SpeakerLAB®

Power Test Analyzer

Printed in Italy, May 2024

INTRODUCTION

ABOUT THE SYSTEM

SpeakerLAB Power Test Analyzer is the system dedicated to power test for audio transducers. PTA is addressed to the development of technology to limit the power compression, as the execution of tests to select the best component in comparison to more suppliers (pole plates, voice coils, different materials for parts assembly...), or to optimize the design of the transducer motor, for instance increasing cooling for convection, or also to validate samples for a production line. PTA analyzes the physical limits of a transducer offering the competence to select the proper solution for its application. PTA is composed by Hardware (100% recyclable chassis, 19 inch/1 Unit Rack) and dedicated Software. The system employ a user friendly software with an interview model, its automatic controls permit several presets, as power amplifier parameters and limits or signal crest factor analysis (measured directly on DUT terminals), giving the opportunity to create new, or directly select some standards for power test (Accelerated life test EIA-426B, IEC 268-5, Power Handling test AES2, routine to search for maximum power). The wireless connection permit to render cables free your computer from hardware also PTA Web Manager distributes remote test application via the SpeakerLAB Web Server, so it is possible to control test status from a remote pc or directly from your personal tablet or smartphone. PTA automatically generate database with HTML and PDF reports including all graphs, histograms and macro-values of the test. Designed by SpeakerLAB S.r.l. the PTA is exclusively built in Italy with internal components selected for premium quality and proven durability.

ABOUT THIS MANUAL

This User's Manual explains the **PTA (Power Test Analyzer)** software version 1.6.0.

CAUTIONS

All users should be continuously mindful of these words of caution while using the **Power Test Analyzer** system.
If not done properly, power testing at high power levels can be dangerous to the user and to the equipment:

- Only qualified and trained technicians should be allowed access to the system. A good understanding of electrical safety requirements is a must for anyone working with the system.
- Never make equipment connections while the equipment is powered up. Shut everything off (computer and all amplifiers) before installing or servicing the equipment.
- Never connect or disconnect loads on the amplifier output of any channel that is running.
- Never touch the speaker leads when the system is running. High voltages can be very dangerous and are potentially deadly.
- It’s preferable to use amps that are short circuit protected. The system has fast hardware protections and relative slow software protections, but when DUT fail the short out can cause damage to the amplifier, so the protections are ever well accepted!

LICENSE AGREEMENT AND WARRANTY

THANKS
Thank you for purchasing your SpeakerLAB PTA software. We hope that your experiences using PTA will be both productive and satisfying.

SpeakerLAB's WARRANTY
SpeakerLAB guarantees the PTA Hardware to be free from defective material and/or workmanship for a period of two year from date of sale, and will replace defective parts and repair malfunctioning products under this warranty when the defect occurs under normal installation and use - provided the unit is returned to our factory via prepaid transportation with proof of purchase (sales receipt). This warranty provides that examination of the returned product must disclose, in our judgment, a manufacturing defect. This warranty does not extend to any product that has been subject to misuse, neglect, accident, improper installation, or where the date code has been removed or defaced.
SpeakerLAB guarantees the PTA Software to the original licensee that the disk(s) and or electronic key(s) on which the program is recorded will be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of purchase. If failure of the product components has resulted from accident, abuse, or misapplication of the product, then SpeakerLAB or third-party licensors shall have no responsibility to replace the disk(s) or key(s) under this limited warranty.

WARNINGS AND LIMITATIONS OF LIABILITY
SpeakerLAB is not liable for any damage to speakers, amplifier, or any other equipment that is caused by negligence or improper installation and/or use of the PTA system. SpeakerLAB will not assume liability for the recovery of lost programs or data. The user must assume responsibility for the quality, performance and the fitness of SpeakerLAB software and hardware for use in professional production activities. In addition to the foregoing, you should recognize that all complex software systems and their documentation contain errors and omissions. SpeakerLAB, its distributors, and dealers shall not be responsible under any circumstances for providing information on or corrections to errors and omissions discovered at any time in the product, whether or not they are aware of the errors or omissions. SpeakerLAB does not recommend the use of this product in applications in which errors or omissions could result in loss of life, injury, or other significant loss. You may not: (a) distribute copies of the program or the documentation to others, (b) lease, rent, grant sublicenses, or other rights to the program, (c) provide use of the program in a computer service business, network, time-sharing multiple CPU, virtual machine or multiple users arrangement without the prior written consent of SpeakerLAB, (d) translate or otherwise alter the program or related documentation without the prior written consent of SpeakerLAB.

This license agreement shall be governed by the laws of the state of Italy and shall inure to the benefit of SpeakerLAB, its successors, administrators, heirs and assigns or third-party licensors. For further detail of software license agreement read License.pdf file.

CUSTOMER SUPPORT

SpeakerLAB provides detailed electronic manuals and on-line help within the program as the primary source for user information and assistance regarding the use of this product. If these sources do not contain the answers to your questions, for technical problems, bug reports, or suggestions for future software enhancements contact SpeakerLAB via website: www.speakerlab.it. Technical support is free at this time; however, we reserve the right to charge for this service in the future as conditions, overhead, and support personnel requirements dictate. In the event that your PTA does need factory service, you may reach the SpeakerLAB Technical Services department for return instructions. A Return Authorization (RA) number must be obtained from SpeakerLAB Technical Services department. SpeakerLAB may not account for products that are returned without a Return Authorization number. Guidelines:

- Pack the product well for protection during shipment
- Include a copy of sales receipt, your name, return address, phone number and defect description with your return correspondence
- Call the SpeakerLAB Technical Authorization Services department for an outside of the packaging
- Ship the product prepared to SpeakerLAB. We recommend United Parcel Service (UPS)

SYSTEM REQUIREMENTS

PTA software is an extremely intensive numerical application. The program contains hundreds of numerical mathematics algorithms, some of which are extremely large and place very high demands on the CPU's floating-point performance. PTA software requires a full 32 bit operating system and can be installed in any personal computer with the following minimum system requirements:

- Pentium IV processor (suggested 1 GHz minimum)
- Mouse and Keyboard
- 500 MB RAM (suggested 1 GHz minimum)
- 1 x USB port
- 100 MB free HDD space, plus disk space for Database
- 800 x 600 minimum resolution video adapters
- Microsoft Windows XP or 7 (suggested Win7)
- Adobe Acrobat Reader
- Power amplifier 10 V_{rms}

SOFTWARE INSTALLATION

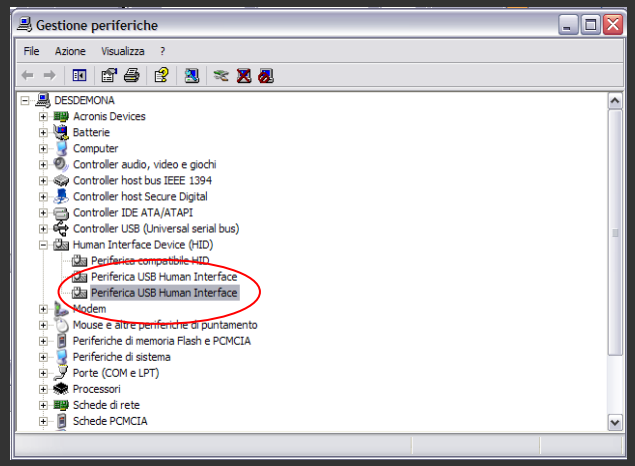
- Delete all previous installations, included Demo Version
- Place the distribution CD into your CD-ROM drive, or open downloaded distribution
- If the distribution does not AutoRun, locate and run the **Setup** file following the instructions on screen
- Before you run PTA from relative link on desktop or from SpeakerLAB PTA folder on Start Menu, you need to install .inf driver
- After driver installation run PTA and accept the network protection (only for *Web Manager* add on)

DRIVER INSTALLATION

1) Administrator privileges are required to install device drivers. Make sure you are administrator of your computer!
2) Insert USB cable (USB version) into the pc or insert USB Dongle (Wireless version)
3) Power on SpeakerLAB Power Test Analyzer
4) Open up the device manager

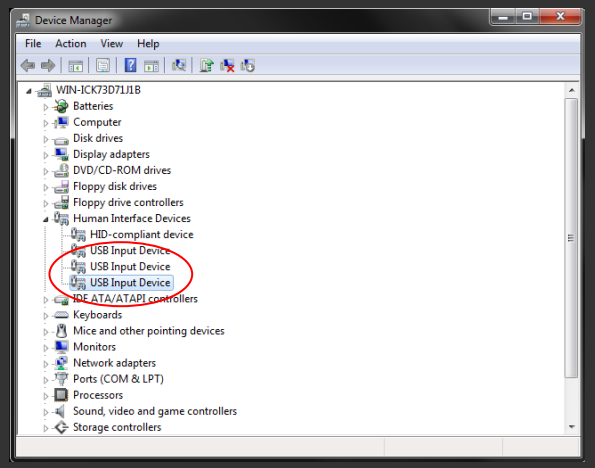
WINDOWS XP

From the Control Panel or by clicking the Start button, clicking Run…, entering *devmgmt.msc* in the text box, and clicking OK.

