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Subject: Smith and Larson - Speaker Tester

Posted by [Wayne Parham](#) on Sun, 20 Jan 2008 04:41:01 GMT

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I've been using the Smith and Larson Speaker Tester (actually WTpro) for a few weeks now and I really like it. I'm planning to do a pretty thorough write-up, at least in as much as I've used the system to verify my cabinets and optimize my crossovers. I purchased the system for the ICD because it is an extension of Spice. Since my crossovers were designed using Spice models, the Smith and Larson system is a natural progression for me, allowing me to use ZMA (measured impedance) files in place of equivalent circuits for loudspeaker loads. But for right now, I want to write a few of my initial comments. The Smith and Larson system uses an outboard digital/analog box that connects to the computer using a USB cable. It serves both as the ADC/DAC and the connector jig box. It has a small signal output port for doing impedance measurements with built-in sense. This is where you connect a speaker to do impedance measurements and/or T/S measurements. It uses a pretty low signal level, just a few millivolts. There is also high level port, which is designed to be used with an external amplifier. You connect an amplifier output to one pair of connectors and the speaker under test to the other, and this way the box can sense current and voltage passing through. The high power port is rated at 200 watts RMS. On the other side of the box, there is right and left line outputs, right and left line inputs and a pair of microphone inputs. Measurement microphones are included. When I first got everything setup and connected, I connected a speaker to do an impedance test thinking it would be the easiest thing to do. Right away, I noticed it thought the speaker was open. The connections were all right, the speaker was good. So something was wrong. Something told me the problem was Vista. If you are running Vista and something doesn't work, blame it on Vista. Chances are, you'll be right. I called Keith Larson and told him I was having trouble with the low level port doing impedance measurements, and he told me to check the connections and what not, of course. I proffered the information that I was running Vista, sort of apologetically knowing that was probably throwing a wrench into the equation and Keith promptly told me that Vista has some issues and while it can be made to work, it might take new drivers. Best to back up to XP, so I did. That did it, impedance worked just fine. After doing a few measurements, I wanted to look into the Vista problem a little more, and after some research, found that the audio drivers for USB have been completely rewritten. It's not just new code, it's a whole new standard for the way the hardware is accessed. At first, I thought maybe it was going to be a pretty big deal to get the system to work with Vista drivers, if it could even be made to work at all. But after reading a little more, I began to think that even though it was different under the hood, it probably should work. So I began to look at configuration options. Without going through all the details, the solution is actually pretty simple. The default setting is mono, but the Smith and Larson tester needs the microphone channel to be set for stereo. Once the default value is changed, the Speaker Tester worked just fine on Vista. So I phoned Keith and told him that, and grabbed a few screen shots of the screens you need to go through to set it up. He is planning to put that in future versions of the user's manual, so check there if you are using Vista. If you need to know how to setup under Vista right now, E-Mail me and I'll send you the scoop. One of the cool things the S&L Speaker Tester Pro does is to use the T/S measurements it makes and model a box with them. It's like having BoxPlot built-in. You can measure the T/S specs and then rather than typing them into a modeling program, the S&L system simply imports them into its own internal modeling program. You can start designing boxes right then and there, without going to an external program to do it. Better still, once you've built the box, you can measure it and the S&L system will use the actual box measurements to

make an even better model. It measures fb for sealed boxes or fl, fb and fh for vented boxes and then plots the response of the system using these values. This is a very accurate way of modeling and will give a better indication of the cabinet's bass response than acoustic measurement will, if done indoors. I've gone through about half of my line of speakers so far and verified the cabinets with the Smith and Larson system. No surprises there, but it was a fun way to warm up to using the system. It is definitely a useful tool and gives a DIY'er excellent visibility. The really impressive part of the system to me is the ICD. That's what I bought it for. I have LMS, and it's great for measuring response. It is perfect for knowing what a finished loudspeaker does. But it isn't really a design tool. The ICD is. And it's coooool. With the ICD, you use a Spice model of the crossover and it becomes an active crossover. The S&L system uses DSP to make a digital filter that exactly emulates your Spice model. So you can try a crossover, measure acoustic response, and then change the crossover and measure again, just by changing a few lines of code. This thing is sweeeeet!

