
Subject: Re: Kind of crazy idea for a flanking sub processor

Posted by [andy_c](#) on Wed, 06 Mar 2013 22:31:05 GMT

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zheka wrote on Wed, 06 March 2013 13:07

Is your system purely for stereo playback and the receiver you are using does not have bass management capabilities? I am trying to get a better idea about the problem this circuit is supposed to offer a solution to.

Yes, my system is stereo-only. I do have an AVR that I use as a DAC/preamp combo (no subwoofers yet). The idea is that I can only place my subs in positions normally suitable for flanking subs, and I have some problems in the 100 Hz - 200 Hz area. I didn't want the subs to operate in mono, as I may cross them over to the mains at 150 Hz or so, maybe even higher. But I didn't want them to operate in stereo either, because below 100 Hz or so, I want as many subs participating in the low-frequency output as possible, to get smoothest response and highest output too. If there were, say, a 60 Hz signal panned all the way to the left or right, I'd nonetheless want both left and right subs to reproduce it. But a signal at, say, 200 Hz panned all the way to the left or right should go to its designated output and not the other channel.

So the idea is to have a circuit with left and right inputs, and left and right outputs. Roughly speaking, the outputs should be mono below some frequency (say 80-100 Hz) and stereo above that. In reality, the transition is gradual, but sudden enough such that the crosstalk is about -30 dB at 200 Hz when the transition frequency is set to 100 Hz.

zheka wrote on Wed, 06 March 2013 13:07

If your receiver offers bass management then would not a mixer solution like the one Darrel proposed lead to essentially the same results? And if you planning to use it in a multichannel set up then how the LF signal from other channels and LFE would get integrated?

Darrel's idea is very clever. In fact, after seeing it, I realized I can simplify my circuit a lot. I don't have the changes up on my web site yet, but it does look a lot more like his concept now.

The only reservation I would have with that particular approach is due to the typical crossover implementation in AVRs. The low-pass is typically a fourth-order Linkwitz-Riley filter, but the high-pass is usually a second-order Butterworth (half of a fourth-order Linkwitz-Riley). The original idea behind this was that the mains were assumed to be a closed box with $QTC=0.707$ (Butterworth), and the crossover frequency would be chosen to be the f_c of the mains, such that the second-order high-pass characteristic of the electrical filter, plus the electroacoustic second-order high-pass characteristic of the mains would combine for a net fourth-order electroacoustic high-pass. But when the low-pass and high-pass signals are combined purely electronically, that assumption is violated. I'm not sure what kind of ripple that would cause in the summed output, but I'll put it into a simulator to check it out.

The only solution I can think of for flanking subs in a MCH system is to set the left and right mains as large, and use the flanking subs to process the bass of those channels only. Then the distributed subs would be used for LFE and bass from the other channels. This leaves the front center speaker as being treated differently from the left and right fronts. It's a difficult problem for the MCH scenario.
