

Bozak Symphony sonic refresh, repair, binding post addition notes.

Documentation:

Build Date: 724 (April 1972)

Tweeters: B-200YC

Midrange: B-209BC

Woofers B-199AC

Crossover Compliment:

Bi-Amped at the factory- N-104 & N-107 Stock Crossovers - Included a Bozak Branded N-106B Active Crossover, stock - in great shape. [edit] 3-29-14 - Output caps leaking. Needed refresh.

Phase 2 of my project is replacing just a few key electrolytic, audio grade capacitors inside of it.

Overall shape of speakers:

Broken 6 screw terminal strips in the back (ended up being 2 of them)

Need to replace out of spec electronics.

The speakers grill cloth: worn / stained.

Metal lattice bent up, loose and disconnected in some areas.

Woodwork: Needs touchup, some scratches. All parts are present with no rotting wood.

Deal made to Jim Lopeman as far as the life of the speakers: Take care of them, upgrade as necessary. Don't sell them or parts of them. I decided to throw in: If modifications are made, keep original parts (except damaged ones) for the next owner. If I can't use them and take care of them as needed anymore, pass them along the same way that I received them... Give them away for a betrig charitable donation of their choice that I feel is fair.

Plans:

Basic Needs: Update capacitors in crossovers, fix terminal strips, replace grill fabric (separate file).

But that is not how I roll...

Electronically I decided to:

- Completely build new crossovers out of new parts, 2 crossovers on single hardwood board, painted and documented
- Using optional Tobin modifications
- Add 5 way gold binding posts using 14 gauge stranded wire from the crossovers
- Rewire the wire from the crossovers to the exterior terminal strips using 16 gauge stranded wire
- Create new larger gauge jumper wires

Cosmetically - simple - change the speaker cloth. (At least I thought that was simple)

Planning - The Yahoo Bozak Group was a wealth of help and information. If I could not find a picture or diagram in the files / photos section of the group, people opened up the backs of their speakers to take pictures of their crossovers for me, others dug through their stash of Bozak parts to send pictures too.

I kludged together a wealth of information, way more than I needed, then decided to take the plunge. I had built my own Klispch Crossovers rather recently, plus designed speakers and subs from the ground up in my younger years for home audio, band, concert and studio audio setups. I was ready to plan, order, build and install.

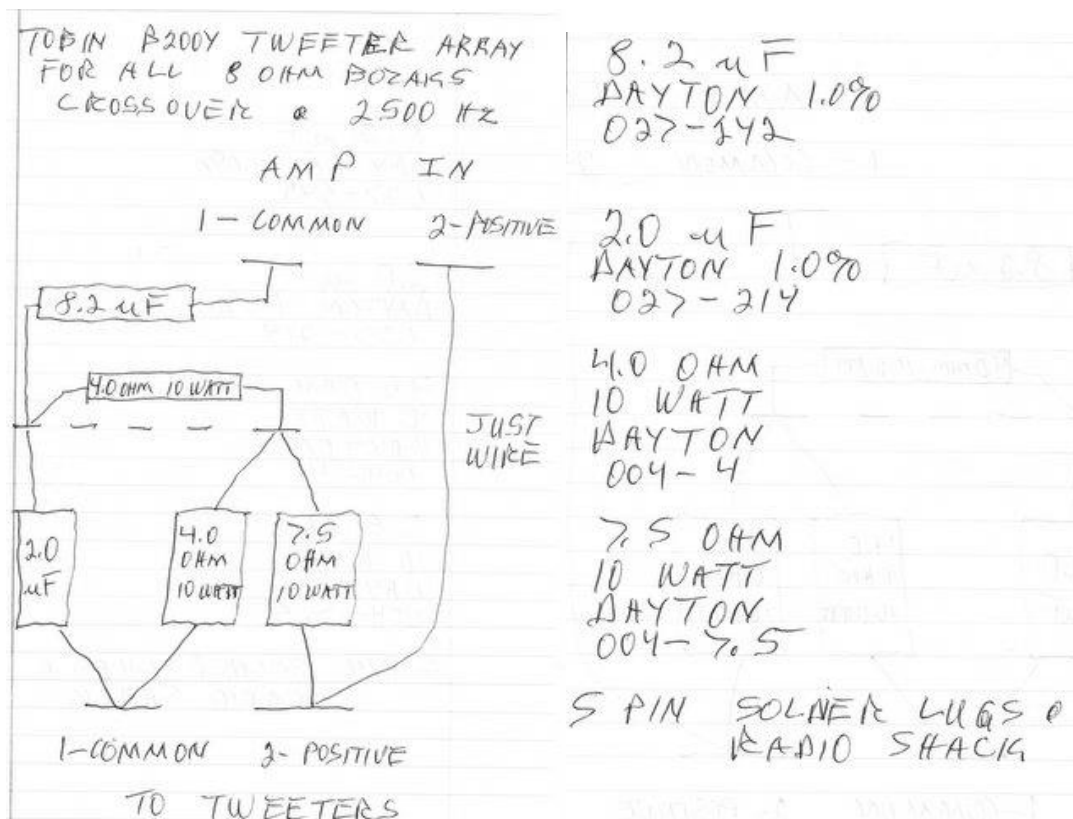
Crossovers - I ordered the parts from parts express. Pat Tobin has some spec suggestions that currently the parts are not available in those values, I needed to build my own N-104T B-199AC (Woofers) inductor @ 3.15mH.

