Subject: Wayne, please review piezo attenuation values
Posted by Patrick Kopson on Mon, 20 Jan 2003 01:53:45 GMT
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I am a bit confused by what you wrote in a recent post:"You will use a capacitor in series with the tweeter. Since the tweeter is primarily capacitive, a series capacitor forms a voltage divider rather than a frequency splitter. There is no filter function when components having the same reactive properties are connected together. So a capacitor/capacitor network forms a simple voltage divider, much like a resistor/resistor network does.For a KSN-1038, you can expect attenuation in the following amounts:1.0uF 1dB0.5uF 2dB0.33uF 3dB0.22uF 4dB0.1uF 7dBThese values are what you'll get if you connect a capacitor in series with the tweeter, and do not use any other components. That gives broad-band attenuation only, and does not act as a crossover."This seems to say (to me), "smaller series capacitor yields greater attenuation." Taking that to the extreme, I think it implies, "no series capacitor (a simple wire) yields total attenuation." This last bit is clearly not true; hence my confusion.Was there a mistake in your recent post, or am I missing something?Thanks,Patrick

Subject: Re: Wayne, please review piezo attenuation values
Posted by mollecon on Mon, 20 Jan 2003 02:08:13 GMT
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I don't know if this will do as much of an explanation, but... If you perceive a capacitor as a resistor with a frequency dependent resistance (resistance falling with frequency going up) the higher values of capacitors have the LOWEST resistance, & the lower values the highest. So that explains why the low value resistor have the highest damping (in Wayne's table) - & the fact that a piece of wire, which in this case can be compared to a capacitor with an INFINITELY high value, don't dampen at all. Hope I helped you a little here :)

Subject: Capacitors
Posted by Wayne Parham on Mon, 20 Jan 2003 05:19:20 GMT
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As capacitance is made smaller and smaller, the more it resembles an open circuit with the gap between conductors growing larger and larger.A capacitor is a very simple device. It is two plates separated by a small gap. The larger the surface area of the plates and the nearer they are together, the greater the capacitance. Capacitors store energy as electrostatic tension, similarly to the way a balloon stores energy that has been transferred to it by rubbing it with another insulator, like your hair.When energy is transferred across the gap in a capacitor, it is because of movement in the potential of charge. A little mind experiment can be used to demonstrate what is happening in a capacitor to couple the charge across it. This is someting almost all of us have done at one time or another.Think of charging a ballon with electrostatic energy by rubbing it on your hair. Then take this charged balloon and move it near to your head. When the balloon is brought near, your hair stands up and when the balloon is taken further away, your hair sets back down again. In a capacitor, a very similar thing happens in the gap between plates when a signal is applied. When an AC signal is applied, the potential moves on one plate in relation to the other and creates an effect that is exactly the same as physical movement causes in the balloon experiment. A moving voltage is applied to one plate of the capacitor, which makes the potential between plates change. This changes the amount of electrostatic energy between plates, and couples a moving charge onto the opposite plate. So the charge on the other plate is made to move just like the way your hair would move when the ballon is brought nearer and further from you. As you make capacitance smaller, it acts more and more like a purely open circuit, having less ability to couple a charge across its plates. The larger a capacitor is, the more it acts like a short across its terminals. Of course, for DC, no capacitor will act as a short, but an infinitely large capacitor will take an infinitely long time to charge and to discharge, so in fact, it acts much like a short circuit.One might think that no matter how large a capacitor is, it cannot act to short a DC source, and this is true. There is no connection between terminals, so no DC current can flow. But when a circuit changes states such as during power on - when DC is applied across the capacitor - for that moment a signal movement is applied. For that moment, it is not a direct current. And very large capacitors take such a long time to charge that they may act like a short circuit to a battery or DC power supply for several seconds, even minutes. That corresponds to a very low frequency, almost DC-like. And it also corresponds to very low attenuation, since it grows nearer and nearer to a short circuit.This makes it easy to see why large values of capacitance offer less attenuation when placed in a series voltage divider configuration with another fixed value capacitance, such as a piezoelectric tweeter. And the converse is also true, that small values of capacitance introduce greater attenuation when placed in series in the circuit. It is important to mention that if any shunt resistance is used, the circuit changes into a filter rather than an attenuator, so other things come into play. But for a simple voltage divider, smaller values of capacitance make greater amounts of attenuation for a fixed capacitive load.

Subject: Thank you both. . . . I was missing something important.
Posted by Patrick Kopson on Mon, 20 Jan 2003 12:34:24 GMT
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