Subject: Bypass capacitors in compensation networks
Posted by Wayne Parham on Fri, 24 Jan 2003 07:46:25 GMT
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The goals of components R1, R2 and C1 are to match the woofer and tweeter levels, and to provide a transfer function that is the conjugate of the driver's power response. This may sound like a mouthful, but bear with me. What it essentially means is the response curve output from the tweeter circuit is exactly the opposite of the respoonse curve of the raw compression driver, as it is when mounted on a plane wave tube. This works very well on horns that provide constant directivity because the on-axis sound is the same as the raw driver. Off-axis within the pattern too, for that matter, because that's what constant directivity means.The thing is, Altec 811 horns are not CD. They have collapsing directivity which provides some acoustic EQ on axis. Because of this, you don't want as much rising response from the tweeter circuit. You'll need the level matching, but not nearly as much top-octave compensation. They can use a little, just not as much. So capacitor C1 should be smaller when using Altec 811 horns. I probably wouldn't even install it.Something else worth noting is the larger you make C1, the less the R1/R2 voltage divider does its job. What we want is for the attenuation circuit to lower the midrange band and then as frequency gets higher, the bypass capacitor acts to allow more and more energy to couple across unattenuated. So if you make C1 too large, it couples energy at a low enough frequency that the attenuator is completely bypassed. That's not what you want.For example, let's consider a CD horn crossed over at 800Hz needing 10dB attenuation. This attenuation can be gradually remove at high frequency to compensate for mass rolloff. You want a capacitor that begins to bypass at 3kHz to 4kHz, no lower. But if the capacitor is made so large that it begins to bypass at say 400Hz, then you can see how the whole compensation network is defeated. You might as well hook the tweeter up directly, without any compensation circuitry at all, because the circuitry is effectively shorted by the overvalued C1 capacitor anyway.