AUDAX HOME THEATER SYSTEM

THE DESIGNER SERIES

by Joe D'Appolito

Home theater systems are gaining in popularity every day. Joe D'Appolito of Audio and Acoustics, Ltd. has designed a complete home theater speaker system based on the Audax Polymer Chassis series range of drivers.

Joe D'Appolito is available via e-mail to answer your questions at audioltd@worldpath.net, but is very busy running his own design and consulting firm. Please limit your questions to the existing design as presented on our web site.

HOME THEATER SYSTEM REQUIREMENTS

Home theater loudspeaker system requirements fall into three broad areas:

- Frequency response
- Polar response
- Maximum sound pressure level (SPL).

In discussing these requirements there are two forms of home theater sound:

- Dolby Pro Logic™ system
- Dolby Digital™ system also referred to as AC-3 or 5.1, 6.1 & 7.1 channel sound.

In both systems the left, right and center channels cover the full audio frequency range. The *Pro Logic* surround channel is monaural and limited in frequency to a range of 100Hz to 7kHz. In *Dolby Digital* all channels are discrete and full range.

In addition to the front and surround channels a *Low-Frequency Effects* (LFE) channel is available for use with subwoofers. Typically, the LFE channel handles frequencies from 20 to 80 Hz, although the upper limit can be as high as 120Hz.

In addition to frequency response, it is also important that all speakers in the system match in the more subtle quality of timbre. All drivers in the Audax home theater system use drivers from the same line and with the same cone material, assuring spectral consistency across all channels.

The front speakers in both systems contain strong directional queues. In *Dolby Digital* the left and right surround channels also carry independent directional information. Delayed sound arrivals due to reflections off the walls, floor and ceiling can confuse these directional queues. Strong reflections can also alter sonic timbres and make rapid sounds such as speech syllables less clear.

In addition to proper placement and room treatment, limiting loudspeaker horizontal and vertical polar response can greatly reduce these reflections and the undesirable effects they produce. It is especially important to limit the vertical and horizontal coverage of the front speakers, concentrating sound within the primary listening and viewing area. *Unfortunately we run into a conflict with the requirements for good stereo sound reproduction where broader horizontal coverage is desirable.*

In the Audax home theater system the MTM geometry is used in the left and right speakers to limit and narrow vertical polar response. Proper selection of driver size and crossover frequency controls horizontal coverage in all front speakers. An appropriate compromise between stereo and home theater coverage requirements has been made in the design of the left and right speakers. Front speaker polar responses are described in later sections.

There is disagreement on the most desirable polar response pattern for the surround channels. The original *THX* (Tom Holman eXperiment) *home theater specification* calls for a dipole pattern. This pattern is quite effective with the monaural surround sound of Dolby Pro-Logic. The dipole produces a "phasey" sound that is difficult to localize, adding to the surround effect.

In AC-3 the left and right surround channels are discrete and contain position specific information. These surround channels will benefit greatly from monopole speakers because they preserve the distinct directional queues present in each AC-3 channel. This is true not only for home theater, but also for the increasing number of music only recordings available in 5.1 channel sound.

There is now a new THX specification for HT installations in smaller rooms, called *THX Select*. This specification allows monopolar speakers for the surround channels that, with proper placement’ can be effective in both Dolby Pro-Logic and AC-3 surround sound.

Realistic reproduction of movie sound tracks can require short term SPLs of 105-110dB. All of the individual speakers in the Audax home theater system can produce 105dB within their frequency range in typical size rooms. Their combined output capability easily exceeds 110dB. Sensitivity for the speakers in this system falls in the range of 87-88dB SPL/1w/1m. This translates to minimum amplifier power requirements of 100W per channel.

THE AUDAX HOME THEATER SYSTEM

The complete Audax HT system is comprised of:

- The **left and right front channel** speakers use the D'Appolito MTM configuration with a pair of *AP170ZO* 6½" mid-bass drivers flanking a *TM025F1* 1" textile dome tweeter. The left and right channel speakers are 2-way vented systems with a 4th order acoustic in-phase crossover at 2650Hz. Sensitivity is rated at 88dB/2.83v/1m. Response is within +1.6dB from 100Hz to 20kHz. The low frequency -3dB point is 50Hz. System impedance is 8W.

- The **center channel speaker** forms the heart of the HT system. It defines the focal point for all cinematic action. The center channel speaker must have uniform horizontal polar response over the viewing region both to preserve the spectral balance of spoken dialog and to center the action for off-axis viewers. It should also be essentially a full range system. To this end, the center channel is a 3-way vented speaker.

  A *TM025F1* 1" textile dome tweeter and an *AP130ZO* 5¼" shielded aerogel midrange driver are vertically aligned and placed on the centerline of the speaker baffle to handle the high frequencies and the midrange. A pair of *AP170ZO* 6½" mid-bass drivers flank the tweeter and midrange driver. Crossovers occur at 400Hz and 3.5kHz. On-axis frequency response is within +1.6dB from 100Hz to 20kHz. The low frequency -3dB point is 55Hz and sensitivity is 87.5dB/2.83v/1m. At typical viewing angles within +15° off the on-axis position, response changes less than 1dB over the full frequency range.

- Aiming the system toward AC-3, the *monopole radiation pattern* was chosen for the **surround and rear center speakers**. These speakers use the same 6.5" mid-bass driver and tweeter used in the LCR channels. The enclosure is a closed-box 2-way design with a 4th order in-phase acoustic crossover at 3kHz. Response is within +1.5dB from 100Hz to 20kHz. The -3dB point is 85Hz and sensitivity is rated at 88dB/2.83v/1m.
- A Peerless XLS 10" long-throw subwoofer driver is matched with a 12” PR in a 40L enclosure to deliver 19Hz at -3dB.

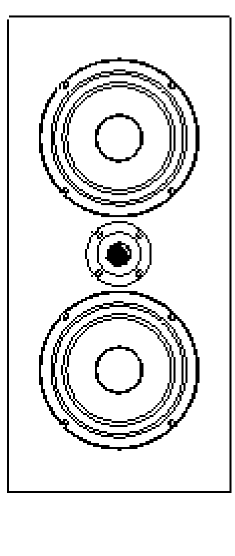
CONSTRUCTION TIPS

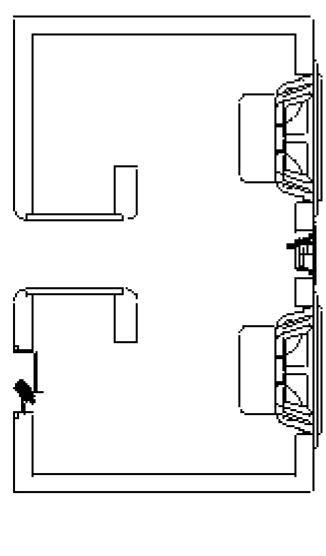
Enclosures Minimum wall thickness should be ¾". 1" is recommended for all front baffles and the subwoofer cabinet. Cut all panels to size and make all holes before assembly. Flush mount all drivers to eliminate diffraction caused by the raised edge of the driver flange. A router can be used to rabbet driver flanges flush with the baffle.