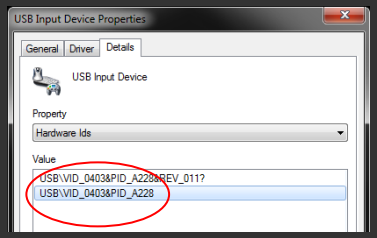


WINDOWS 7

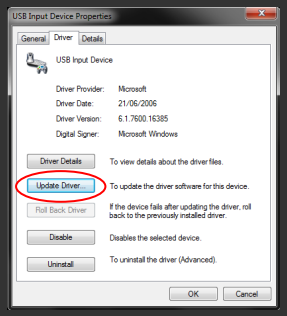
Open the Device Manager by clicking on the Windows Start button and typing *device manager* in the text box and click the program listed in the programs section.



5) Open **USB Input Device**
6) On the Detail tab verify the right Hardware ID (**VID_0403&PID_A228,** or **VID_0403&PID_A229 for wireless version**)



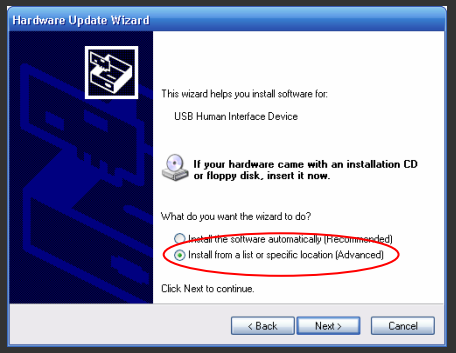
7) Go to the tab **DRIVER>UPDATE DRIVER**



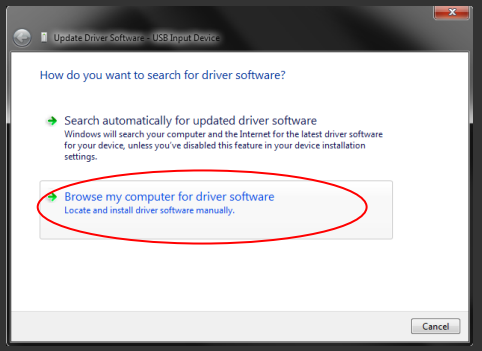
8) Select *No, not this time*, when prompted by the Hardware Update Wizard and click Next

9) Select *Install from a list or specific location* and click *Next*

WINDOWS XP

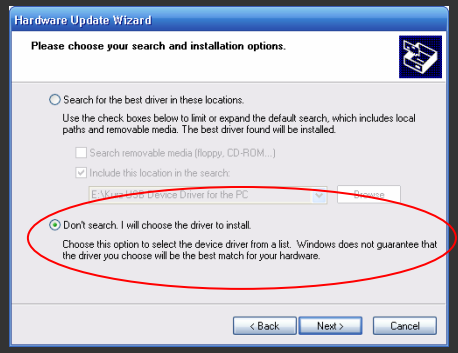


WINDOWS 7

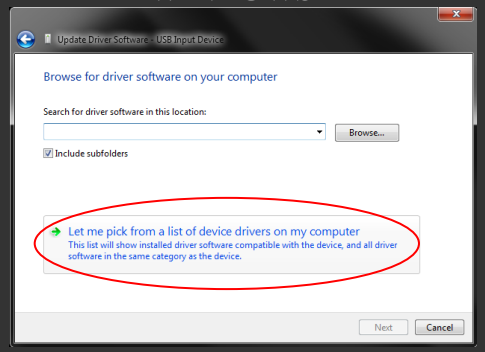


10) Select *Don't search. I will choose the driver to install* and click *Next*

WINDOWS XP

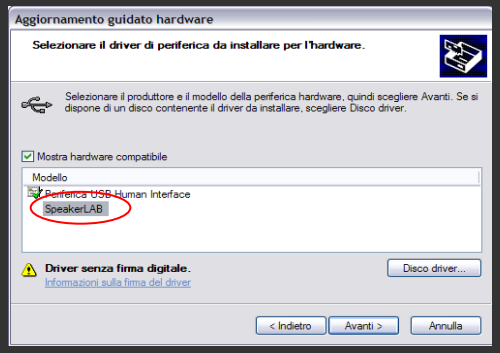


WINDOWS 7

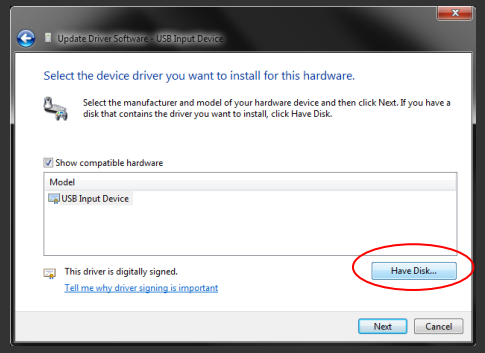


11) If under Model the option SpeakerLAB is listed, click it, click *Next*, and skip to step 13

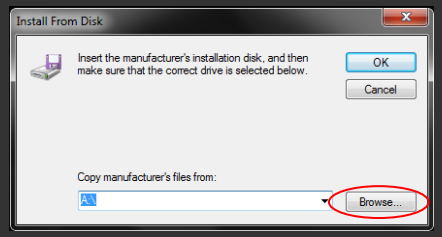
WINDOWS XP



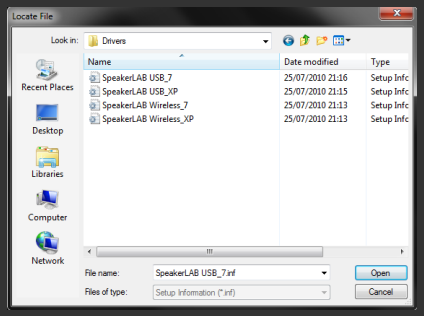
WINDOWS 7



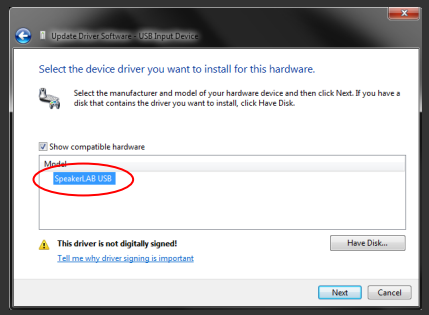
12) If the option SpeakerLAB is not listed so click the *Have Disk*... button



13) In the Locate File window browse to *SpeakerLAB Drivers* on your Desktop and select the OS specific **SpeakerLAB.inf**

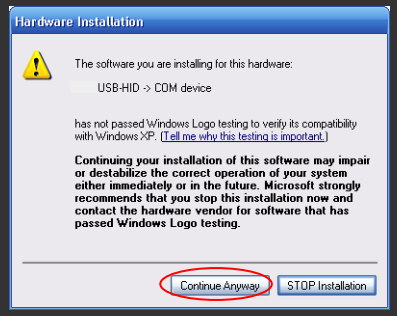


14) In the Hardware Update Wizard should now show the *SpeakerLAB device* option. Click it and click *Next*

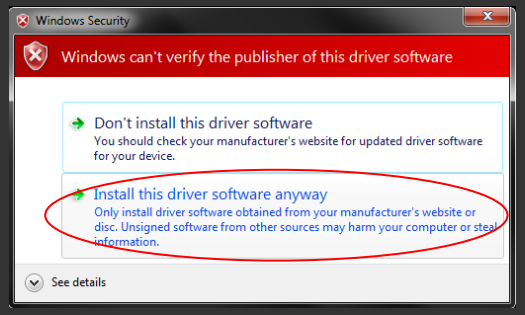


15) Select the *Continue Anyway* button on the Hardware Installation window and install software

