Subject: Impedance Correction Conjugate Network
Posted by FredT on Thu, 10 Mar 2005 21:03:06 GMT
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The FredArrays' bass sounded nice and tight with the solid state amp but a bit uncontrolled with the SET. So I checked my crossover software and it indicated a 30+ ohm impedance peak at the enclosure tuning frequency, which I thought might be contributing to this problem. The suggested network to correct this included a series filter consisting of an 8 ohm resistor, a 1000uF cap, and a 10mH inductor (yes those are large values, but the filter is tuned to 50hz). The difference is amazing - the bass is down about 1dB, but the transient response is remarkably improved, maybe too much. I'll swap the 8 ohm for a 16 and see how it sounds.What's interesting here is that I started this project with a simple 2nd order woofer network and a 3rd order tweeter network. Then it required an RC network to compensate for the woofers' rising impedance and nail the target crossover frequency. Finally, I added the conjugate network to tame the wooly bass. The tweeter was still a bit bright so I added the RCL Zoebel network which Bottlehead corp recommends for this tweeter in the Straight 8. Finally a one ohm resistor ahead of the tweeter crossover tamed the last trace of brightness.What started as a simple network now has 15 parts (17 including bypass caps), but each time I remove one section the sound is degraded. Whoever said simpler is better wasn't designing with cheap drivers?
FredArray Crossover

Subject: Re: Impedance Correction Conjugate Network
Posted by Wayne Parham on Fri, 11 Mar 2005 03:27:44 GMT
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I agree. I appreciate the "simpler is better" approach, and find good solutions that are physically simple to be elegant. But a loudspeaker is a complex load, so a network that is physically simple often creates a system that is reactively complex.Sometimes a conjugate filter is needed to compensate for the built-in filter of the speaker, itself. In this case, what appears to be complex is actually counteracting something else equally complex, balancing the equation to form something pure.

Subject: It's Adjustable Too
Posted by FredT on Fri, 11 Mar 2005 12:31:10 GMT
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It's interesting how I can vary the effect by changing resistor values. Without the network the bass transient response sounds undercontrolled to my ears. Using an 8 ohm resistor the bass becomes very tight but sounds a bit overcontrolled (the typical Best Buy or Circuit City shopper would complain that the speakers "don't have enough bass"). A 16 ohm resistor provides a nice balance,

even on bass transient heavy material like Brian Bromberg's "Wood" acoustic bass disk.I remember Jim Vandersteen was talking about his company's subwoofers, and he said the first model had a Q of 0.7, but some customers were complaining they "couldn't hear the bass". So he modified the subs by incorporating a continuously variable Q control, giving the customer a choice of tight bass, fart box bass, or anything in between.
