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Subject: Horn Damping Resistor  
Posted by [aborza](#) on Mon, 09 May 2005 13:26:44 GMT  
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Wayne, After reading all your white papers I feel I understand how to estimate the preliminary values for most all your crossover components except one. I am unsure how the Horn Damping Resistor is estimated. The damping resistor is in parallel with the series circuit comprising the horn attenuating resistor and voice coil. Am I correct that a first cut would be a damping resistor that when in parallel with the attenuating resistor and coil circuit would result in an impedance seen by the rest of the crossover that is about the same as the nominal horn impedance at the crossover frequency? As an example: If we want a 6 dB attenuation and the horn has a nominal Z of 8 Ohms then the attenuating resistor would be 8 Ohms and the damping resistor would be 16 Ohms for a local network impedance of 8 Ohms. I realize that first cut values are temporary and subject to change to get the crossover spot-on by a whole lot of measurements and listening. But is the above method the right way to get to the first cut? Or am I missing something? Could you explain? Thanks

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Subject: Re: Horn Damping Resistor  
Posted by [Wayne Parham](#) on Mon, 09 May 2005 21:03:14 GMT  
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You'll need to model the circuit in Spice. The damping resistor sets the load on the tweeter circuit's high-pass filter, and therefore sets its Q. Components R1, R2 and C1 do three things: They attenuate the signal for level matching, they provide conjugate response to compensate for the tweeter's falling response, and they set the Q of the high-pass filter to provide a small amount of peaking, just enough to make the first couple of octaves flat. The resulting curve has a shelf of flat response that is followed by an area of rising response, like this:

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Subject: Re: Horn Damping Resistor  
Posted by [aborza](#) on Tue, 10 May 2005 01:41:57 GMT  
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Wayne, I understand the attenuation and the conjugate rising response circuits. Those are straightforward. On the other hand, the Q adjustment and selecting a starting point for R2 (the damping resistor) are out of my reach. I do not use Spice. So I will try to iterate the problem in CALSOD and see where that gets me. If nothing else, I will let CALSOD optimize against a good target and see if it will arrive at an appropriate R2. Perhaps there is more than one way to skin this cat. Thanksab

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Subject: Re: Horn Damping Resistor  
Posted by [Wayne Parham](#) on Tue, 10 May 2005 07:00:35 GMT  
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You can download a copy of Spice at the link, and that will give you another modeling tool.

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Subject: Re: Horn Damping Resistor  
Posted by [aborza](#) on Tue, 10 May 2005 13:26:43 GMT  
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Wayne,WOW! Spice and your Spice models. THANK YOU!Now all I have to do is learn to use Spice and learn to write Spice models for drivers.Writing nodal circuits is not a problem. I have to do that with my version of CALSOD anyway. CALSOD can accept measured FR, IMP and Phase data directly. And if you do not have Phase data, it will recreate it. I am not sure how Spice deals with measured results. But I will check it out.Thanks again.ab

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