Crossovers High quality Mylar or metalized polypropylene capacitors with at least a 100V rating should be used in all crossovers. Air-core inductors are recommended for all coils except for the woofer crossover coil in the center channel speaker.

Crossover components should be mounted to ¼" Masonite. ***High-pass and low-pass sections should be placed on separate boards and placed on opposite walls of the enclosure***.

THE LEFT & RIGHT FRONT CHANNEL SPEAKERS





The left and right front channel speakers are two-way MTM designs using a pair of Audax AP170ZO 6½" HD-A cone woofers and a TM025F1 1” textile dome tweeter. This tweeter employs a high-energy neodymium magnet and a ferrofluid cooled voice coil for increased power handling ability. The vented enclosure has been computer optimized to maximize the power handling and low frequency extension of the woofer pair. The result of this optimization is a low frequency -3dB point of 50Hz with a 105db SPL capability at any frequency above the -3dB point.

Crossover The woofer and tweeter crossover provide an overall fourth-order, in-phase acoustic crossover at 2650Hz. Driver impedance and frequency response are fully accounted for in the computer optimization process.

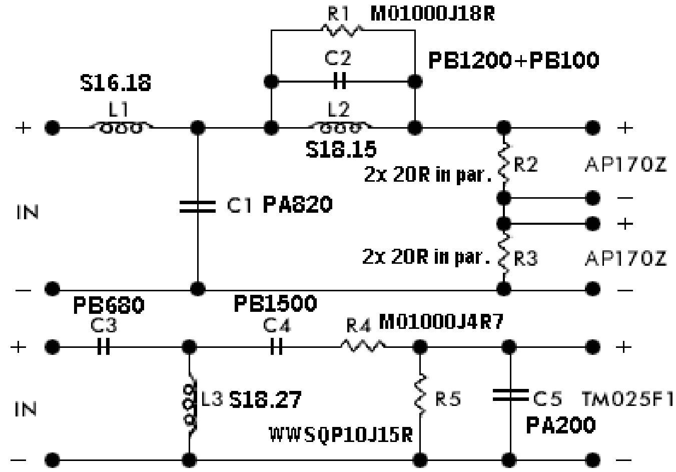
The woofer crossover consists of a second-order low-pass filter realized with L1 and C1 plus a controlled-Q parallel resonant trap made up of R1, C2 and L2. The trap suppresses a peak in the woofer response at 3600Hz and provides additional roll off of woofer frequency response above crossover. The woofers are connected in series to better match the sensitivity of the tweeter. Resistors R2 and R3 equalize power sharing between the two woofers. Although 16-ga wire is called out for L1, 14-ga wire may be used to gain a few tenths more dB in sensitivity.

Crossover Parts List

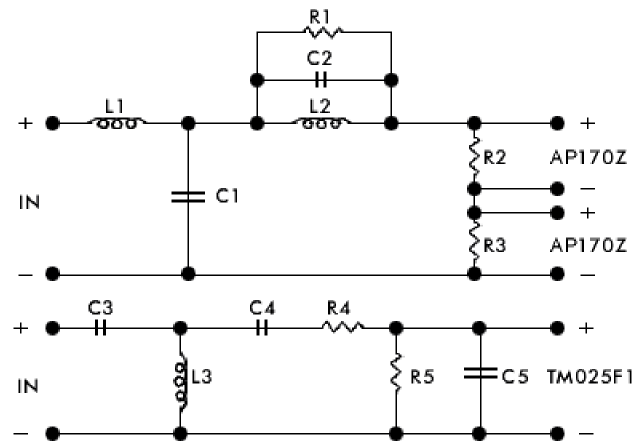
- L1 = 1.8mH, 0.43Ω, #16AWG
- L2 = 0.15mH, 0.17Ω, #18AWG
- L3 = 0.27mH, 0.24Ω, #18AWG
- C1 = 8mfd (8.2)
- C2 = 13mfd
- C3 = 6.8mfd
- C4 = 15mfd
- **C5 = 2mfd [omit with *F7*] (2.2)**

- R1 = 18Ω, 10watts
- R2, R3 = 10Ω, 25watts
- R4 = 5Ω, 10watts (4.7)
- R5 = 15Ω, 10watts

The tweeter crossover consists of a third-order electrical network made up of C3, C4 and L3. L3 is made with 18-gauge wire. *Do not use a larger wire size.* The resistance of the coil controls crossover Q. A larger size wire will produce peaking of the tweeter response at crossover. Resistors R4 and R5 form an L-pad that attenuates tweeter response just enough to match the sensitivity of the series woofer pair. Capacitor C5 rolls off a high-frequency rise in tweeter response to produce an overall flat response (remove when using the TMO25F7). All drivers are connected with positive polarity (the positive terminal of the tweeter is the WIDER spade connector, colour-coded **green**).



Left/Right Speaker Crossover Network Diagram



Left/Right Speaker Crossover Network Diagram

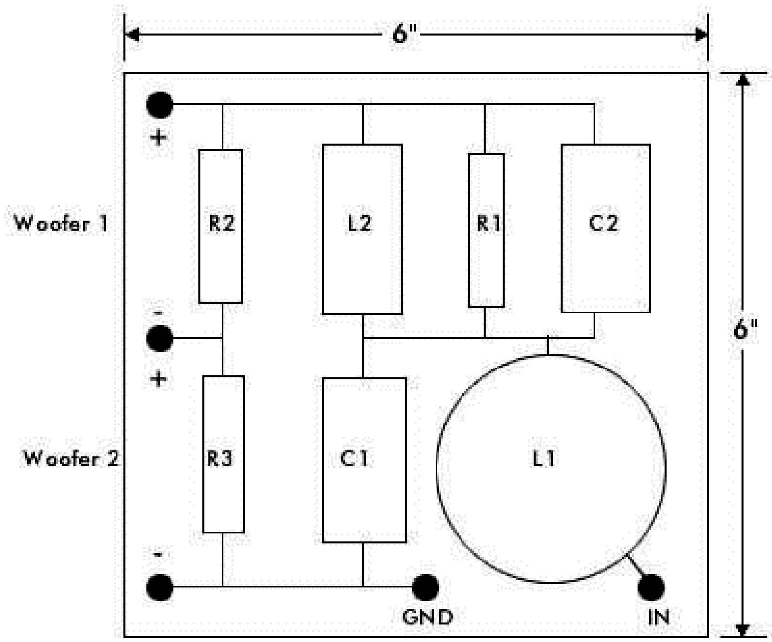
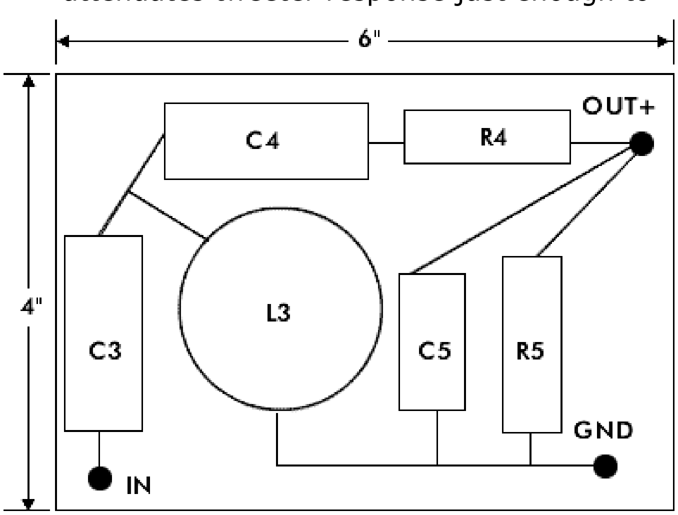


