

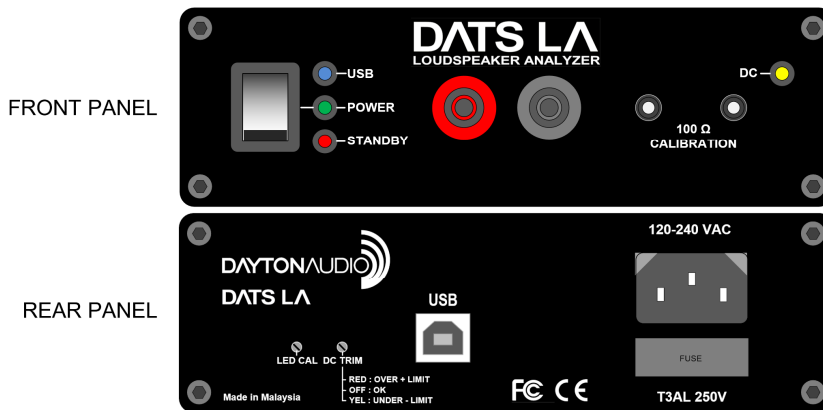
DAYTONAUDIO

DATS™ LA

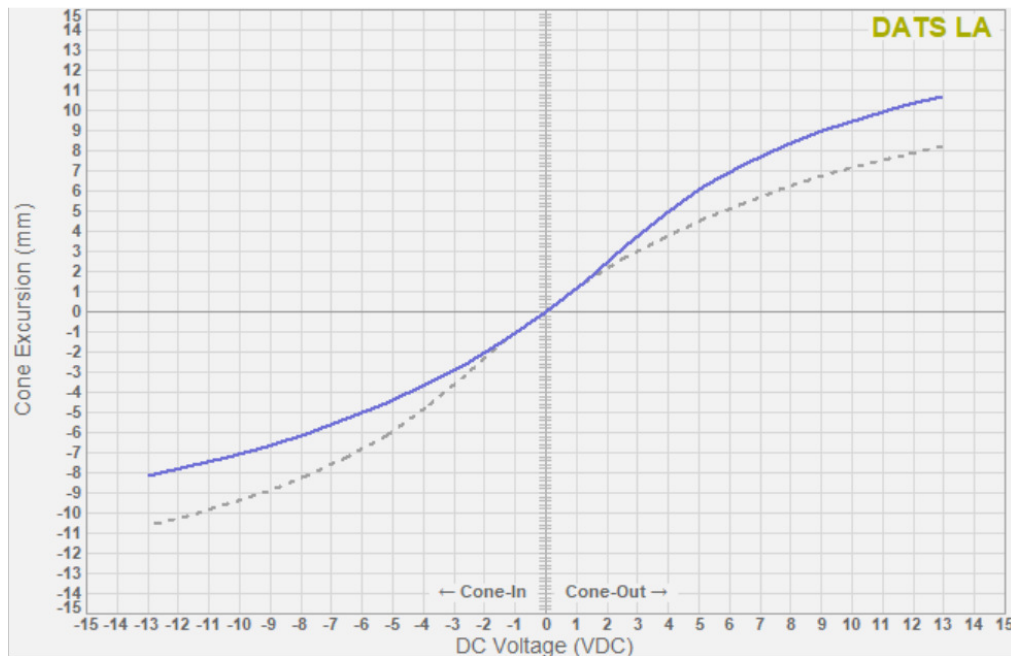
LOUDSPEAKER ANALYZER

Introducing DATS LA

While DATS V3 was busy becoming the first choice in speaker testers, Dayton Audio has been busy creating the *next* generation Loudspeaker Analyzer: DATS LA.



Like DATS V3 the new loudspeaker analyzer consists of both hardware and software that work together as a measurement system. But unlike DATS V3 the LA system employs a new DC coupled power amplifier under the software's control. Even more, this AC/DC power amp (~100W) enables an all-new patented method of measuring loudspeaker non-linearity and symmetry over a wide power range. Seen below is a typical plot of a displacement vs. DC voltage. The symmetric opposite is shown as the dashed grey line for comparison.



