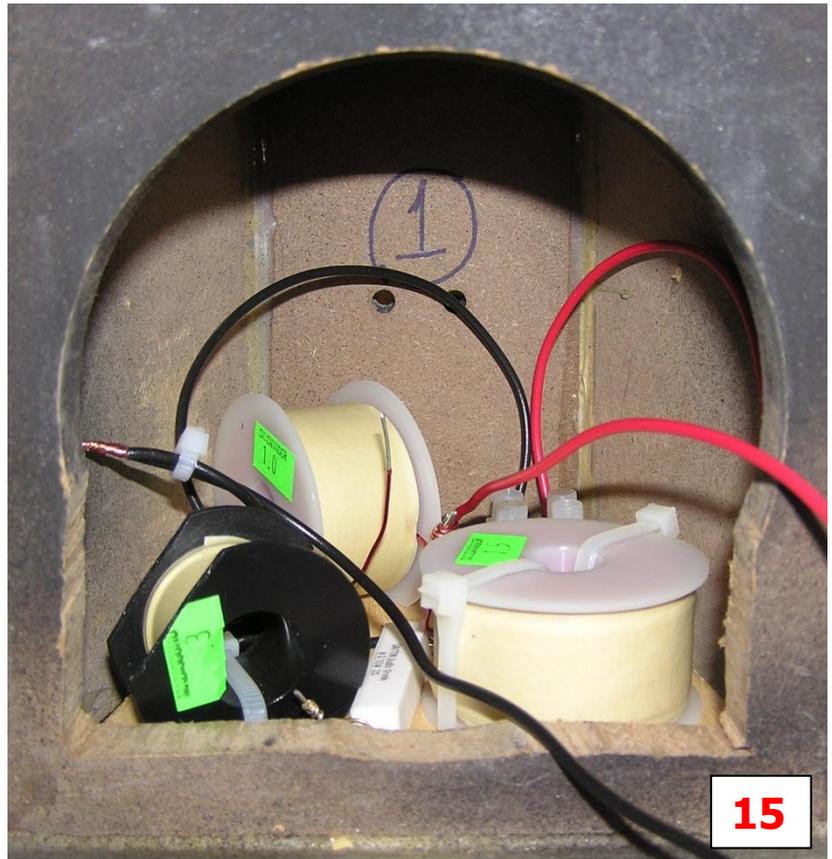


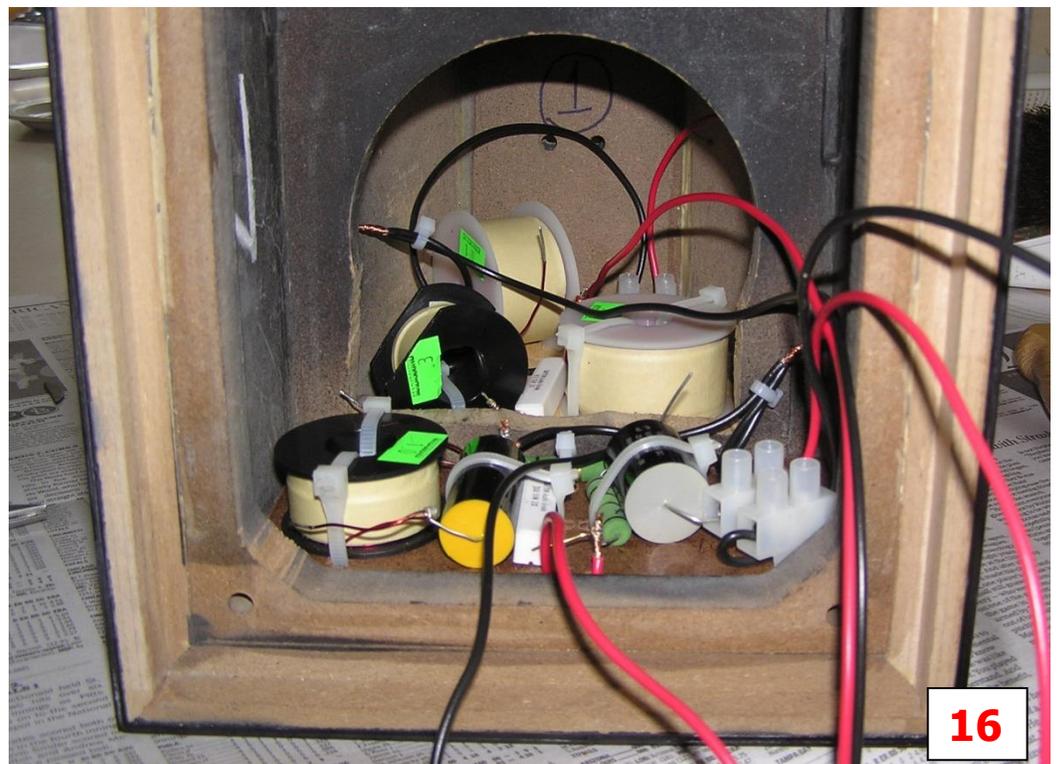
### Building Your First DIY Speaker – The MB27 – part 3

