Subject: Re: Wayne, what about passive bi-amping?
Posted by Wayne Parham on Thu, 03 Jul 2008 18:49:01 GMT
View Forum Message <> Reply to Message

I think passive filtering and biamping is a great idea. The filters used in the crossover are simple enough to implement easily with a handful of passive components, so it's a perfect application. The splitter filters are simple 3rd order networks, 1.3kHz low-pass for the woofer and 1.6kHz high-pass for the tweeter.The trick is getting the tweeter's response curve right. The proper top-octave compensation is 6dB/octave, but you don't want it to start until above 4kHz and crossover is below 2kHz, so you have over an octave that should be flat before starting the 6dB/octave rising region. The way I do that is to make the load impedance a little bit high on the high-pass filter in the tweeter circuit. That causes it to be slightly underdamped, which causes it to peak around the crossover frequency. Then, when a 6dB/octave top-octave filter is added after that, the first octave becomes flat, followed by the region of rising response.My suggestion for making a passive line-level crossover would be to do the exact same thing, but at high impedance

instead.Here are some circuits that would work:Woofer circuit:o-----150mH--------50mH----------o

|o---------oTweeter circuit: ----0.0047uF--- |

|o---------oYou'll notice the inductance values are very large. Fortunately, they do not need to have much current capacity so they can be made with small guage wire. Don't look for speaker crossover coils, instead, use small signal chokes. Unfortunately, most of these have cores that aren't that great for fidelity. They won't get anywhere close to saturation, so maybe that's OK, but I'm not sure I'd want a ferrite core coil in the crossover circuit. Maybe you can find better low-hysterisis coils.Another possibility worth looking at is Steve Bench's 6DJ8 Tube Crossover. Circuit boards are available, making assembly easy and keeping it clean. I made a Spice model to help me find components that would provide the proper top-octave compensation, having the initial flat shelf and then 6dB/octave augmentation above 4kHz. Use this circuit with crossover splitter values of 1.3kHz 3rd order low-pass for the woofer and 1.6kHz 3rd order high-pass for the tweeter.