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [palesha](#) on Mon, 12 May 2008 05:31:48 GMT  
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Respected Wayne Parham, Now u hv woofer tester pro & LMS. For checking thielsmall which is better? In LMS there is LTD & TSL methods to test thielsmall by new method. They claim that LTD is the most accurate for measuring thielsmall parameters. It is based on Impedance by constant voltage method. What is ur opinion about thielsmall parameter testing results from woofer tester pro & LMS ? hv u compared?

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [Wayne Parham](#) on Fri, 10 Jul 2009 03:06:08 GMT  
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Sorry, I didn't see this post until now. Don't know how I missed it.

The LMS system is great for doing outdoor sweeps. It is rock solid and dependable, I can always trust its results. I also like the tool that produces polar charts from a series of off-axis response curves.

However, for development work, I like the S&L system better. It has so many built-in tools. The T/S measurements are reliable and easy to use. The WTPro also has the ability to go a step further, to allow you to measure the speaker in the box and to tell you the anechoic response. It's a handy way to know what the loudspeaker will do in terms of bass response without having to lug it outside. You can then design the crossover with the help of the ICD. The WTPro is a very useful development tool.

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [Juniorjbl](#) on Tue, 03 Jan 2012 03:34:16 GMT  
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I too have a WTpro. I just wish that there was tutorial to aid in getting started. I know it is best if you have previous experience doing measurements but I need to start somewhere. Anyhow does anyone here using one of these even a wt2 have any good reading or tips that one could share?

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [Keith Larson](#) on Sat, 07 Jan 2012 15:27:44 GMT  
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Look in the main directory for WTPRO\_USERGUIDE.PDF and WTPRO\_QUICKGUIDE.PDF. The help file is the same PDF that opens from the programs Help pull down or F1 hot-key and the quick guide shows some very basic tests. It also reinforces the idea that you can save and restore the state of the tester. Basically an easy way to share data, tester setup, or a demo.

One of the things you want to keep in mind about audio testing is that in almost all cases two measurements are being compared. In general the measurement and reference are picked from the first tab of the signal control window. For example,

Impedance = Voltage/Amperage  
o LoZP and HiZP will automatically set this up

SpeakerResponse = ResponseFromSpeaker/ResponseWhatWentToSpeaker  
o We also want dB, so this becomes dB(A/B) where  
A = the microphone signal  
B = Line signal going to your amplifier (flat response assumed)

Or, optionally for a WTPRO, the HiZP voltage, the actual signal into the speaker.

Notes:

The Line in-out patch cords are normally left connected providing the 'B' side of the equation mentioned above. Removing the patch cord allows other devices to be connected or tested. IE, external pre-amps.

If you are wondering about signal routing or levels, open the FFT/OSC window. The spectrum analyzer is a great way to see whats happening. For example, an open circuit in the LoZP will produce a square wave that is full of harmonics.

Hope this helps,  
Best regards,  
Keith Larson  
[www.woofertester.com](http://www.woofertester.com)  
[tech@woofertester.com](mailto:tech@woofertester.com)

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [Juniorjbl](#) on Sat, 07 Jan 2012 18:02:41 GMT  
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Thanks Keith

I will be messing (learning) this and next weekend!!

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [gofar99](#) on Sun, 08 Jan 2012 01:39:23 GMT  
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Hi What does it cost?

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [Wayne Parham](#) on Sun, 08 Jan 2012 01:52:40 GMT  
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Shameless plug from an unaffiliated but happy customer:

The Smith and Larson testers are awesome. Entry level is around a hundred bucks, and does mostly electro-mechanical specs for drivers. You can use the WT2 to tell you the T/S specs of your woofers.

But don't stop there. S&L sells full-featured measurement systems that allow you to import Spice models of crossovers. That, combined with acoustic testing, give the most full-featured loudspeaker development environment I've ever seen. Price for that model is about a grand, but it puts you way ahead of the pack. I'm serious, it's that good.

The thread below has a video showing me making measurements using a S&L WTPro system. What you see on the screen is the S&L system.  
Crossover optimization for DI-matched two-way speakers

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Subject: Re: Smith and Larson - Speaker Tester  
Posted by [Keith Larson](#) on Sun, 08 Jan 2012 02:19:05 GMT  
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The 'getting started' advise I would give is not diving too deeply into the advanced capabilities. There are a lot of advanced features and understanding them will be a lot easier when you know how the underlying system (signals and operational modes) works.

Best regards,  
Keith Larson

