

Re: How would you calibrate a sound level meter RESTATING THE PROBLEM

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From: mike (spamme0_at_juno.com)

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Date: Tue, 31 Aug 2004 14:54:34 -0700

Norm Dresner wrote:

> *I originally wrote:*

>

> *"Norm Dresner" <ndrez@att.net> wrote in message*

> *news:v3UWc.512527\$Gx4.104653@bgtmsc04-news.ops.worldnet.att.net...*

>

>> *Any microphone with a suitable amplifier and an AC voltmeter makes a sound*

>> *level meter. Suppose I wanted to make one to set up a stereo system where*

>> *the input is single tone at a time and the goal is to adjust a*

>

> *multichannel*

>

>> *equalizer to get approximately overall flat response from voltage/power in*

>> *to sound level out. I don't need OSHA or any particular "weighting"*

>

> *scheme.*

>

>> *Can someone give me a rough idea of the sequence necessary to calibrate*

>> *something like this?*

>>

>

>

> *and several responders cautioned me that room acoustics would make the*

> *measurement process at best questionable.*

>

> *But perhaps I simply gave a bad application of a perfectly good instrument*

> *so let me try again. I have several speakers of differing*

> *acoustic-electrical efficiency by which I mean that in a free-field*

> *environment the acoustic energy output per unit of electrical energy input*

> *differs -- the usual measurements come from the factory in the form of dB*

> *SPL re 1 meter per 1 watt input but those details are unimportant. What is*

> *important is that I have several speakers, each with a restricted frequency*

> *range, which I want to use to create an array with flat response, i.e. the*

> *acoustic energy output per unit electrical energy input is approximately*

> *constant across the relevant bandwidth. This is usually done with*

> *cross-over networks which are in reality nothing but electrical bandpass*

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- > *filters. But in terms of matching the acoustic energy from the various*
- > *speakers I also need to attenuate the response of some of them relative to*
- > *the others. In general, tweeters are much more energy efficient than*
- > *woofers, sometimes as much as a decade in power. To do the matching I want*
- > *to be able to measure the acoustic energy out of each speaker as a function*
- > *of its electrical input. SO ...*
- > *How would one go about calibrating a sound-level meter?*
- >
- > *Norm*
- >

You're still focusing on the wrong problem.

How do you intend to attenuate the drive to the speakers? Unless you plan to have an amplifier for each one, your attenuator is gonna really mess things up. That's why purists don't like passive crossovers. Attenuators are much WORSE.

There are phase shifts. In the crossover, in the attenuator, due to the relative placement of speakers. You need to measure amplitude and phase from the listening point to all speakers. The more speakers you cobble together, the smaller the sweet spot will be...well, I guess there's a limiting case with an infinite number of speakers in an infinite space that might work well...

Try this experiment. Put pink noise into your speakers. Use the sound card spectrum analyzer on the microphone. Experiment with the high frequency response as you translate/rotate the microphone in space. Also see what happens if you put a small flat plate behind the microphone. Just the shape of the microphone and any box that it might be in can have major effects on the measurement.

Many have gone where you're going. Some have never come back ;-)

Having said all that, it appears that you won't be satisfied until you calibrate your microphone.

If you're in Portland, Oregon, I have a General Radio Type 1562 Sound-Level Calibrator that we could try out. It put out sound, but I've never felt the need to use it.

mike

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Return address is VALID.

Wanted, 12.1" LCD for Gateway Solo 5300. Samsung LT121SU-121 Bunch of stuff For Sale and Wanted at the link below.

Compaq Aero floppy,ram,battery.

MINT HP-41CV, 2-METER AMPS, 200CH SCANNER

<http://www.geocities.com/SiliconValley/Monitor/4710/>