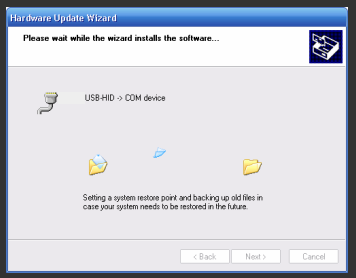
WINDOWS XP



WINDOWS 7

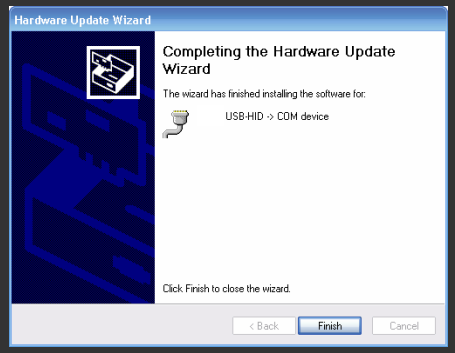


16) The **SpeakerLAB** Device Driver is now being installed

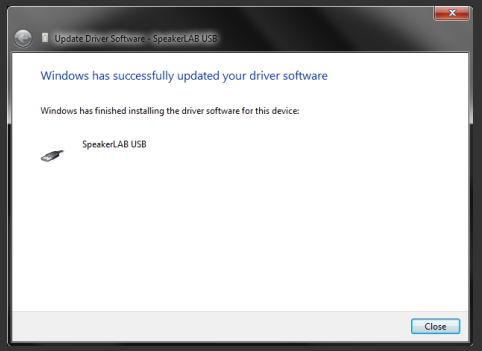


17) Click the *Finish* button to complete the installation

WINDOWS XP

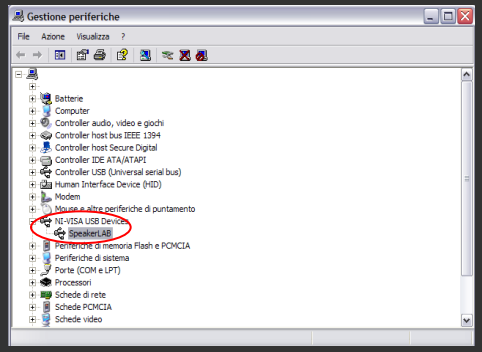


WINDOWS 7

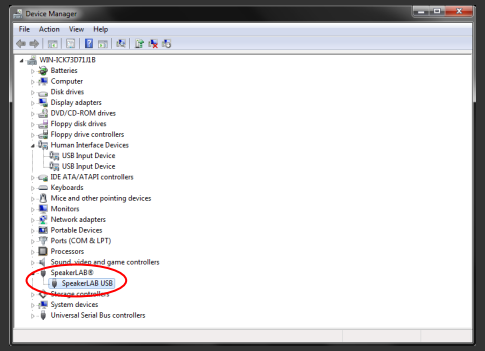


18) On the Device Manager window, check the SpeakerLAB under the relative *Port (NI-VISA* section if it is enumerated)

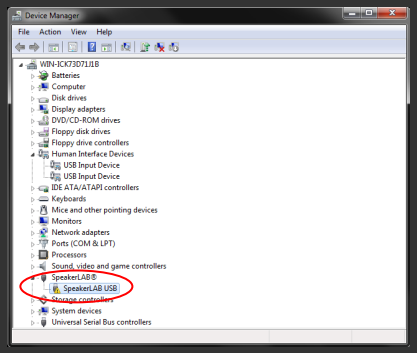
WINDOWS XP



WINDOWS 7

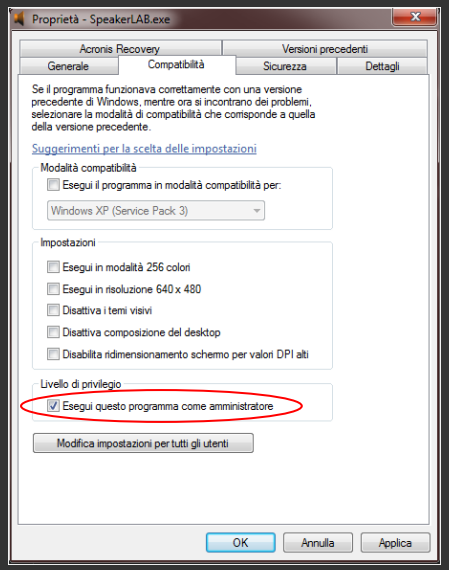


19) If, after the operations, appears

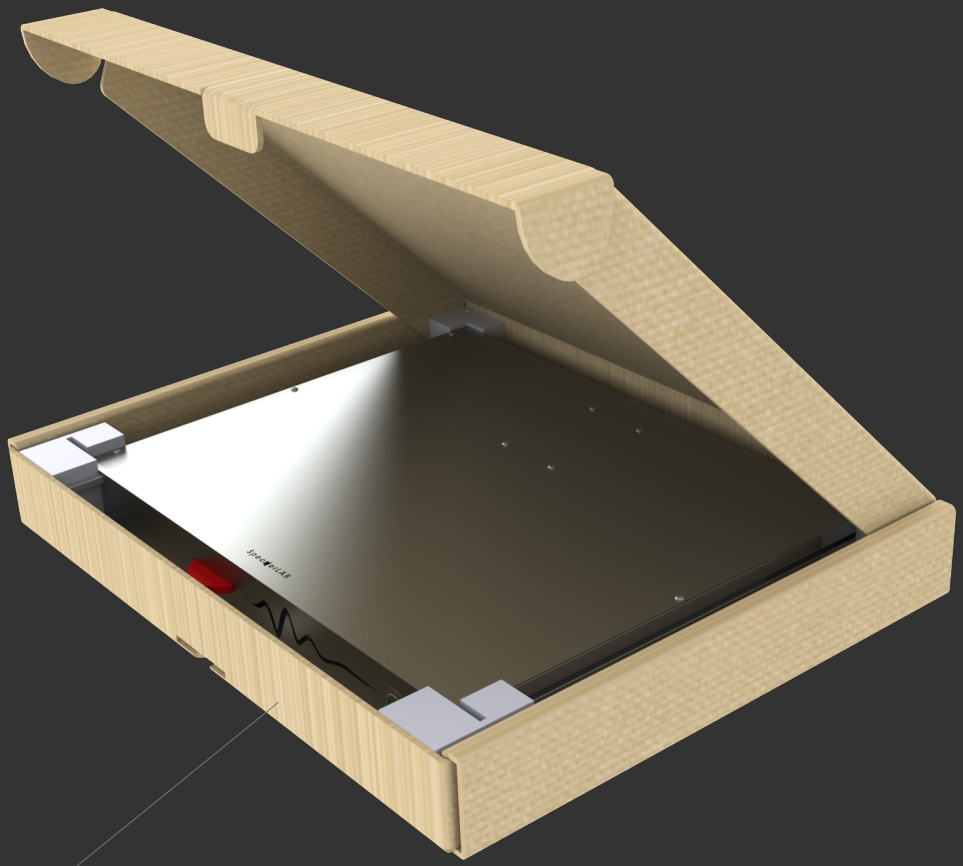


20) Power off and then, waiting 4s, power on SpeakerLAB (in Wireless version also plug out and then plug in USB Dongle from the computer)

NOTE: Before run SpeakerLAB.exe set execution permission as administrator. Right click on SpeakerLAB.exe icon, propriety, compatibility, after selection *execution as administrator*, click OK button