Figure 8 Left/Right Speaker Woofer Crossover Layout



Left/Right Speaker Tweeter Crossover Layout

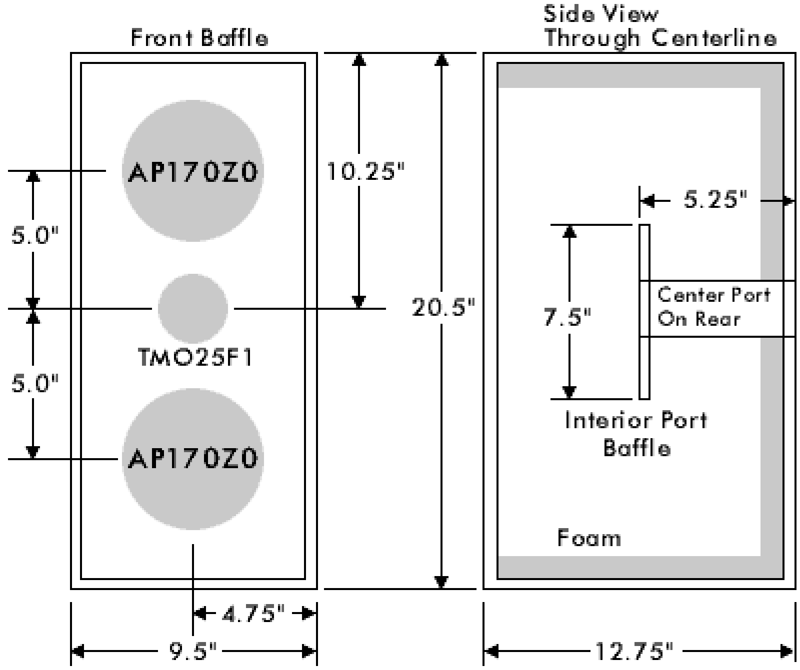
Left/Right Channel Enclosure Construction

The enclosure has a net internal volume of 30 liters. A 3" ID port tube 5¼" long tunes the enclosure to 49Hz. The interior port opening is supported by an 8" x 8" piece of 1" MDF. This piece forms a baffle that linearizes port volume velocity at high SPLs and also serves to brace the enclosure sides against vibration. The port baffle should fit snugly between the enclosure sides and be glued in place. The enclosure sides can be drawn tightly to the interior port baffle with coarse-thread screws.

Both ends of the port tube have a ½" quarter round applied with a quarter rounding router bit to further smooth airflow at the port openings.

The enclosure is internally damped with 2" *"egg-crate"* acoustic foam placed on the top, bottom, rear and one side of the enclosure. The foam can be glued in place with rug cement available at hardware stores

Left/Right Channel Enclosures (1 of 2)

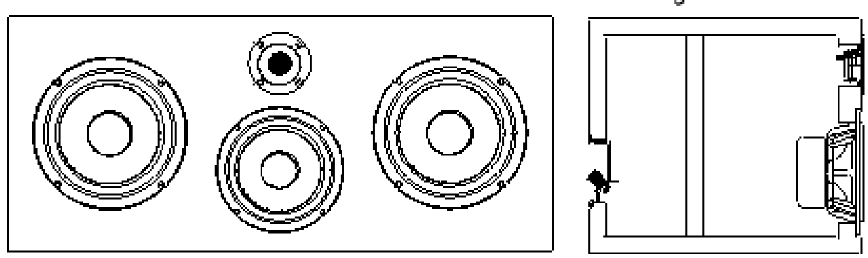


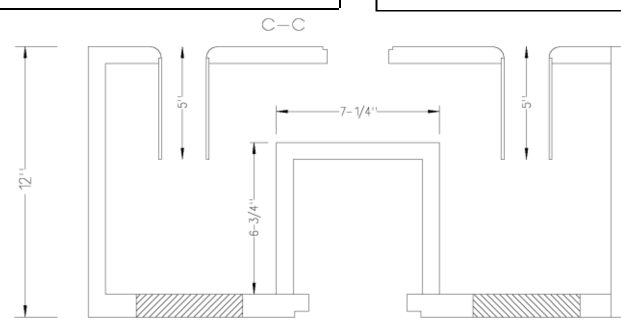
NOTE: Tweeter mounting hole is 2" ID. Tweeter is mounted flush on front baffle. Top, bottom, sides and rear lined with 2" egg-crate acoustic foam.

drawing is not to scale

THE CENTER CHANNEL SPEAKER

The center channel speaker is designed to produce uniform frequency response over the primary listening area. A *TM025F1* 1" textile dome tweeter and *AP130ZO* 5¼" HD-A coned mid-bass driver are vertically aligned and placed on the centerline of the speaker baffle to handle the high frequencies and midrange. A pair of *AP170ZO* 6½" mid-bass drivers flank the tweeter and midrange drivers. The woofer enclosure is vented and tuned to the same QB3 alignment used in the left and right channel speakers. In typical listening rooms, the center channel speaker can produce 105dB SPL at any frequency above 50Hz.



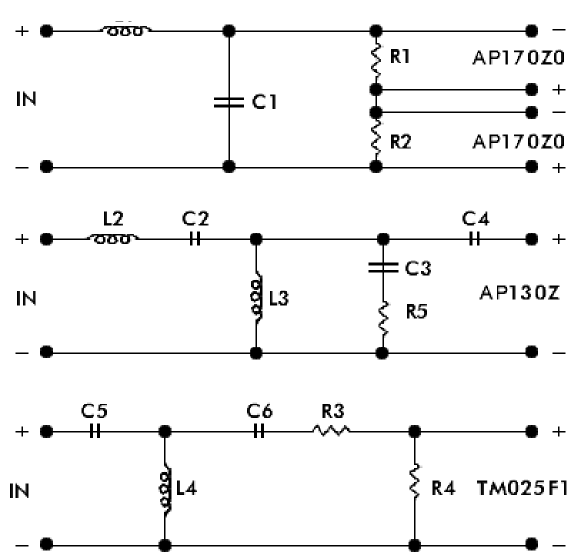


Center channel on-axis frequency response is within +1.5dB from 100Hz to 20kHz. The low frequency -3dB point is 50Hz and sensitivity is 87.5dB/2.83v/1m. Crossovers are seen to occur at 400Hz and 3.5kHz. The response of the woofer pair, midrange and tweeter are each down 6dB at their respective crossover frequencies indicating that the drivers are in phase at crossover.