Note that when this driver's excursion is below 2 mm either way the response is nicely linear and symmetric. But as the excursion increases beyond 2 mm the excursion becomes more non-linear and shows greater excursion in the outward direction than inward. The difference between the two curves reveals the asymmetry at a glance.

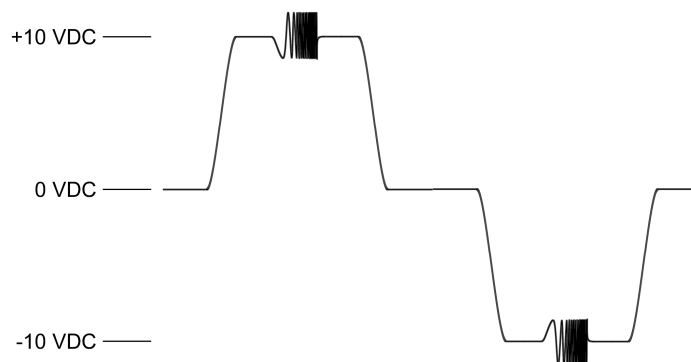
DC Coupling in DATS LA

It is unusual in the audio world that our amplifiers pass DC (direct current) from input to output. Rather it is typical that audio amplifiers pass AC (alternating current) signals but have a low frequency limit appropriate for their application, typically in the range around +/- 2 octaves of the nominal human low frequency hearing limit of 20 Hz (i.e. 5 Hz to 80 Hz). Blocking DC is normally a "requirement" for power amplifiers that will be connected directly to loudspeakers as DC voltage and resulting current can easily damage a speaker if not managed carefully. So, while most audio power amplifiers, preamplifiers and processors are designed to only pass AC (alternating current) signals, DATS LA is designed specifically to pass both DC voltages and AC signals.

The Symmetry Test

As a loudspeaker test system DATS LA's unique Symmetry Test employs DC offsets to displace the speaker cone while measuring speaker parameters using a brief audio sweep superimposed upon the DC offset. This new test reveals speaker non-linearities in each direction of cone displacement. After the multiple sweeps are complete the software combines parameters from the set of sweeps and displays a set of graphs showing how the various parameters vary with cone displacement. To the extent that each parameter graph deviates from a straight line that parameter is said to be "non-linear" (not a line). Typically, we see speaker parameters appearing to be linear when the cone is close to zero offset and becoming more non-linear (curved) as the cone moves away from its rest position.

While DATS LA can serve as a high-powered version of DATS V3 it is much more than that. Most importantly DATS LA's new (patented) symmetry test uses multiple sweeps to reveal how speaker parameters change with cone position. It works by first displacing the cone using some exact voltage and then emitting a short sweep to capture the impedance response at that offset. Then the cone is returned to its rest position while the impedance is calculated and parameters are extracted and saved. Then the next test sweep is synthesized and sent to the speaker. This sweep cycle repeats for the specified number of sweeps in each direction of displacement. The test then continues using the chosen method for measuring the Vas related parameters. When all sweeps are complete the software uses proprietary algorithms to determine the cone displacement and parameters and plot them as a function of displacement. Here we see one sweep each way at a 10 VDC offset.



The Front Panel DC LED



In order to ensure the safety of speaker units under test DATS LA carefully monitors the DC offset of the internal power amplifier and illuminates a front panel LED whenever DC offset is outside the range of ± 150 mV DC (± 15 V DC). The LED illuminates RED for + offsets and YELLOW (as seen above) for – offsets. When the DC offset is within limits the DC LED is extinguished.

Most units will display the RED DC LED for a short time after power up while the offset settles to within limits. This is normal. The LED also illuminates during symmetry sweeps to indicate the polarity of the DC offset being employed.

DC Calibration

DATS LA hardware has been carefully calibrated at the factory and should not normally require calibration by the user. However, should the front panel DC LED remain illuminated (red or yellow) after the unit has had a few minutes to stabilize then you can restore calibration via a trim adjustment at the rear panel.