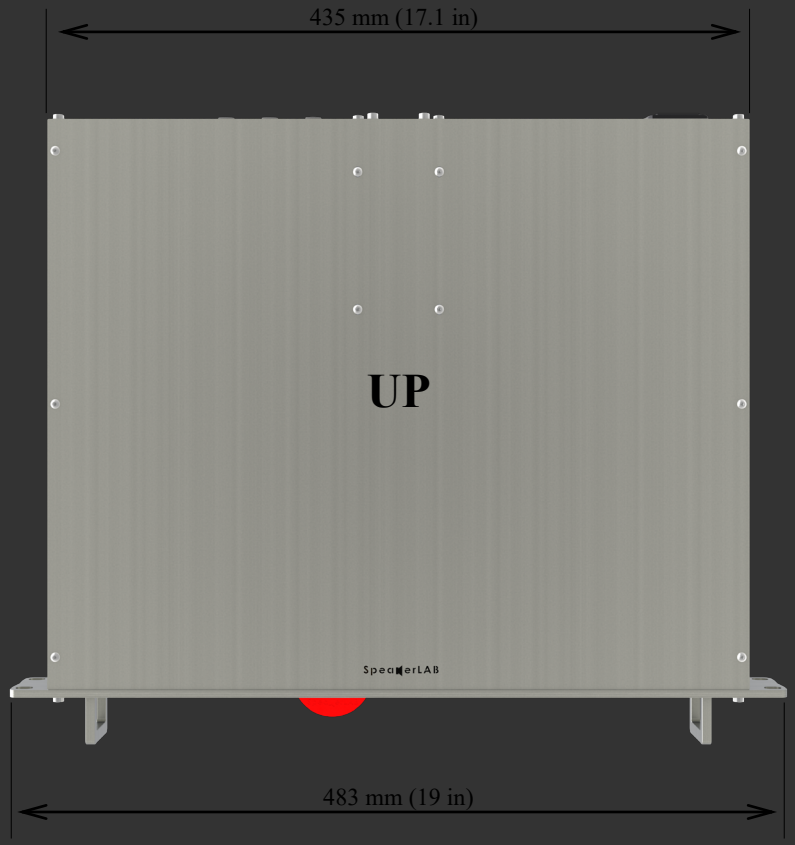
PACKAGING

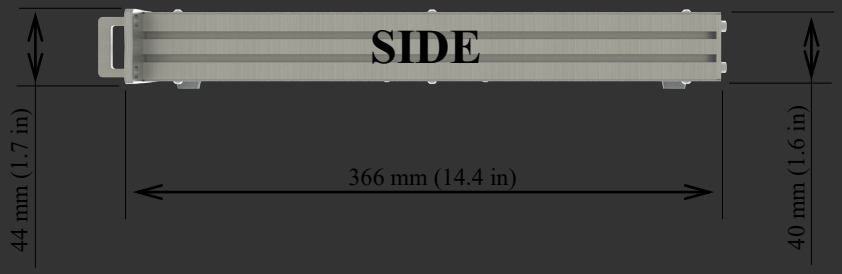


Unpacking

Carefully open the shipping box and check for any noticeable damage. The figure shows an example view of the packing. Every SpeakerLAB system is completely tested and inspected before leaving the factory and should arrive in perfect condition. If you find any damage, notify the shipping company immediately. Be sure to save the box and all packing materials for the carrier's inspection.

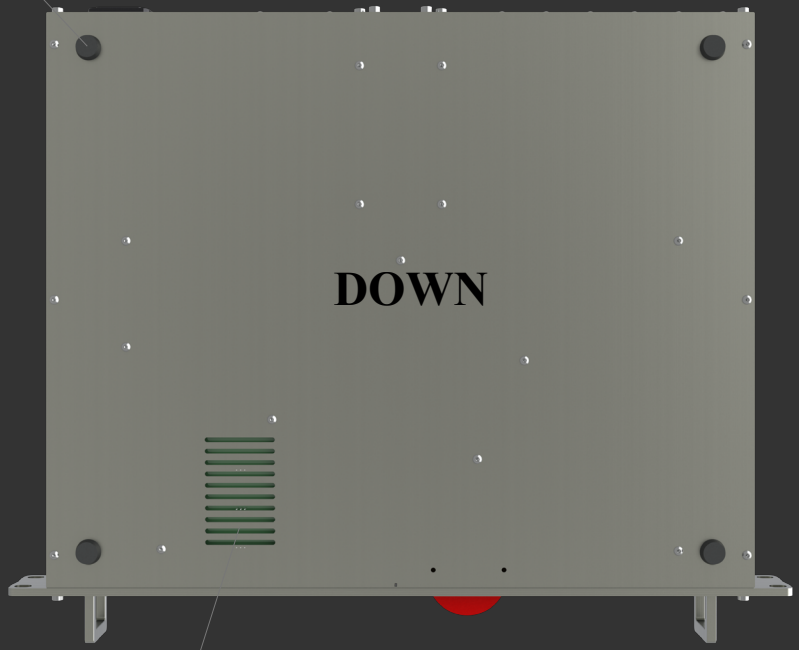
DIMENSION AND MOUNTING

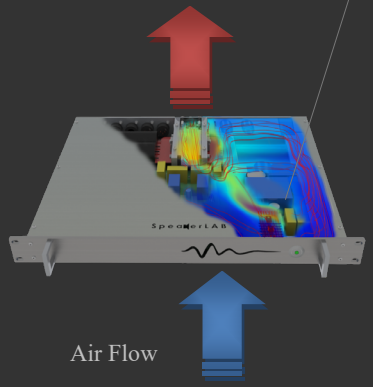




Hardware installation

For a rack mounting do not insert the four feet supplied with equipment
For a desktop usage insert the four feet on the bottom side, pushing them inside holes





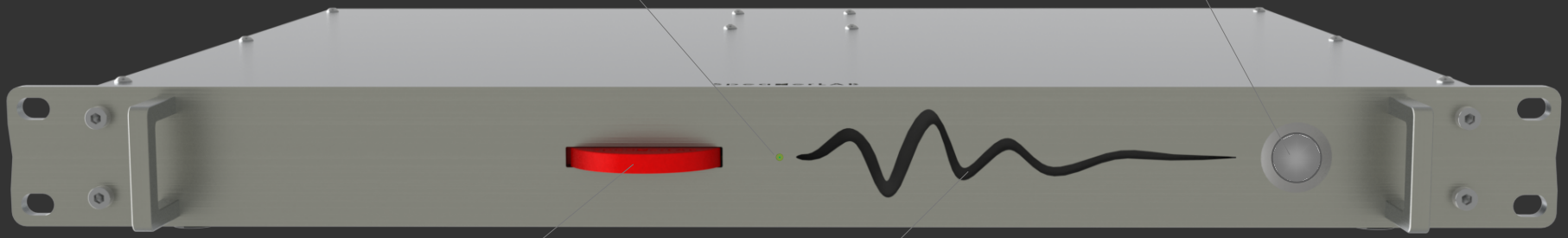
Cooling System

The exhaust cooling air is forced out through the rear of the chassis. The bottom air duct facilitating thermal dissipation inside the device. For a desktop usage we suggest to put the device away from heat sources on the bottom side. For a rack mounting is possible to cover the bottom air duct and left the front side free from obstacles. Inside rack devices can stacked directly on top of each other (no space needed between units), starting from the bottom of the rack. Always make sure the exhaust air on rear side can flow without resistance. However sensing circuit control internal temperature, if the device has abnormal overheats µP automatic power off the system

FRONT SIDE

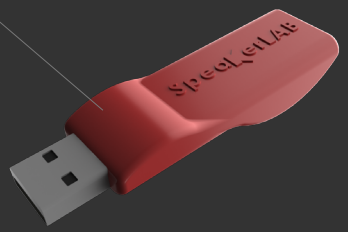
Streaming Status Led
Intermittent (~4 Hz): status ok
Stationary: status stalled

ON/OFF Push Button
Press and hold 1s for power on
Press and hold 3s for safety power off

