Subject: Zobels and stuff
Posted by Wayne_Parham on Sun, 25 Mar 2001 15:34:22 GMT
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A damping resistor or Zobel is a good solution in many cases. Some drivers and/or driver crossover combinations don't peak, so a damping resistor or Zobel isn't needed. But if a passive crossover is used, dampers are often required because the driver load isn't purely resistive.I like 1st order networks. They're simple and effective. Phase shift is limited. And if two speaker drivers both have 1st order crossovers, then the slope is well matched.Its disadvantages - other than the possibility of inappropriate power transfer shown above - is that most speakers rolloff at a higher rate something more like 12-18dB/octave, so it isn't a good match unless both contiguous drivers have 1st order networks.This kind of network is usually limited to use with two pretty wide band drivers with a large region of overlap. There's going to be several octaves where both drivers are audible. This means that the two diaphrams should really be physically close, or we can run into diffraction interference problems. Off-axis nulls can be pretty severe, so the listener may tend to prefer on-axis listening.But to answer your question more directly - Yes - Anything which remedies the problem of resonant impedance allowing the capacitor to pass excessive energy will solve it. In the example I gave - an 8 ohm tweeter having a 40 ohm resonant peak at 600Hz crossed using a 5uF capacitor - this problem could have been solved with a 10 ohm resistor across the tweeter. That is similar to the suggestion you've made of using the Zobel, and either would solve the problem. I tend to keep things as simple as possible - so I wouldn't use the resistance unless I needed it. But in this case, I would need it.I wouldn't use a notch filter, because it's not that 600Hz is particularly troublesome other than the fact that the tweeter is resonating here. More to the point, we're just coupling more energy into it that we might have expected. It's a systemic issue - using a 6dB/octave crossover, at 2kHz, with this particular tweeter - forms a non-viable solution, unless other things are also done.There's nothing wrong with 1st order networks, and there's nothing wrong with the tweeter. It may be flat as a board and the most distortion-free part available. And there's nothing wrong with a 2kHz crossover frequency either. But in this situation, these things combine to form a non-viable system. So we must do something else.In this situation, one should probably use a fixed resistor across the tweeter, if a 1st order crossover is desired. Or simply put an inductor across it and make it a 2nd order. A third series capacitor would make it a 3rd order, and so on. Those would be the design choices I would make.