Subject: Origins of Power
Posted by Adveser on Sat, 27 Nov 2010 19:51:02 GMT
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Audio Fred posted this:

AudioFred wrote on Fri, 26 November 2010 06:04Adveser wrote on Thu, 25 November 2010 23:40My two cents: The resistor idea sounds like the most logical idea and actually directly addresses the problem expressed.

It's also the least expensive solution, because a 10 watt resistor costs about $1.25. Get a couple of one ohm resistors and a couple of 1.5 ohms and try both.

(sorry if this a bit confusing in context, I was going to post it in the post it came from but it became too off topic)

It raises a question:

10 watts as in it's power rating? I haven't really seen anything bigger than a watt, so those must look strange and big.

I get the feeling that the load of the magnets of the speakers are providing the majority of the current, is that right by conventional physics at least?

I know for a fact that in the 4d physics model of electricity that magnetic fields are providing virtually all the power. AC motors for example do not contribute a singe watt of power to the design, the magnetic field they produce provides it and whatever vector flux leaks out of the vacuum is what we get for power. This is the real model of physics, but is extremely complicated and unobservable to us. In other words we are using very outdated models of physics currently because it is pragmatic and works within our scope. Just like a flatworm that doesn't experience gravity in his word, but we see it. If the flatworm made up his own physics, he would ignore gravity and we would laugh at how juvenile and misguided his knowledge is.

ahem

So the amplifier sends a line level voltage and a tiny bit of current to the speaker and the voltage amplifies the current in the speaker. Something like that.

No amp "outputs" 100watts or it would blow up every component in the signal chain. That is a flat out lie. The amp outputs line levels and the speakers are powering the acoustic output.

What are your thoughts?

Subject: Re: Origins of Power
Posted by AudioFred on Sun, 28 Nov 2010 01:58:21 GMT
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Adveser wrote on Sat, 27 November 2010 13:51

10 watts as in it's power rating? I haven't really seen anything bigger than a watt, so those must look strange and big.

Ten watt wirewound resistors are fairly standard in speaker crossover networks. Higher wattage ratings are used for the resistors in certain parts of the woofer crossovers in pro-type speakers that are intended to be driven continuously at high power levels. For example, a 100 watt resistor is recommended for use in the impedance compensation circuit of the three pi speaker.

http://www.parts-express.com/dayton-non-inductive-resistors.cfm
http://www.parts-express.com/pe/showdetl.cfm?Partnumber=019-020

Subject: Re: Origins of Power
Posted by AudioFred on Sun, 28 Nov 2010 13:56:02 GMT
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Adveser wrote on Sat, 27 November 2010 13:51

So the amplifier sends a line level voltage and a tiny bit of current to the speaker and the voltage amplifies the current in the speaker. Something like that.

No amp "outputs" 100watts or it would blow up every component in the signal chain. That is a flat out lie. The amp outputs line levels and the speakers are powering the acoustic output.

What are your thoughts?

Wayne P, this is stuff that a mere MBA can't unserstand, but which EE's delight in. What are your thoughts?

Subject: Re: Origins of Power
Posted by Wayne Parham on Sun, 28 Nov 2010 16:47:58 GMT
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Loudspeakers are moved by the interaction of the fixed magnet and the voice coil's magnetic field. The voice coil is an electromagnet and its strength is directly proportional to current. Current is directly proportional to voltage, so you can really talk about either, if you disregard impedance fluctuations.

The impedance curve is what makes things a little bit complicated, since the resistance of the wire, output impedance of the amp and any insertion losses in the crossover all create a series resistance which forms a voltage divider with the loudspeaker, and this can create response anomalies. There is a filter function in the transfer curve as a result.

Most people familiar with the basics of loudspeakers expect a coil to impart a low-pass transfer function, a capacitor to make a high-pass curve and a coil and capacitor to create a band-pass bump. But what is counter-intuitive to many hobbyists is how a pure resistance can also create a filter function.

resistor in series to lower the SPL output, you would expect 6dB drop in output, right? That's true

region, where the diaphragm's mechanical resonance "bucks" the drive current and increases

now, with the driver getting more voltage across it. The reduction in SPL output is now only 2.4dB, much less than the 6dB drop across the rest of the band. So it gets a bump in response at resonance, one that is quite easily measured and definitely audible.

The documents below go into this in more detail. The "Crossover Electronics 101" handout is what I use at my audiofest seminars, and it's a handy cheat sheet of forumulas. It also shows the circuits we hook up during the demonstrations, and the response curves they generate. We listen to music played through those circuits, so you can hear what they sound like and compare that to what is shown on the graphs. Lets people get an idea about what audible effects are produced and how a graph "sounds". And the "Speaker Crossover Document" is a study/demonstration document that shows various crossover circuits employed in loudspeakers, particularly those used in constant directivity and waveguide designs. It has become kind of the reference for all of us building what are now often called "waveguide" loudspeakers.
Crossover Electronics 101
Speaker Crossover Document