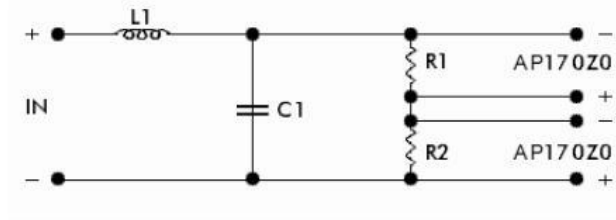
Impedance is above 7.5W throughout most of the low-frequency range. The minimum impedance of 5W occurs at 4.5kHz. This frequency is high enough to be of little concern. Phase angle lies within +40° over the entire frequency range. This is an easy load for typical multi-channel home theater receivers.

Crossover

The low-pass filter comprised of L1 and C1 constitutes a second-order electrical network. Similar to the L/R speaker, resistors R1 and R2 equalize power sharing between the two

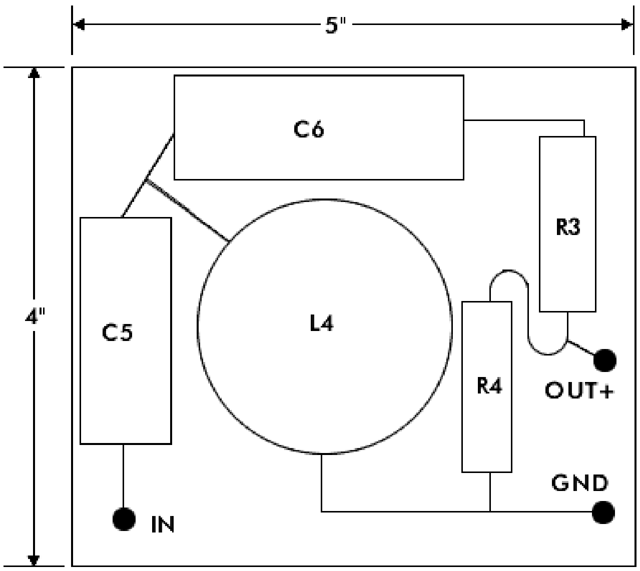


Center Speaker Crossover Network Diagram woofers. Notice that the woofers are connected in reverse polarity (*the minus (-) terminal on the input cup is wired to the plus(+) terminal of one of the woofers*) as required for 2nd-order in-phase crossovers. Because of its large value, an iron core or ferrite core coil can be used for L1. The specified DCR for L1 is 0.48Ω. We have experienced no undesirable effects on performance using the cored coil. The purest among you can replace L1 with a 12-gauge air-core coil.

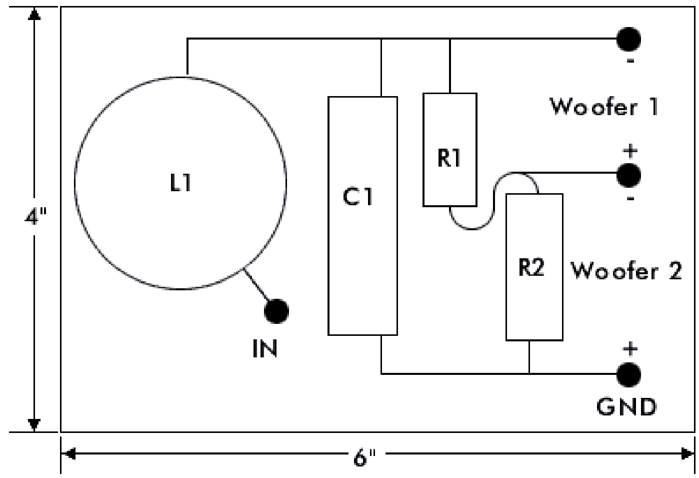


THIS WIRING SCHEMATIC FOR THE CENTER CHANNEL WOOFER CROSSOVER IS CORRECT

The minus(-) in connects to the plus(+) of the lower woofer.



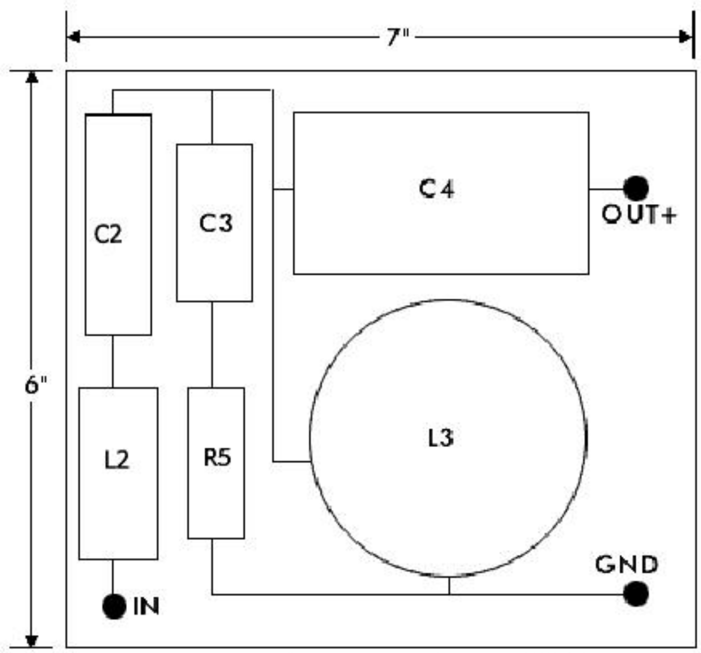
Crossover Layout for Center Channel Tweeter



Center Channel Woofer Crossover Layout
(note: woofer polarity is reversed)

Crossover Parts List

- L1 = 6.8mH, 0.48Ω, #12AWG air core
- L2 = 1.2mH, 0.34Ω, #16AWG
- L3 = 2.7mH, 0.53Ω, #16AWG*
- L4 = 0.27mH, 0.24Ω, #18AWG
- C1 = 62mfd (68)
- C2 = 24mfd (22)
- C3 = 10mfd
- C4 = 82mfd
- C5 = 4.7mfd
- C6 = 8 mfd (8.2)
- R1, R2 = 10 Ω, 25watts
- R3 = 8 Ω, 10watts (8.2)
- R4 = 15 Ω, 10watts
- R5 = 2 Ω, 10watts (2.2)



Crossover Layout for Center Channel Midrange

The midrange crossover has 2nd-order high-pass and 3rd-order low-pass characteristics. The topology is a bit unusual in that it does not resemble the traditional high-pass/low-pass cascade. Rather the topology is derived from a low-pass to band pass transformation. You can think of the 400Hz high-pass filter as being made up of L2, C3 and R5. This combination provides a 2nd-order response to compliment the 2nd-order woofer roll off. R5 controls the Q of the 2nd-order response. C2, L3 and C7 make up a 3rd-order low-pass. This electrical filter combines with the natural response of the midrange to produce an overall 4th-order in-phase high-pass response at 3500Hz.