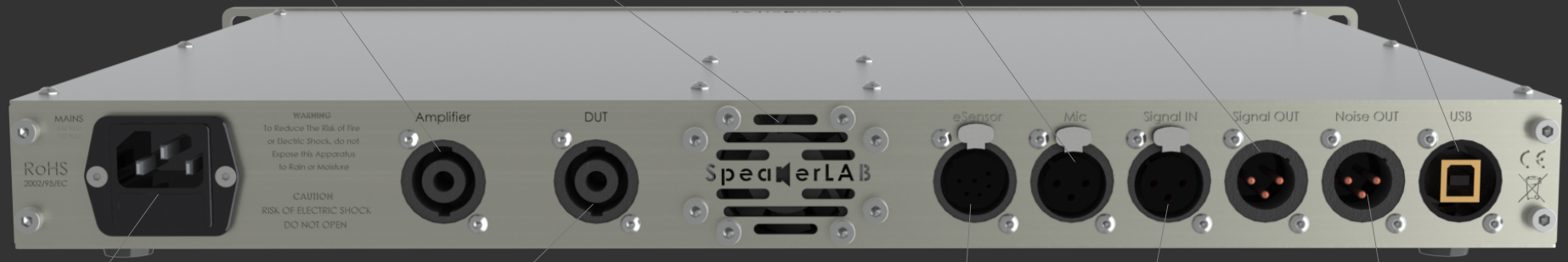


Forced air input
Avoid covering this channel

Wireless (optional)



REAR SIDE



Amplifier
2-pole speakON

Forced air output
Avoid covering this channel

Balanced Mic IN
3 PIN XLR Female

USB type B Female
USB optical isolation (optional)

Balanced Signal OUT
3 PIN XLR Male

Main Power Inlet
IEC 950-compliant, 240/120 Vac (optional)
Fuse: 0.125 A (T)

Device Under Test
4-Wire Kelvin Termination speakON

Environment Sensor
4 PIN XLR Female

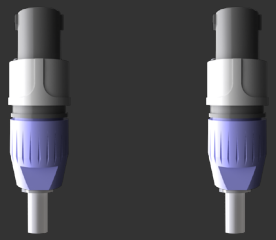
Balanced Signal IN
3 PIN XLR Female

Balanced Noise OUT
3 PIN XLR Male

CONNECTORS

MAINS

1	Earth
2	Phase
3	Neutral



Amplifier NOTE 1

1+	IN (+)
1-	IN (-)
2+	NC
2-	NC

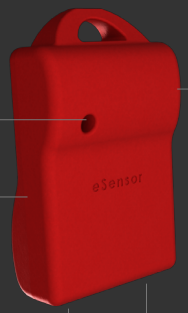
DUT

1+	OUT (+)
1-	OUT (-)
2+	Sense (+)
2-	Sense (-)

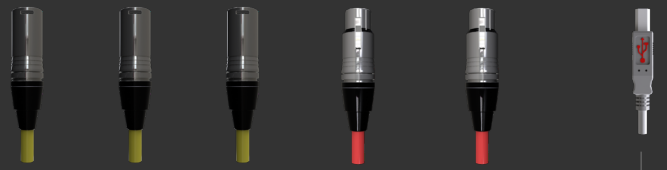
Environment Temperature Sensor

Environment Humidity Sensor

Environment Pressure Sensor



Magnet Temperature Sensor



USB

1	V+
2	D-
3	D+
4	GND

Noise OUT NOTE 2

1	GND
2	OUT (+)
3	OUT (-)

Signal OUT NOTE 2

1	GND
2	OUT (+)
3	OUT (-)

Signal IN NOTE 2

1	GND
2	IN (+)
3	IN (-)

Mic NOTE 2 NOTE 3

1	GND
2	IN (+)
3	IN (-)

eSensor

1	Isolated GND
2	Isolated V+
3	Clock
4	Digital Data

NOTE 1: Mono and Bridge Power Amplifier.
In PTA LITE Negative Input (pin 1-) is connected to GND.
In PTA PRO Negative Input (pin 1-) is connected to negative bridge terminal.

NOTE 2: Balanced and Unbalanced Signals.
You can use both configuration, but you must consider that unbalanced long line can introduce noise in the audio system.
For 3 PIN XLR type unbalanced signals use XLR to RCA standard adaptors, or link pin 1 to pin 3.

NOTE 3: Optional Microphone Phantom Power

ASSEMBLIES

POWER AMPLIFIER

Internal Source
Enable internal signal generator NOTE 0

EXTERNAL SOURCE

POWER AMPLIFIER

External Source
Disable internal signal generator NOTE 0
Enable external source input (Signal IN) NOTE 0

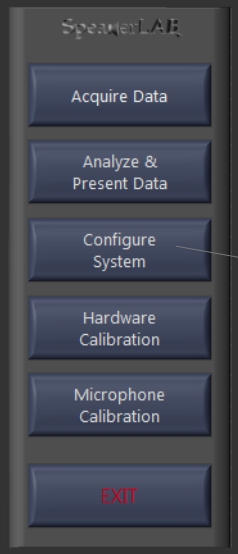
DSP / DIGITAL FILTER

POWER AMPLIFIER

Internal Generator + External Filter
Enable internal signal generator NOTE 0
Enable noise out (Noise OUT) NOTE 0
Enable external source input (Signal IN) NOTE 0

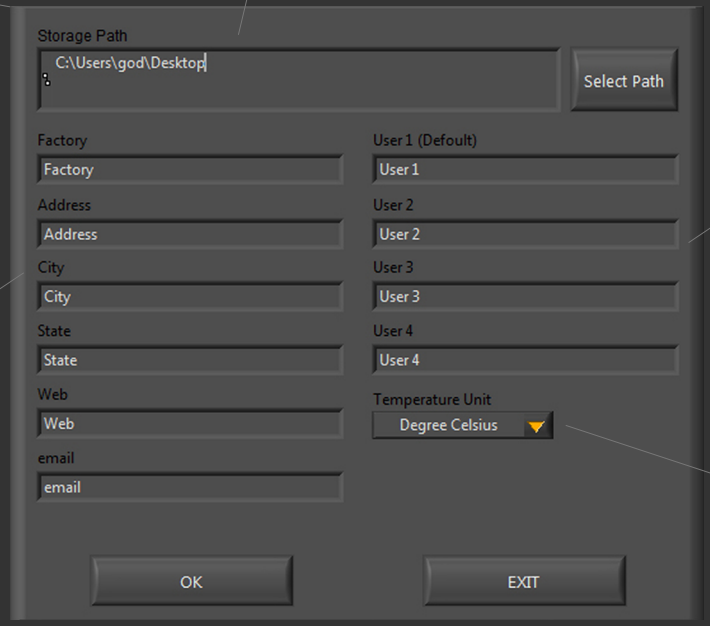
NOTE 0: see **ACQUIRE DATA: BOX 2**

INTERFACE OVERVIEW: CONFIGURE



Storage Path

Push *Select Path* and navigate till the preferred folder, where to save SpeakerLAB database, then select *Current Folder* button



Users

Names of the Operators usually work with SpeakerLAB

Factory Data

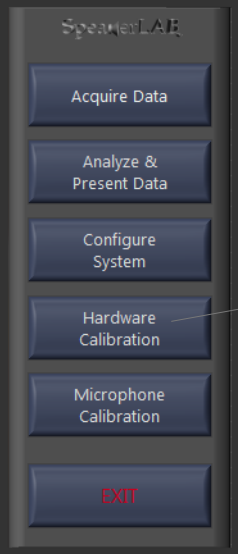
Complete all fields for factory

Temperature Unit

Select the preferred Unit for all temperature measurement

Degree Celsius
Kelvin
Degree Fahrenheit

INTERFACE OVERVIEW: HW CALIBRATION

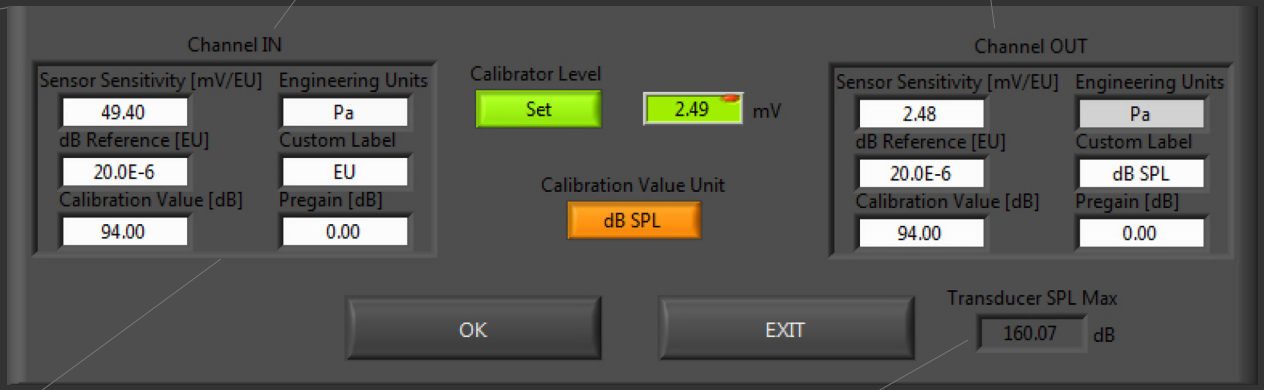


Calibration is completely automatic, it's not necessary to disconnect connectors, DUT or cables from SpeakerLAB: internal relays operate all these incumbencies. If launched, this routine stop when terminate the calibration. Check only if the meters indicators remain inside their maximum values, send a comment to factory in case of anomaly.

