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WORKING WITH SPEAKERS YOU ALREADY HAVE

You can certainly measure speakers that you already have with Speaker Workshop. Often times, commercially made speakers may not be designed well. You can "back measure" speaker box parameters. Measuring the volume of the box is fairly easy if it is a closed box. The following spreadsheet will assist with this:

"Volume estimator1.xls"

Ported boxes require a little more savvy. You can measure what they are tuned to with the following spreadsheet:

"Tuning Frequency Calculator.xls"

Using this information along with your driver measurements, you will be able to see if the box is appropriately sized and tuned. You can plug your numbers into a program like Unibox to evaluate predicted low frequency response and modifications that might be made to improve things.

Using Speaker Workshop, you can measure the system and experiment with different amounts of stuffing or with different electronic crossover values. You could even measure the individual drivers and design a completely new system around them !

CALCULATING EFFICIENCY

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SpL is a very misused driver parameter. Manufacturers do not necessarily measure SpL at consistent distances. You can run some simple equations and come up with a comparative measure of just how efficient a driver is at converting electrical power to acoustic power with a subsequent fair estimate of SpL. The relationship is based upon Qes, Vas, and Fs for woofers and Bl, Mms, Sd, and Re for tweeters. A spreadsheet will help you to estimate a more realistic comparison between drivers. Realize that more power generates more heat. As the coil temperature rises, so does the DC coil resistance, and as a result, the loudspeaker becomes less efficient.

efficiency1.xls

USING A VARIABLE L-PAD

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There are two conditions under which you might use a variable L-pad:

1. You can permanently insert a variable L-pad to allow for adjustment to different environments. A potential problem in doing this is that this reportedly provides a less stable value than using a fixed L pad.
2. You can calculate fixed L pad values via acoustical measurements or by adjusting by ear.

The following steps are followed to connect and measure:

1. Turn the shaft of the L-pad completely counter clockwise.
2. With a DMM, measure the center tab to each outside tab.
3. Connect the tab that measures "shorted" to the crossover tweeter + output
4. Connect the middle tab to the tweeter
5. Connect the high resistance tab to the ground side.
6. Tweak by ear or measurement.

If you are going to replace the variable L-pad with a permanent L-pad, measure the L-pad as follows:

1. From one outside tab to the middle (the one lower in value) is the series resistor.
2. From the other outside tab to the middle is the parallel resistor.

LISTENING TESTS

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Excerpt from John Atkinson
November, 1998
Stereophile Magazine

Musical and technical accuracy—how good? How close is the loudspeaker to reproducing an overall sound that will convince its listeners they're in the presence of live sounds?
Frequency range—bass and treble extension. Does the sound have its full complement at the frequency extremes? Or has, say, the designer discarded ultimate bass extension, perhaps to maximize midrange clarity or overall power handling?
Frequency balance—how neutral? Does the speaker have a natural timbre? If you play a recording of someone's voice, does it actually sound like that person's voice, or does it sound more like a combination of bass boom and a bat squeak? Is the presentation tilted-up at one or both frequency extremes? Is there a shelf effect present at one or more frequencies?
Response and balance anomalies—coloration. Do voices sound like someone is speaking through a megaphone or pinching their noses. Is there excessive sibilance on a female voice or too much chest tone on male voice? Can the sounds of similar but different musical instruments be distinguished? Or does the loudspeaker's own character make a violin sound like a viola, an oboe like an English Horn, a Fender Stratocaster like a Gibson Les Paul? With some chronic loudspeaker cabinet problems, it can almost sound as though someone is banging a xylophone along with the sound of the recorded instruments.
Clarity and transparency. How much detail can you hear? Do individual images within the soundstage sound sufficiently separate from each other, or do they seem more like spatial highlights emerging from a background of sonic soup?
Grain, hardness, and distortion. Does the loudspeaker sound significantly more distorted at high playback levels? *Stereo imaging precision*. When a dual-mono recording is played, do listeners perceive a narrow sonic object precisely midway between the loudspeakers, or do they just hear a vague, amorphous blob? Do central images stay centrally located at some frequencies but not others?
Soundstage width and depth. With appropriate recordings, can listeners hear acoustic objects precisely positioned anywhere on a two-dimensional grid defined by the loudspeaker and listener positions?
Dynamics (micro and macro). Are loud musical passages appropriately louder than the quiet passages (macro dynamics)? Can listeners hear subtle changes in one acoustic object when something else is playing very loudly (micro dynamics)? Does it all blur at high playback levels, or does it take being played loudly to make the music "come to life"?
Pace'n'rhythm. First defined by *Stereophile* contributor and UK reviewer Martin Colloms. Some loudspeakers clearly make the music sound like it's going slowly, while others make it sound like it's going faster, even though the recording's playing time and the music's tempo obviously cannot be affected by anything that a loudspeaker does.