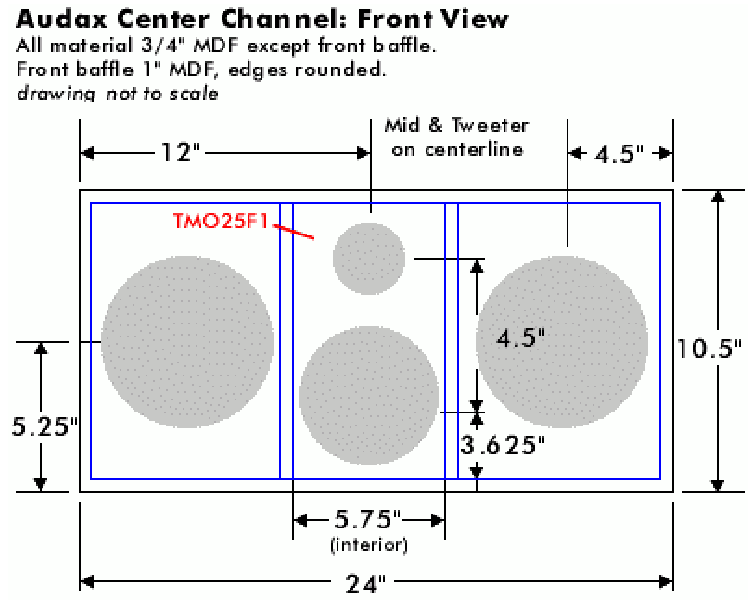
The tweeter high-pass filter is also a 3rd-order electrical filter. Again, this filter combines with the tweeter response to yield an overall 4th-order in- phase response. The high-frequency roll off capacitor used in the L/R speaker crossover (C5) is not needed here since the 3500Hz-crossover frequency is above the point where the tweeter response begins to rise.

Enclosure

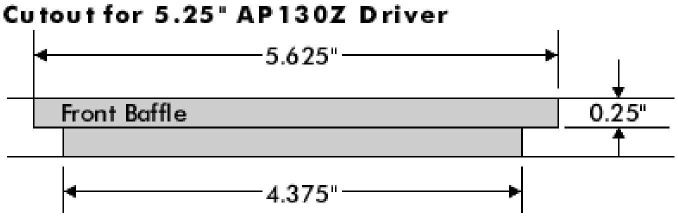
The bass response alignment is the same as that used in the L/R speakers. That is, the internal volume of 30 liters occupied by the woofers is tuned to 49Hz. However, the 3" ID port used in the L/R speakers is replaced with two 2" ID ports 5" in length.

The center channel enclosure contains a 6-liter sub enclosure housing the 5.25" midrange driver and tweeter.

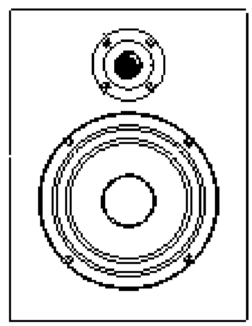
The rear wall of the sub enclosure is lined with 2" acoustic foam and filled with lightly compressed hi-loft Dacron™ pillow stuffing. The woofer volume is damped with 2" acoustic foam applied to the rear, sides and top or bottom (not both) of the enclosure.

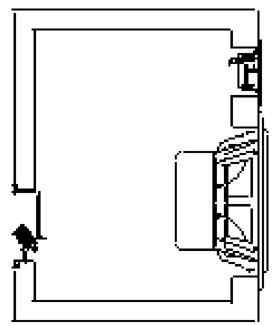


Cutout for 5.25" AP130Z Driver



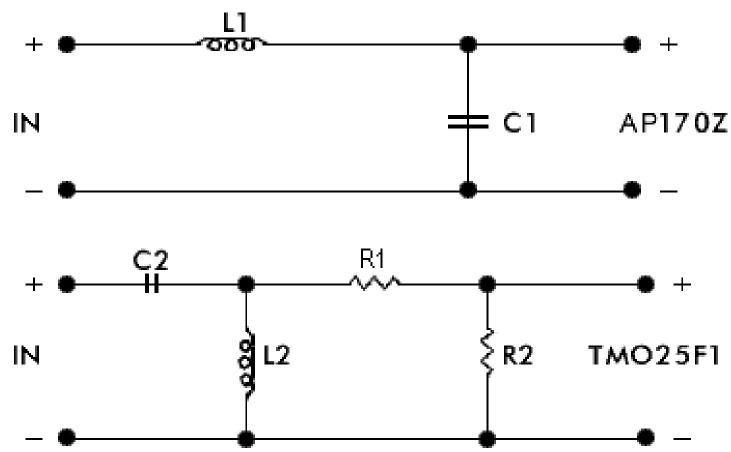
THE SURROUND SPEAKER



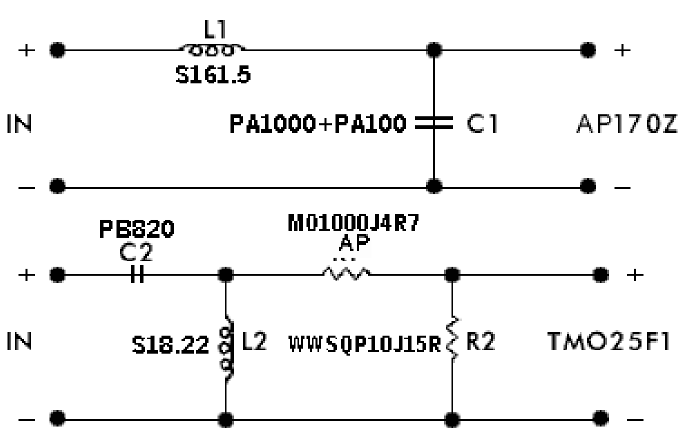


The surround speaker is a closed-box design using the same *AP170ZO* 6½" mid-bass driver and *TM025F1* 1" textile dome tweeter used in the L/R and center channel speakers. Response is flat within +1.6dB from 100Hz to 20kHz. The half-space -3dB point is at 85Hz. Bass response will extend below this frequency when the surround speaker is placed against a wall. Sensitivity averages 88db/2.83v/1m. A 4th-order acoustic crossover occurs at 3kHz.

The woofer crossover network is 2nd-order electrical, but it combines with the natural roll off of the woofer to produce an overall 4th-order acoustic response.



Surround Speaker Crossover Network Diagram

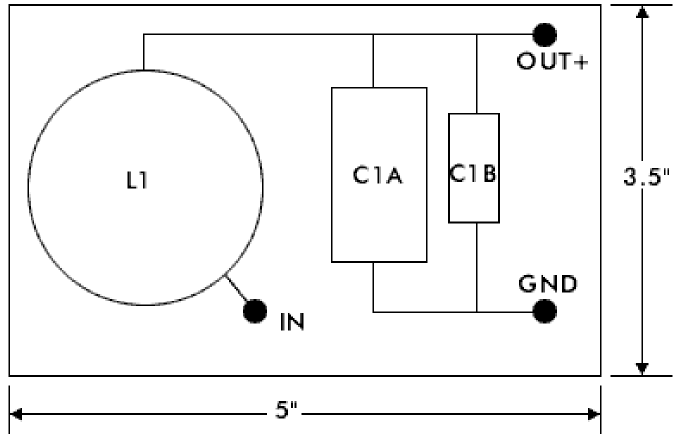


Surround Speaker Crossover Network Diagram

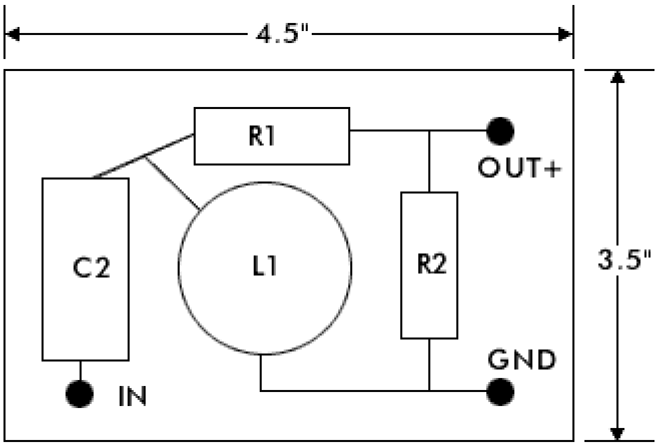
The tweeter also achieves a 4th-order characteristic with a 2nd-order electrical filter. Crossover component values are given below. All coils are air-core.