Here is the parts list for the N-104T: (note - to build the N-107T, all don't need 50uF Cap and the 3 or 3.15mH inductor.)

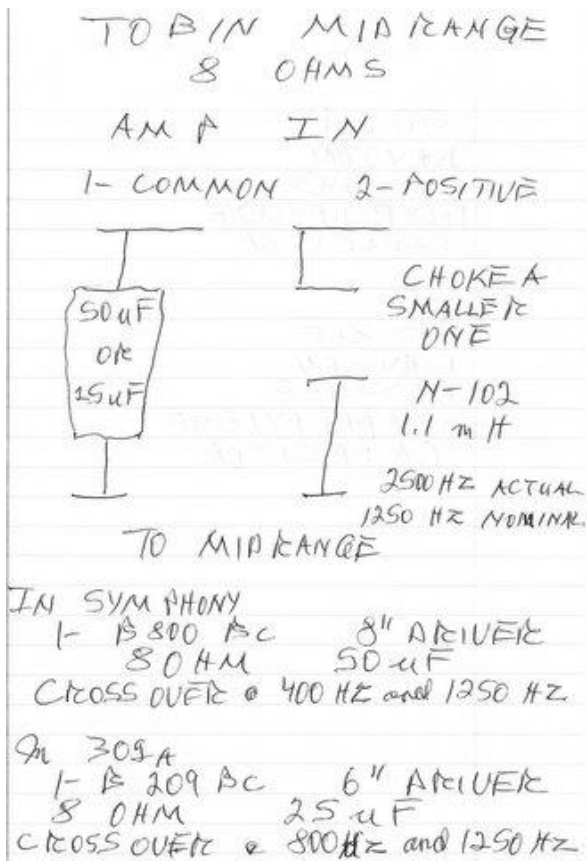
ORDERED	PART NUMBER	DESCRIPTION	UNIT PRICE
4	004-7.5	DAYTON AUDIO DNR-7.5 7.5 OHM 10W PRECISION AUDIO GRADE RESISTOR	\$1.38
4	027-214	DAYTON AUDIO PMPC-2.0 2.0UF 250V PRECISION AUDIO CAPACITOR	\$2.41
4	027-242	DAYTON AUDIO PMPC-8.2 8.2UF 250V PRECISION AUDIO CAPACITOR	\$5.99
4	027-443	DAYTON AUDIO DMPC-50 50UF 250V POLYPROPYLENE CAPACITOR	\$13.80
4	266-828	ERSE 1.1MH 18 AWG PERFECT LAYER INDUCTOR	\$10.39
8	004-4	DAYTON AUDIO DNR-4.0 4 OHM 10W PRECISION AUDIO GRADE RESISTOR	\$1.09
2	255-274	JANTZEN 3.0MH 18 AWG AIR CORE INDUCTOR	\$15.60
2	266-804	ERSE 0.15MH 18 AWG PERFECT LAYER INDUCTOR	\$4.35