**Photo 15** shows a test fit of a woofer board after assembly. It shows the 2 notches I had to cut out of the circular hole in the brace, and that I also had to trim the black plastic bobbin on the small inductor coil. Kitchen scissors easily cut these plastic bobbins.

I also cut some off the plastic bobbin edges on the large 1.0 mH white inductor to keep it from rolling on its edge as I played with different layouts.



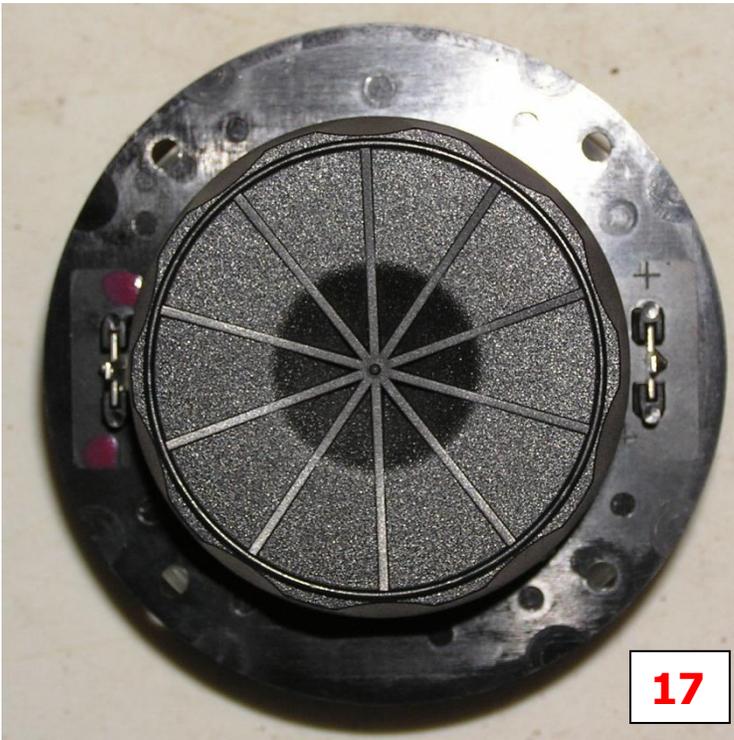
And finally, **Photo 16** shows both woofer & tweeter boards inside the cabinet.