Crossover Parts List

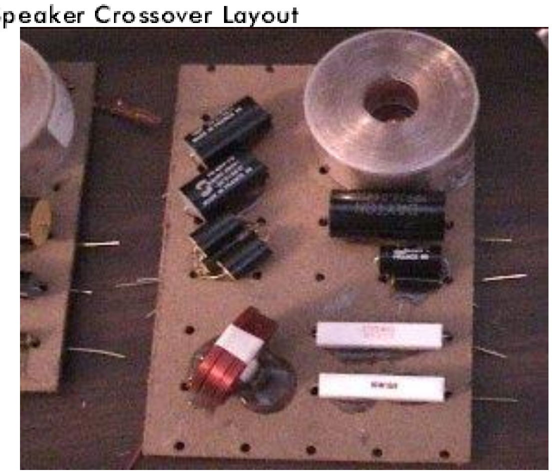
- L1 = 1.5mH, 0.4Ω, #16AWG air core
- L2 = 0.22mH, 0.2Ω, #18AWG
- C1 = 11mfd [10mfd & 1 mfd in //](10)
- C2 = 8mfd (8.2)
- R1 = 5Ω, 10 watts (4.7)
- R2 = 15Ω, 10 watts



Surround Speaker Crossover Layout



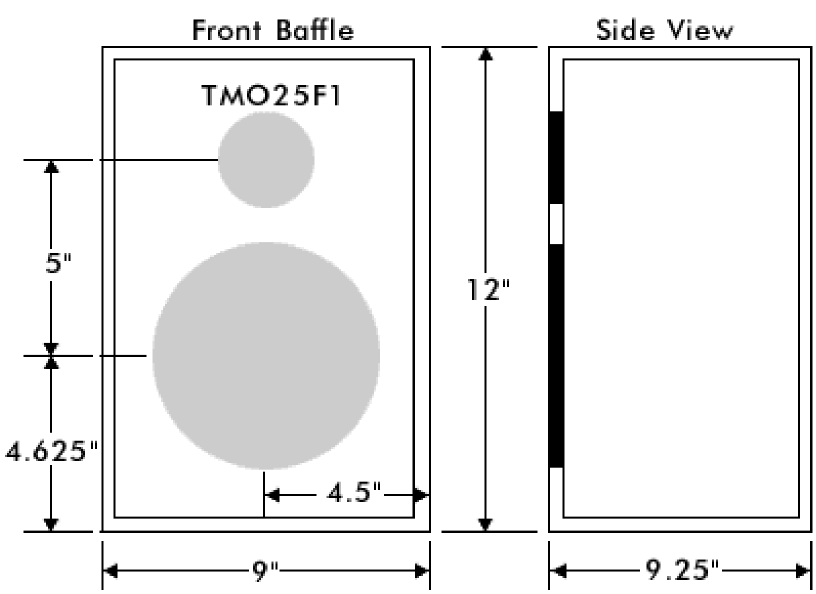
Surround Speaker Tweeter Crossover Layout



This is one of the surround crossovers after the parts have been glued to the pegboard. *Notice the cascaded capacitors in the upper left corner.* These surrounds sounded fantastic all by themselves when I tested them. A pair of these would make a very good set of bookshelf speakers, although I would probably want to go with something with better bass extension. The F3 for the surrounds is a little under 90 hz (sealed).

This is one of the L/R front speaker woofer crossovers. I didn't cascade the caps for this one but I used all Solen caps. *Cascading would have been a waste, I think, since this crossover is a relatively simple 2nd order with a parallel notch filter.* Notice the alignment of the inductors.

- An internal view of the crossovers inside the surround speakers. Check the x-overs for proper positioning then remove them to seal the interior seams with silicon.



Substituting the TMO25F7 Titanium for the TMO25F1 Textile

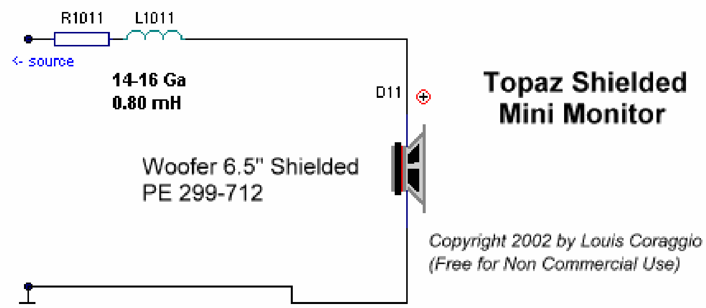
- *In the original crossover for the L&R Mains, Joe D. added a small filter (2uF shunt cap) to compensate for the rising response of the F1. This needs to be removed when using the F7, which does not have the same response characteristics in the upper octaves. Otherwise, no other changes are needed for good performance. That's the only change I'm suggesting needs to be made to use the F7 in place of the F1.* **WJ**
- *I prefer the F7 to the F1 in my Audax HT system, with the changes noted above, as it is a bit more detailed and accurate than the F1. I haven't found the F7 to be fatiguing under any listening conditions but I use the Audax HT system strictly for home theater, not critical listening with music. These applications place somewhat different demands on the system, so what might be optimum for a music-only system might not work as well as for a home theater system.* **WJ**

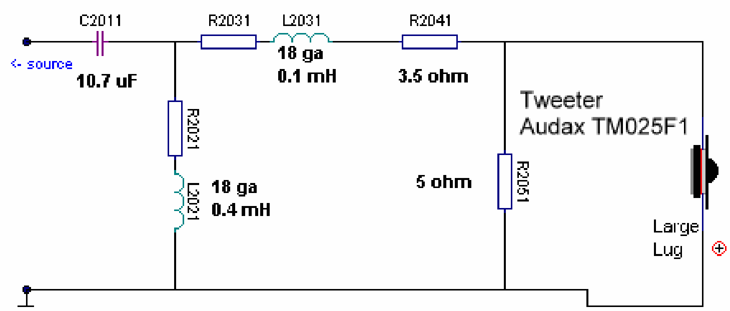
Dayton Film and Foil Polypropylene Crossover Capacitors

The ultimate by-pass capacitor that provides superior sonic detail, lower ESR, lower dissipation factor, and due to the extended foil construction, are non-inductive. These are ideal for by-passing mylar and metallized polypropylenes in loudspeaker crossover networks. Especially useful in midrange and tweeter circuits. All values are rated at 400VDC 5% tolerance.