INTERFACE OVERVIEW: MIC CALIBRATION

Channel IN
Edit these fields for a manual calibration of the sensor

Channel OUT
Visualize output values to save



Channels
Sensor Sensitivity
Sensitivity of sensor [mV/EU]
dB Reference
Reference value in dB of selected Engineering Unit
Calibration Value
Reference value of calibration
Engineering Unit
Select the Unit from available Units
Custom Label
Write a personal label
Pregain
Value of preamplifier gain

Transducer SPL Max
Check maximum Sound Pressure Level, if it is too low for your application set a different gain in your microphone preamplifier and write the value in *Pregain [dB]* into relative *Channel IN* field

Microphone Calibration Setup Techniques:

Manual (without a calibrator)
1. Complete all fields in *Channel IN*
2. Select *dB SPL* for *Calibration Value Unit*
3. Don't setting *Calibrator Level*
4. *Save Calibration*

Auto (with a calibrator)
1. Put microphone into calibrator
2. Select *dB SPL* for *Calibration Value Unit*
3. Set *Calibrator Level*
4. Check *Sensor Sensitivity* on Channel OUT, when the value is stable…
5. *Save Calibration*

INTERFACE OVERVIEW: ACQUIRE DATA

Voice Coil Temperature

Peak Current

Peak Voltage

Average Power on Re

RMS Current

RMS Voltage

Average Power on Z_{min}

Reduce, Resize, Close window

Active Power

Reactive Power

Environment Temperature

Magnet Temperature

Acoustic Compression

Current Crest Factor

Voltage Crest Factor

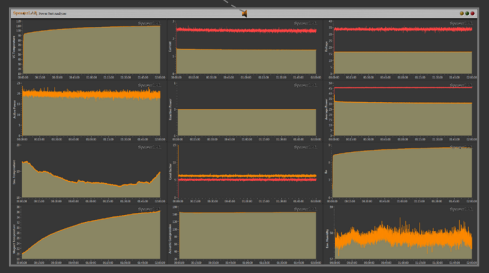
Voice Coil Re

Environment Humidity

NOTE: when launched window position is maximized on primary monitor

ACQUIRE DATA: CONTROL BOX

Moving mouse near SpeakerLAB logo cause opening the *Control Box*



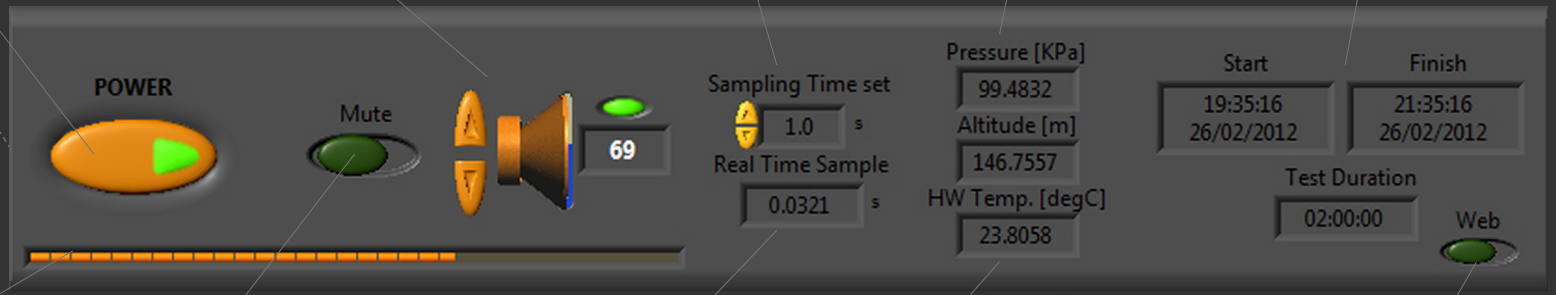
Sampling Time set
From 1 to 60 s
For the first 60s sampling time is fixed to 1s
For low sampling time values consider your operating system resources

Power
Start/Stop test sequence

Volume Control
Increase/Decrease Signal OUT

Environment data
Pressure and Altitude

Timing Information
Start, Finish and Test Duration



Wireless Power Bar

Mute
Enable/Disable Signal OUT

Real Time Sample
Visualize the samples number during acquisition time. This value is a sample every 4ms, but the velocity is machine dependent and can differ from theory, because Windows OS ensure a real time acquisition with 1 kHz Clock

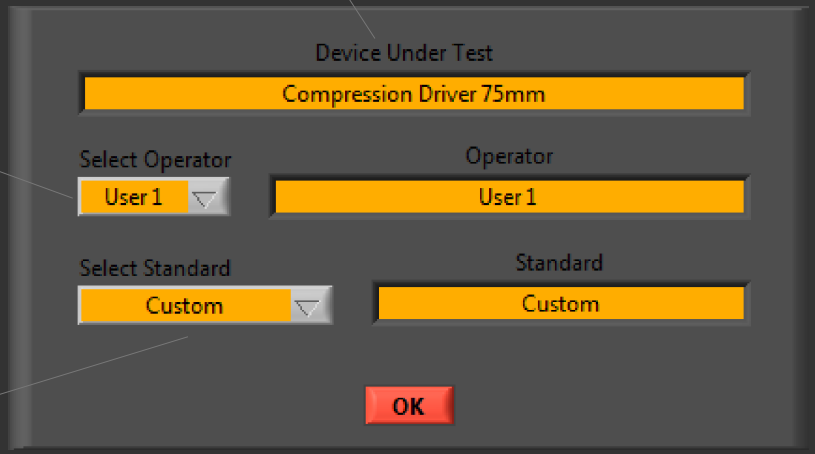
HW Temperature
Internal Hardware temperature

Web
Enable/Disable Web Manager

ACQUIRE DATA: BOX 1

Device Under Test
This is the name of saved measurement folder inside SpeakerLAB database

Select Operator
From System Configuration is possible to save user names, or write here a new operator



Select Standard
Default Standards with automatic routines, for a fast setting, are:
ANSI EIA 426-B
IEC 268-5
DIN 45573 T2
AES2 1984 (R. 2003, R. 2012)
Max AES Power (Automatic)

For completely open and manual settings, select
Custom

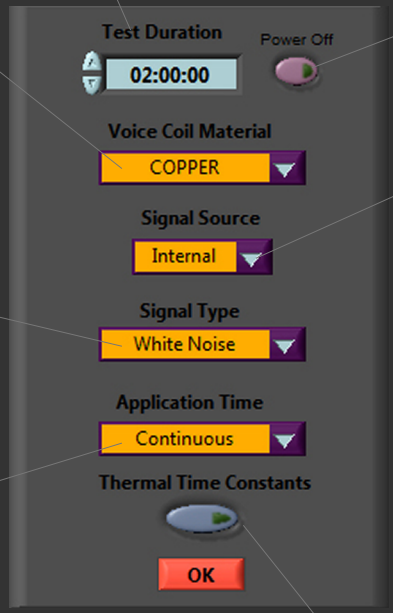
If you need to save a custom pattern, select
Save this configuration…
and type the name to recall configuration in the future. It's possible to save infinite configurations, to delete a custom saved configuration delete the relative folder on SpeakerLAB program path …\Settings\customCTRL

Warning: to not damage DUT or hardware, when load a saved custom standard ensured that the power amplifier gain and external signal gain are not changed in comparison to saved date

ACQUIRE DATA: BOX 2

Test Duration
Insert the time period for test in format HH:MM:SS. You can digit any number (s), in ex. 3600 it is auto-converted in time format 01:00:00

Voice Coil Material
Select the wire material of DUT voice coil. Implemented materials are:
Copper
Aluminium
Copper Clad Aluminium
Gold
Silver



Power Off
SpeakerLAB auto-power off immediately at test end. However to save energy, SpeakerLAB has a smart auto stop after 60 minutes of inactivity time

Signal Source
Internal
Enable internal signal generator
External
Enable external source input (Signal IN)
Internal Generator + External Filter
Enable internal noise (Noise OUT) and external source input (Signal IN)

Use *Internal Generator + External Filter* to apply noise generated by SpeakerLAB and processed by a Digital Filter or a DSP. Connect processor output to the *Signal IN* (see Assemblies)

Signal Type
Pink Noise
White Noise
ANSI/EIA 426-B
IEC 60268-1

Application Time

Thermal Time Constants
Enable/Disable thermal time constants when test finish. Available only with Continuous Application

ACQUIRE DATA: BOX 3, 4, 5

Signal Analysis
Wait until the sequence complete all settings and measurements.
The waiting time is about 10 s.