## Final Assembly

- Attach wires to the crossover boards. Label them with tape and a marker so it's easy to get it right when you later attach them to the woofer & tweeter terminals! Use red nail polish (**Photos 17 & 18**) to mark the inside tip of the + (red) cabinet binding posts, the positive contact on the woofers, and the negative contact on the tweeters. Remember that this is a 2<sup>nd</sup> order crossover, the tweeter is meant to be connected with reversed polarity.
- If all the crossover boards are fully wired correctly (double check them against the schematic), and you're certain they fit in the cabinets, go ahead and solder all the connections. Use rosin core solder that is either 60/40 or 63/37 lead/tin.
- Drill 1 or 2 holes through the board to fasten it to the cabinet floor with screws. This allows you to remove it if needed. It took some maneuvering to drill these holes in the cabinet floor. Drill the holes through the board just larger than the diameter of the screw threads, and drill holes in the cabinet floor smaller so the screw threads hold. Use stick-on rubber feet under the boards.
- Install the cabinet binding posts (**Photo 19**). I drove them in with a hammer and a block of wood.
- Crimp on the rings (**Photo 20**), or solder on the supplied solder terminals (**Photo 19**), to the wires from the crossover boards that go on the inside of the binding posts.
- Install the crossover boards and screw them to the cabinet. Attach the appropriate wires to the binding posts.
- Cut pieces of convoluted foam to fit the interior cabinet walls and install them. I have done this before without using glue, but this time I used hot melt glue. It seemed to work OK.
- Install port tubes with 100% silicone sealer inside the lip of the tube. Do this only after installing crossover boards and interior foam. It may be necessary to drive them in with a hammer and a wood block. Allow the silicone sealer enough time to completely dry.
- Pre-drill holes for the woofer & tweeter mounting screws. Both accept #8 pan head wood screws. I used ¾" long black screws with heads that accept square drive bits. I genuinely fear slipping while using a Phillips head or normal screw driver and poking a hole in a driver cone, so I use square drive screws and driver for this. They cannot slip. I drilled the holes slightly smaller in diameter than the screw threads and used a drill stop to control how deep I drilled.
- Attach the front baffle boards to the cabinets.
- Attach wires to woofer and tweeter using either the 0.187" or 0.110" female quick disconnects. I had labeled the wires, so it was easy to know which wire to attach to each terminal. I trimmed the excess wire and crimped-on brass quick disconnects that I found at a local auto parts store (**Photo 20**). Madisound also sells gold plated brass quick disconnects. The cheap aluminum ones are junk and don't fit well.
- Mount woofer and tweeter to the baffle. Don't slip while driving the screws. The curved flange of the woofer is easily cracked – don't over tighten the screws.
- Time to listen!

Finally, if the speaker sounds too bright to your tastes, you may experiment with the tweeter L-Pad values. In the tweeter circuit, there is a 7  $\Omega$  resistor in series with the tweeter. Try adding 1.0 - 1.5  $\Omega$ s extra resistance between it and the tweeter. I find it easier to add extra resistance at the tweeter's plus terminal rather than on the circuit board. Remember that in this design, the plus side of the tweeter circuit attaches to the negative terminal of the tweeter. I marked the negative terminal with red nail polish so I can't forget that.



17

Back of Tweeter showing red dots at negative terminal. Both terminals accept 0.110" female quick disconnects.