Part Number	Description	Size (mm)	Price $USD
027-450	.01uf 400VDC	6 x 18	.63
027-452	.10uf 400VDC	11.5 x 20	.79
027-454	.22uf 400VDC	11 x 35	.88
027-456	.33uf 400VDC	13 x 35	1.06
027-458	.47uf 400VDC	16 x 35	1.24

Topaz Shielded Mini-Monitor





Original Crossover (Minimal Baffle Step)

The original crossover looks a bit strange but it works out to about 2800 hz.

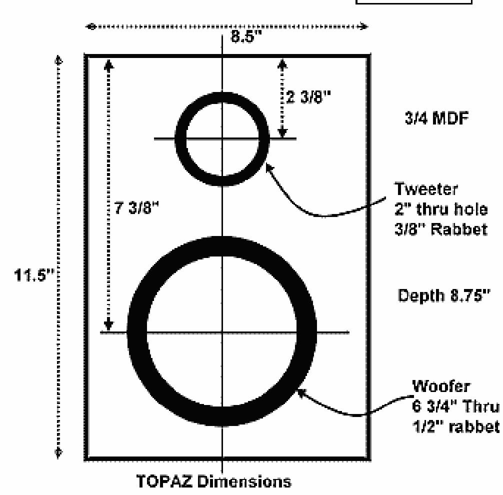
I tried to work things around to use more or less "standard" values. (You can combine caps 5.1 + 5.6 = 10.7)

Overall, it's a fairly economical crossover. You should be able to put the drivers & crossover together for less than $70 a speaker.

Overall, with this xover, the bass is skimpy. For HT with a sub, this design would be more suitable for wall, or in-cabinet mounting.

The 0.8 mH coil provides about 2db of baffle step. If you are stand mounting the Topaz, my simulation suggests you can bump the coil to 1.0 mH for about 4.5 db of baffle step without drastically changing response.

The 3.5Ω resistor could be replaced with a 4Ω if you prefer your sound a bit more laid back. The large lug on the tweeter should go to ground.



Revised Xover for Enhanced BSC *After extended listening, I decided that the original crossover was just too thin for mains. I came up with a revised crossover that ups the baffle step compensation to about 5 db.*

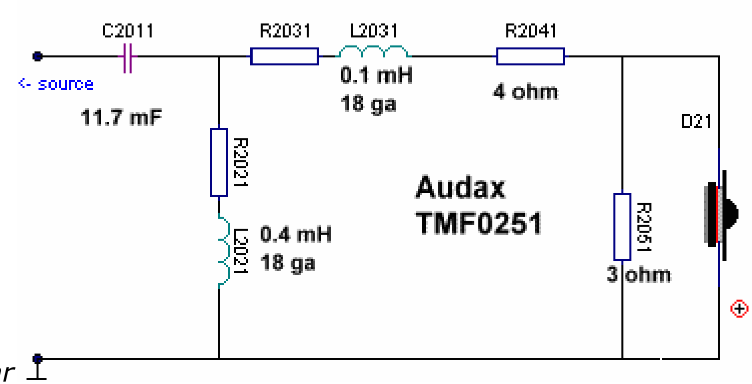
I had a couple of 14 ga 1.2 mh coils in inventory so I used them as a basis for the woofer. The major changes on the tweeter network included increasing the cap to 11.7 mf and revising the LPad. This effectively reduced the crossover frequency to about 2400 hz.

I was afraid that these changes would lose that wonderful detail I heard with the initial design. The revised version pretty much mitigated most of the thin bottom end but left the high end detail I liked.

The mids are now a bit more laid back, and I picked up a hint of sibilance. Overall I am now quite pleased with the performance. These are very capable standalone monitors. Bass heads will probably want a sub. The Topaz should be a fine HT monitor.

I believe that this Audax tweeter is the real deal. Very crisp detail, lots of air. Lovely on vocals and wind instruments. Very clear vocals, virtually no sibilance, excellent image and soundstage. Decent depth and placement.

TOPAZ Shielded Monitor
Revised Xover for Baffle Step



The square cross section of the enclosure is far from optimal for internal resonance. To compensate, I lined the inside with acoustic foam and filled the rest lightly with Dacron. Volume: 500 in³(.29ft³), 8.19L

Sold-Out Buyout Woofer Specifications: * Power handling: 100 watts RMS/150 watts max * Voice coil diameter: 1¼" * Re: 6.0Ω* Le: .81 mH * Impedance: 8 Ω * Frequency response: 50-9,000 Hz * Magnet weight: 20 oz. * Fs: 57.9 Hz * SPL: 88 dB 2.83V/1m * Vas: .51 Cu. Ft. * Qms: 2.03 * Qes: .60 * Qts: 0.46 * Xmax: 3.5 mm * Sd: 19.5 sq.in. * Net weight: 4 lbs. *

John Krutke's Audax Mini - AP100Z0 and TM025F1

Some designers use simple (cheap) crossovers with this tweeter, usually 2nd order electrical consisting of a single cap and a single coil. This is poor design, and the tweeter needs much more response shaping that can provide.

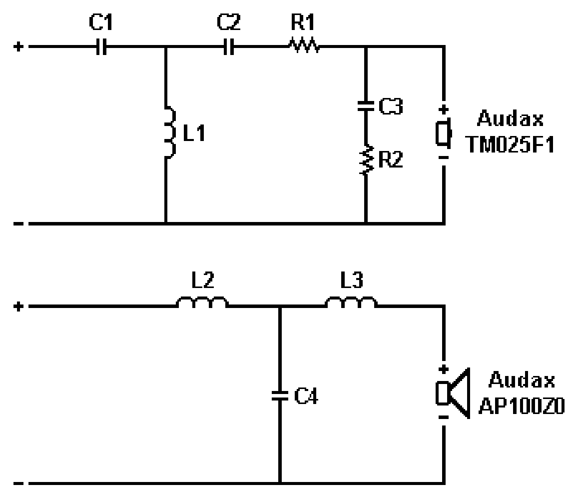
My design represents the minimum number of components that I feel are required to make this tweeter usable.

Crossover Parts List

L1 0.55 mH 19ga air core (.37ohm)
L2 1.5 mH steel laminate (.14ohm)
L3 0.3 mH 19ga air core (.3ohm)

C1 2.2 uF poly or mylar
C2 4.7 uF poly or mylar
C3 1.0 uF poly or mylar
C4 5.6 uF poly or mylar

R1 25ohm 10 watt non-inductive
R2 8ohm 10 watt non-inductive



Joe D's Audax home theater design for the front channels looks like a "somewhat correct" use of this tweeter although he crosses over a bit too low. On the other hand, his ***rear channel is simplified to the point where I think he doesn't care how they sound, just as long as they don't blow up****. Note that I'm not saying Joe's rear channel is a poor design, just that he limited the number of components to reduce cost, and it's better to do that on the rear channels than the critical fronts.*

Comment from Duaner - Sept 18, 2005 on AVS Forum

After listening to my Audax HT system for several months, I plugged in my old Cerwin Vega's to do a quick comparison ... and yuuuuuuck. There is no comparison whatsoever. And what strikes me the most is the difference in bass. The Cerwin Vegas are empty sounding... I couldn't believe it. I had always held the bass capabilities of the Cerwin Vega's with high esteem... but man... they just sound unnatural in comparison to the Audax... these babies are the best DIY project I have ever done... hands down.