Voltage
Vpeak, Vrms time chart and display.

Noise Generator Bit
Select the preferred bit number to modify internal generator dynamic.

Limiter
Adjust limiter to fine-tune crest factor.

Crest factor
Crest factor time chart.
Selected values of CF ratio and CF dB.

Power Amplifier Gain Analysis
Wait until the sequence complete all settings and measurements.
The waiting time is about 15 s.

NOTE 1: Crest Factor analysis regard line signal. Be sure your power amplifier is able to supply selected CF.
NOTE 2: To save time we suggest recording a custom pattern, selecting *Save this configuration…* in the BOX 1.
With this method, for the same test type (utilizing identical set up parameters as power amplifier, signal input, etc.) you need to launch Crest Factor Analysis and Amplifier Gain Analysis only when save the configuration, because in the other sessions you can recall all saved setup parameters in one shot.

ACQUIRE DATA: BOX 6

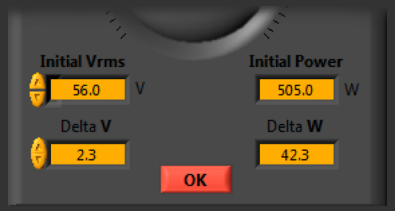
Zmin
Insert here DUT Zmin (or other Z value), if you need to produce measurement of Average Power on Zmin (or other Z value).

Enable/Disable Zmin

Enable Force Re and Re Temperature

Re, Re Temperature
When the DUT has different temperature compared to environment. In ex. when DUT is hot for a test previously performed, or is cold because the test room has a higher temperature compared to external environment and DUT was not pre-conditioned.
SpeakerLAB advise this condition and suggest forcing manual values.
You can use original Re and Re Temperature measured with SpeakerLAB in another session, or measure these values with other devices.

Volume Control
Setting amplifier gain to desired Voltage or Power. Power is calculated on Re, if you enable Zmin Power is calculated on Zmin value.
If you select *Duty Cycle (Ramp)* or *Max AES Power (Automatic)* analysis it appear the ramp to permits you to choice *Delta V* and the relative *Delta W*. These are the ramps of each step.



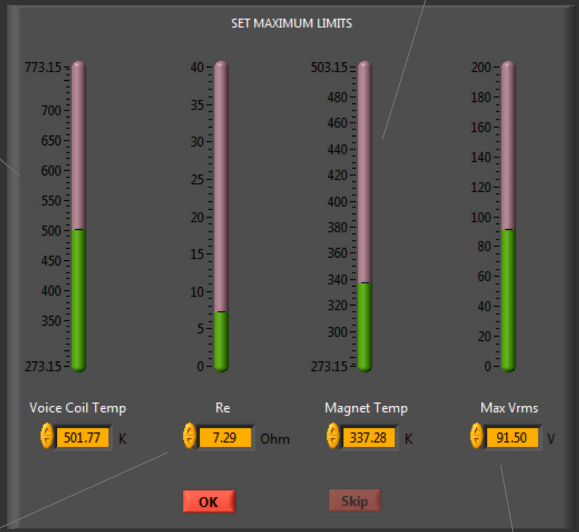
Note: Volume control is available only if you previously selected Amplifier Gain Analysis.

Caution: use power amplifier no less than double of the power you need.

ACQUIRE DATA: BOX 7

Voice Coil Temperature
Set software limit on voice coil temperature value.
Select the preferred Unit in *System Configure*.
When the measure reaches this limit the test is auto stopped and saved

Magnet Temperature
Set software limit on magnet temperature value.
Select the preferred Unit in *System Configure*.
When the measure reaches this limit the test is auto stopped and saved



Notes
To leave hardware limits only, excluding software limits set these values on maximum or skip this box.
First of all, to set Max Vrms, consider if your amplifier is able to produce the request power (for more information read *Recommendation & Warnings* section)

Re
Set software limit on direct current resistance value.
When the measure reaches this limit the test is auto stopped and saved

Maximum Vrms
Set software limit on rms voltage at DUT terminals.
This limit is available with *Duty Cycle (Ramp)* and *Max AES Power (Automatic)* tests.
When the measure reaches this limit the audio volume control stop the percentage increase

INTERFACE OVERVIEW: POST PROCESS

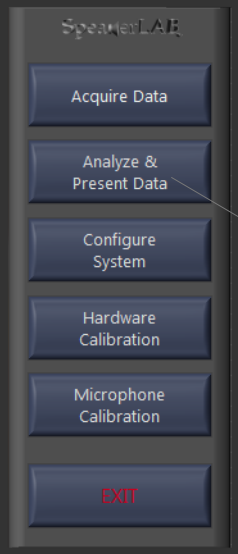


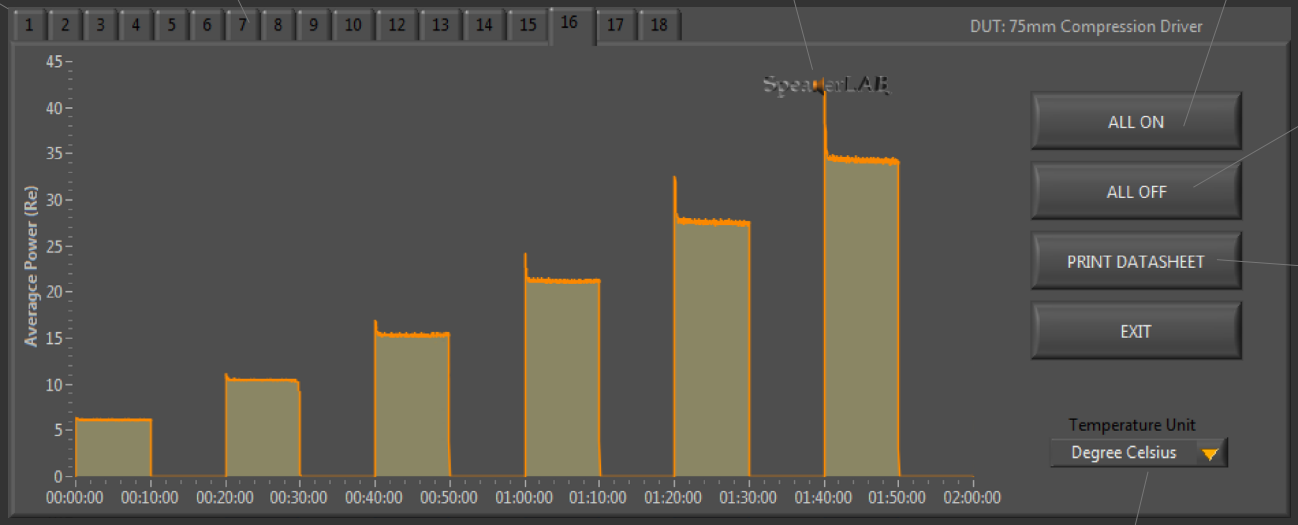
Diagram Control
Enable/Disable the relative diagram to export on datasheet.
Enable/Disable cursors to zoom a particular diagram section

TABS
Switch among the measurement diagrams

ALL ON
Enable all diagrams and disable all cursors

ALL OFF
Disable all diagrams and enable all cursors

PRINT DATASHEET
Print base HTML or advanced PDF sheet



Temperature Unit
Select the preferred Unit for the datasheet
Degree Celsius
Kelvin
Degree Fahrenheit