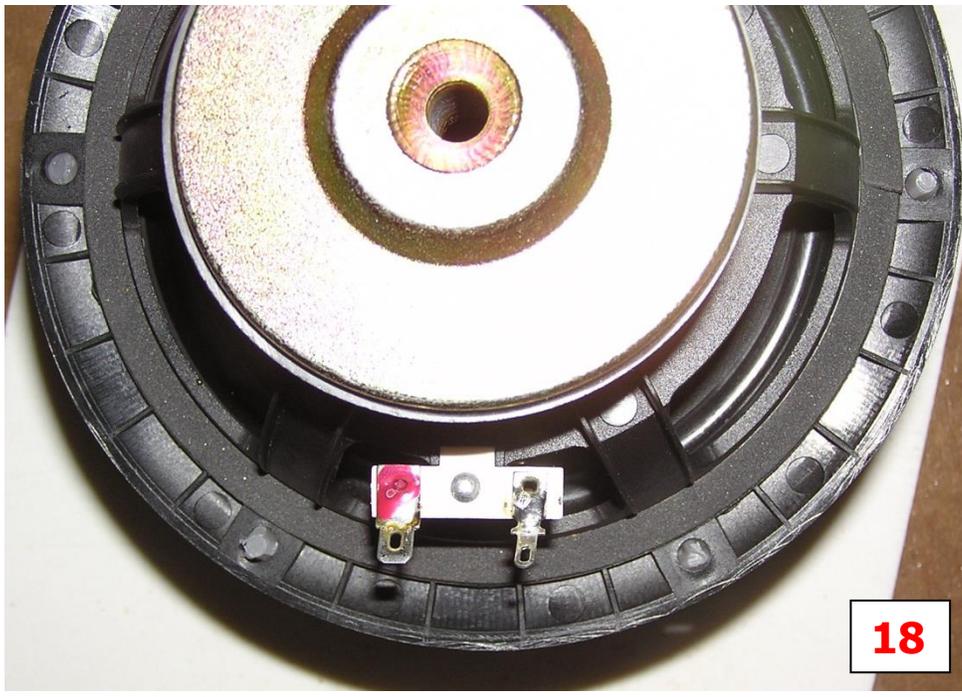
19

Cabinet Binding Posts



20

Crimp-On Terminals:  
Female Quick Connects 0.187" & 0.110"  
Ring Terminals 1/4" hole fits Cabinet Binding Posts



18

Back of Woofer showing red dot at positive terminal. The + terminal fits 0.187" female quick disconnect, and the - terminal fits 0.110".

Parts & prices as of August 2012

<b>Part</b>	<b>Vendor</b>	<b>Part No.</b>	<b>#</b>	<b>\$ each</b>	<b>Total \$</b>
M130 woofer	GR		2	26.95	\$53.90
Seas 27TFFC tweeter H881	Mad		2	44.75	\$89.50
Binding posts (pair)	PE	091-1247	2	8.48	\$16.96
Port 4" long × 1¾" diameter	PE	260-407	2	1.55	\$3.10
6.8 µF Dayton PP capacitor	PE	027-424	2	2.93	\$5.86
8.2 µF Dayton PP capacitor	PE	027-426	2	3.37	\$6.74
2.0 µF Dayton PP capacitor	PE	027-414	2	1.48	\$2.96
1.5 mH Sidewinder Inductor 16 g 0.43 Ω	Mad		2	17.00	\$34.00
1.0 mH Sidewinder Inductor 16 g 0.34 Ω	Mad		2	13.80	\$27.60
0.3 mH Air Core Inductor 19 g 0.30 Ω	Mad		2	3.20	\$6.40
1.0 mH Air Core Inductor 19 g 0.50 Ω	Mad		2	6.50	\$13.00
50 Ω (30 Ω + 20 Ω in series)					
30 Ω Dayton resistor	PE	004-30	2	1.25	\$2.50
20 Ω Dayton resistor	PE	004-20	4	1.25	\$2.50
10 Ω Dayton resistor	PE	004-10	2	1.25	\$2.50
8 Ω Dayton resistor	PE	004-8	2	1.25	\$2.50
7 Ω Dayton resistor	PE	004-7	2	1.25	\$2.50
Cabinet 0.38 ft <sup>3</sup> black rectangular	PE	302-710	2	84.85	\$169.70
<b>Total (rectangular cabinet)</b>					<b>\$442.22</b>
Cabinet 0.38 ft <sup>3</sup> black curved	PE	302-711	2	108.98	\$217.96
<b>Total (curved cabinet)</b>					<b>\$490.48</b>

µF = micro Farad (a unit of capacitance, 1 µF = 10<sup>-6</sup> Farad)

mH = milli Henry (a unit of inductance, 1 mH = 10<sup>-3</sup> Henry)

Ω = ohm (a unit of resistance)

g = gauge (a unit of wire thickness, 16g is thicker than 19g)

GR Research <http://www.gr-research.com/>

Madisound <http://www.madisound.com/>

Parts Express <http://www.partsexpress.com/index.cfm>

In the crossover, you may substitute other parts of nearly identical electronic values if you wish without seriously affecting speaker performance.