Subject: Re: Powering my PI Speakers
Posted by Wayne Parham on Sat, 18 Feb 2012 00:49:13 GMT
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I think some would go as far as doubling the amp power level, but remember that this is all about making sure the amp doesn't clip. Your speakers will handle the rated power, all-day, every day. But if you go much beyond that, the speakers will be the limiting factor.

Also remember that the decibel difference provided by doubling of power is only 3dB, so it isn't like you will want to push anything to the limits anyway. It just doesn't buy you very much. By the same token, if you aren't at least doubling power, you're not doing much. Either way - the point is - Stay back off the limits. Get enough gear for the SPL desired, and don't get near the limits.

I've run pretty serious power with Crown or QSC amps, and knew that I wasn't even close to the rails. I've also run 100 watt home hifi receivers and amps, my favorites being from Yamaha and Harman-Kardon. And I've run flea-power tube amps, some with as little as 2 watts but most often in the 10 watt range. A good 10 watt SET amp has plenty of power for home hifi or home theater. Naturally, you'll need more power than the flea-power tube amps but my point is any of those setups can sound good.

The only time the system sounds bad is when the amps are pushed past their electrical limits, or when the speakers are pushed past their mechanical limits. You can't possibly push the speakers past their mechanical limits with the power levels you've shown, but you can push the amps past their electrical limits. If you increase amplifier size, you might be able to push the speakers past their limits, but you probably won't be able to max out the amps. So it's all about the limits, and what you hit first.

In my opinion, it is reasonable to size the amps max power to the speakers limit somewhere between a ratio of 1-to-1 and 2-to-1. I know that doesn't help you much, because it means choosing between 600 watts for the mains or 1200 watts, which is a pretty wide spread. Same for the surrounds, it's 100 to 200 watts, a wide spread. But these are reasonable numbers. With an amp sized the same as the speaker's thermal limit, you'll clip the amp before the speakers strain. When the amp is twice as large, you'll be able to push the speakers beyond their limits.

I will say that a stressed speaker sounds a little different than a clipping amp, but I'm not sure which I prefer. Both sound harsh, but different. The speaker pushed past its excursion limit sounds like it's gargling, then in extreme cases it begins to clack. The amp pushed past its limit sounds grainy and raspy. There is a third limit, when the speaker reaches a thermal limit, but you can't usually hear this. It just doesn't get as loud as it should. The real first notice of a speaker pushed too hard is when it exceeds mechanical limits.

This is why high-pass filters are helpful. They protect the speaker from reaching its excursion limits. So if you plan to push them hard, high-pass the mains at the Helmholtz frequency. Don't go crazy with this though, because we do want modal smoothing. So don't high-pass the mains at 100Hz like you might do at an outdoor even or larger room. We need the modal smoothing, so let the mains run all the way down to the Helmholtz frequency.