Tobin Schematics & Parts: N-104T v2

Tweeters

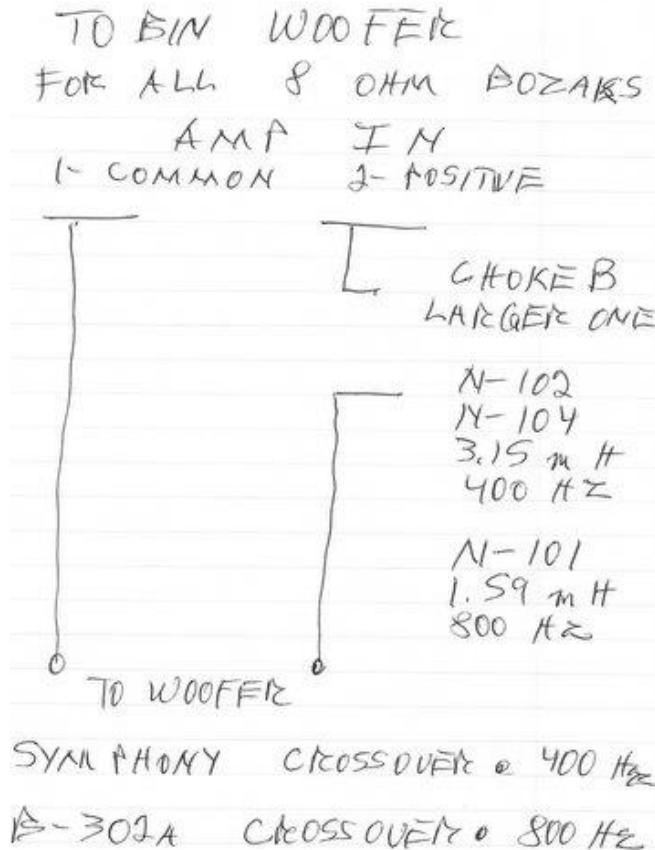


Midrange:

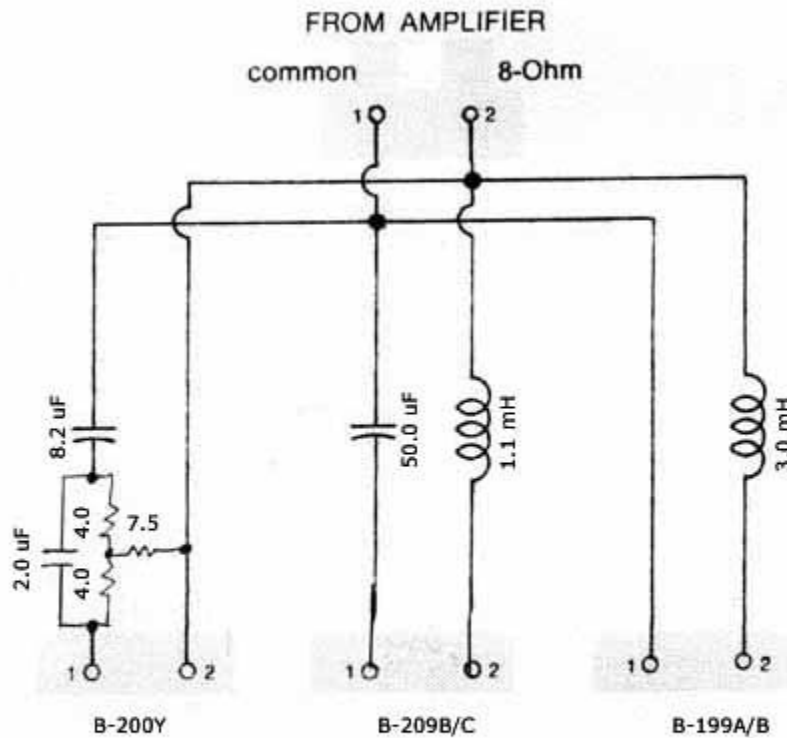


50 uF
DAYTON
027-443
POLYPROPYLENE
CAPACITOR

Woofers:



Version #1 of the Tobin N-104T.