Phillip,

Thanks for the response to my question. I did double-check my connections, etc. and everything was correct on the woofer crossover. However, after re-checking all the crossovers, I found I had C2 and L2 backwards on the midrange crossover (I followed the **Audax** pictorial diagram rather than the schematic when I put it together). I switched it this morning and gave another listen. It seemed to help.

Anyway, back to the topic of my **Audax center** listening experience..... If you recall, my original question on my first post was something like "Is it normal for the woofers to not be nearly as present as the midrange and tweeter drivers?"

I educated myself this week on **center** channel speakers to have more basis on how a center channel is supposed to function in a HT setup....something that I was lacking in for sure!

Educational experience #1:

To help try to answer this question, I went to a local electronics/audio store that had some high-end speakers to give them a listen to see if they were functioning the same way as my **center**. I went into the store and told the salesman to take me to their best center channel. He proceeded to show me a KEF center that retailed for $1999.00! I listened to it carefully and critically and I have to say, it was nice but I did not hear much difference between it and my new **Audax center**. However, it may have been an unfair comparison since I didn't have my center there for a direct comparison. I especially listened to hear if the woofers were not as present as the midrange and tweeter. The woofers were functioning pretty much the same as with my center (not as present as the midrange and tweeter).....which made me feel better already!

Next, I asked to salesman to show me the next level down in **center** channels. He took me to another KEF center that retailed for $1199.00. Again, I listened critically and was less impressed (not surprising since it cost $800 less than the other KEF I listened to). The store had about 4 or 5 other centers (don't remember specific brands) in the same area going down from $1199 to $299. I had him put on each of them for a quick listen. Wow, was I surprised how awful some of them sounded! They ranged from hollow sounding, bright, strident, to in-your-face obnoxious! The $1999 KEF sounded the best, but who in their right mind would spend that much money on a center channel speaker. After this brief listening experience, my **Audax center** was already sounding better!

I went home and cranked up my home theater for another critical listen of my new **center**. I have to say I was much more impressed this time around.

Educational experience #2:

A couple HT buddies came over and brought their **center** channels so we could do a sound comparison. One of the guys had a 4-way switch so we could hook up all the speakers at the same time and change speakers using the switch. The four centers were:

1. smaller Polk audio **center**
2. my Kenwood **center** (part of a HTIB)
3. Klipsch **center** ($299 retail)
4. my new **Audax center**

We used Pirates of the Caribbean, Fantasia 2000 and Open Range for our test soundtracks.

Results:

The **Audax** was clearly the winner. If I had to rank the speakers from best to worst based on sound quality, I would go Audax, Kenwood, Polk and finally the Klipsch. Compared to the others, the Audax had a rich, full-bodied sound that was very easy on the ears. It had just the right amount of presence and produced dialog with realism (as if the person was standing in front of you talking). The others had more of a bright, higher-pitched or hollow sound. They were all characteristically different in their own ways.....they all did the job in delivering dialog but none did nearly as well as the Audax.

Being a classically-trained musician, I put on Fantasia 2000 to see how the various **center**s would handle the soundtrack. The **Audax center** did not disappoint. It handled orchestral sounds with wonderful realism....it was like being in a top notch concert hall listening to the music live. The other centers fell very short here.

Both of my HT buddies also really liked to **Audax center**, though the owner of the Klipsch remained partial to his center. The other buddy is now looking into building a DIY center but thinks the Audax center is too large for his space.

Now to answer my original question about the woofer presence problem. During my initial first listen, I did not have a good basis of how a quality **center** channel works. My thought was that I have a pair of big 6½" woofers that were not doing much. I expected even during dialog to have the woofers working as hard as the midrange and tweeter. Why would a person build such a large enclosure with ports if you weren't going to hear them more dominantly than what I was hearing? As all of you know, most dialog comes from the midrange and tweeter (Shamefully, I did not know this). I believe the purpose of the woofers is to give extra body/depth or support certain ranges of dialog. The woofers also provide depth to the entire HT sound when non-dialog signal is sent to the center. (Fantasia 2000 is a prime example of this).

After my **center** education this week, I have to say I am totally happy with my new **Audax center**. For grins, I hooked up my original center (Kenwood) for another final comparison, and I now hear a huge difference between the two centers.

Ken H

Update:

I had to reset my receiver so the center and surrounds were large, not small, that way they would get the correct input, and then readjust all of the levels for each speaker. I've actually had the center finished for a couple of weeks. It's been connected and in place, but I didn't reprogram my receiver. Sounded ok, but not noticeably different in general. Some sounds (highs) came through differently; more pronounced (punch?). Voices are louder, clearer.

At first I was like Ken H, hmmmm... no bass, or very little bass from the center. Disappointed, but after connecting the surrounds and resetting the receiver, Wow! Tons of bass.

Just like JL, things just rattled in the room. That never happened before! Lots of clear sounds, and more volume from the surrounds (or more presence) and more dialog from the center.

I love it. After reading Ken H's post, and setting up the center properly, I am quite pleased.

Thanks to all for this thread. I never would have thought of building a set of speakers. I would have gone out, and eventually plunked down a huge chunk of change for some expensive brand and I probably wouldn't be happy with them because I had spent all that money.

PHISCH: (from AVS Forum) …The Audax system has the best center channel design, IMO. The center channel does an outstanding job and sounds great, but it is very large and heavy. It is the reason why I chose the Audax system for my dedicated home theater. It really can't be beat in this regard. The Audax system was also designed by Joe D'Appolito, who is one of the main figures in loudspeaker design. I use separate amps and pre/pro with the Audax system at 200w per channel. I listen at reference levels with dvd movies and this system easily handles the power. For the LFE channel I run 2 Dayton Titanic 12" subs with 2 250w amps.

The Madisound Vifa kit center channel (one of the L/R on it's side), while it does a very good job, is not quite as good as the CC in the Audax system, although it is a more compact solution.

Duaner from AVSforum: Aug 17/06

I just wanted to give y'all an update on my Audax speakers... I was finally able to find time to take them to a hi-end audio store and hook them up to a decent receiver... a Denon 3806. Wow!

I was considering my next purchase to be the materials for the Dayton RF series that Joe L. is building... But I think now I am going to pursue the acquisition of another receiver. I am not sure if I want a Denon for sure, I'd like to look at the pioneer elite series too, but man alive the difference between the Denon and my little Sony. There was so much volume, it was just insane, but what amazed me most was the clarity at such high volume levels. And I am proud to say, that my Audax speakers handled everything that Denon could put out... and the guys who worked at the shop were fairly impressed as well... These speakers are better than I had even realized.

Duane