Bozak 104T Crossover

Pat Tobin

09-21-06

As you see, he does have the smaller 1.1mH inductor for the midrange, but he has the 3.0mH inductor for the woofer.

I found this site: Basic Stereo Speaker Crossover Inductor Calculator @ <http://www.apicsllc.com/apics/Misc/filter1.html>
It shows that the 3.0mH inductor frequency will be @ 424HZ. Using the calculator on the page, Pat's 3.15mH gets it down to 404.21HZ. That is pretty darn close.

Also, coupling inductors in series adds them together; I read that the wire gauge should be the same. That is why I chose the 18g inductors on my parts list. I also read that the wire gauge in a circuit should be the same or less to the inductors, any larger starts to add inductance to the circuit.

Tools for the job: I've built my tech bench using the recommendations of the Dynaco Doctor here: <http://curcioaudio.com/Recommended%20Tools.pdf> I have a Weller analogue adjustable soldering iron with a stock of different size tips, most of the hand tools, a cordless drill with lots of bits and tips, cordless reciprocating saw, old hair drier for shrink wrap tubing. Generic X-Acto knife set that comes in handy. I attended a Tech School some 15 years ago; we received a good to better Volt Meter (Update 4-5-14: Picked up a new VM that can measure inductance after seeing Judy's), breadboard with wires and clips, Oscilloscope Leads and an electronic function calculator. I keep a copy of Ugly's electrical reference guide either on the bench or by my computer / home office. I bought a 1 pound spool of Kester 44 Rosin Core Solder 63/37 a year or so ago, I still have most of it left.

Bench Parts: I bought a bunch of the radio shack 5 pin solder lugs. But I find the hole too small on the bottom side. So I ordered some old style (NOS Phenolic) ones from EBay. I also got some Phenolic 6 Screw solder terminal strips (EBay). Also needed black friction electrical tape, 3 color 18 gauge hook up wire set (not bigger than the inductor size). All that, among other basic electrical bench stuff. Corrugated containerboard (OK Cardboard)

Crossover Board:

I mocked out the crossovers as separate units (N-107 & N-104) on Cardboard, all of them.

After studying a couple of styles of the Tobin resistor / capacitor hookup, I chose to run the 4 ohm resistor across the top of the 5 point solder lug. I used my Miniature (6") Long Nose, Serrated pliers to make close bends on the components.

I created a wax paper template (my wife has a full drafting setup at her office; I could not wait for tracing paper).

It is easier to work with a 1x8 wood than the thin Masonite type material. I noticed that the stock crossovers are black, so I hustled on down to Home Depot, picked up a 4' 1x8 hardwood plank. Measured the space inside the speaker (I did not want to remove any insulation), cut to length and painted it with many coats of Gloss Black.

I used an ice pick / punch awl to mark where the solder lugs to, I then transferred 1 set of solder lugs to the wood. I predrilled the holes. I used screws and washers to fasten them down.

After putting together all of the components, I checked and double-checked my work. It looked good so I wired it up.

Labeling the connection points is a key step, as is keeping common (1) and positive (2).

On my speakers, the Phenolic 6 Screw solder terminal strips slide in and out of the whole cut in the back panel. That is if you don't run solder down the wire into the insulation. So I soldered them up on the bench, same as the little tabs for the Gold 5 Way Binding Posts.

Gold 5 Way Binding Posts:

I am not a believer in \$2K speaker cables; I build my own out of decent raw materials. For Bi-Amp cables on the same amp, I will use all 4 wires inside a single package. But as my set up will have 2 separate amplifiers sitting on different shelves, I'll be using 2 separate runs of speaker wire. I do like the convenience of banana plugs. So I install Gold 5 Way Binding Posts on all my speakers and vintage amps if at all possible. It's simple, on a speaker (wood), purchase a set of Dayton Audio BPA-38G HD Binding Posts, use a ¼ inch drill bit and tap them into the whole. Use ¾" spacing for use of the dual plugs. I used a 'T' square to get a straight line, followed by using a dual set of Banana Plugs and a tape measure to get the spacing right.

That's it. Replacing the grill cloth will be in a separate file in the building plans folder of the Yahoo group.

I'm planning on removing these terminal strips, installing a 3PDT Switch. I'll update the file if it is successful.

Pictures Below