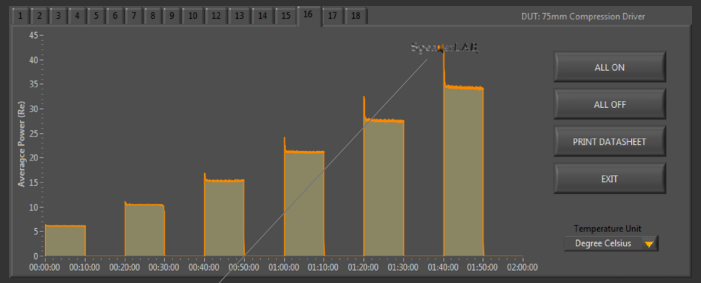
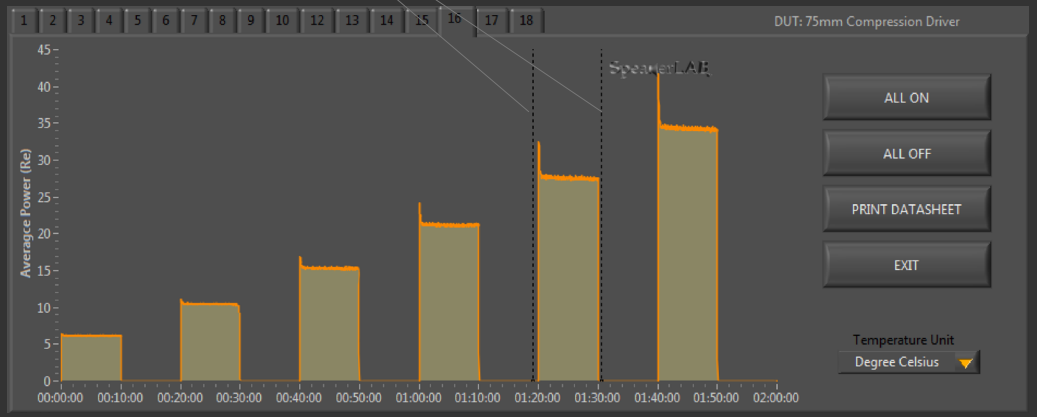


Diagram Control
Switch off *Diagram Control* to visualize cursors

Cursors
Move each cursor dragging it into relative time position



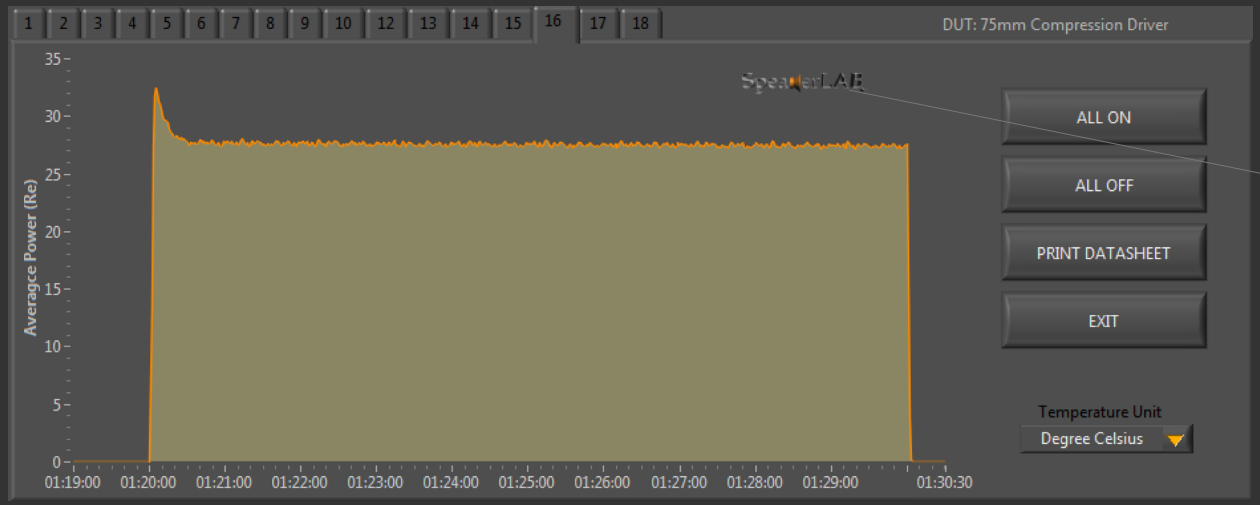


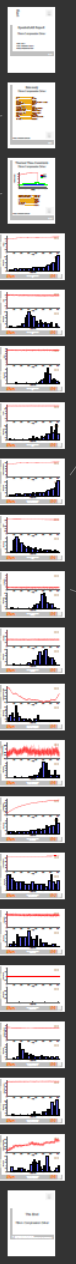
Diagram Control
Switch on *Diagram Control* to visualize area inside the cursors and activate diagram to print

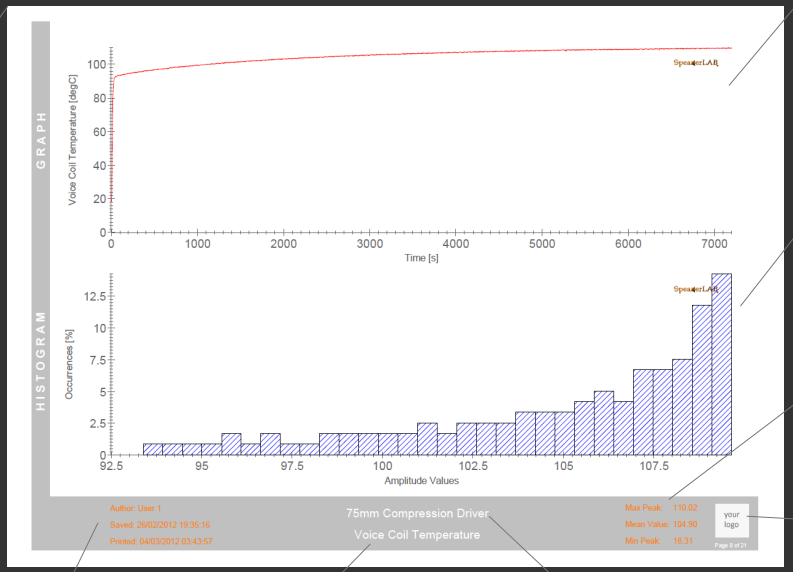
SAVED DATA FORMAT: TEST REPORT (PDF)

Summary

Thermal Time Constants

Diagrams





Graph
Y= Amplitude values [Unit]
X= Time [s]

Histogram
Y= Occurrences [%]
X= Amplitude values

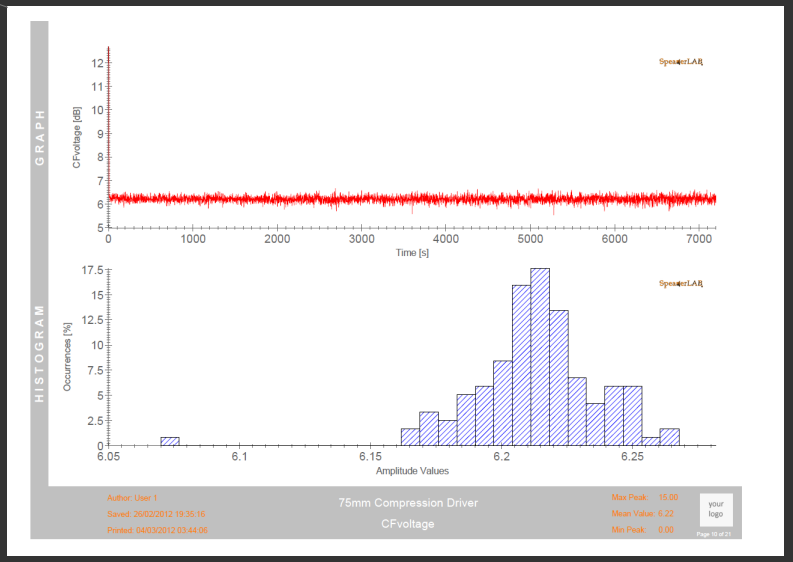
Diagram Values
Max Peak
Mean Value
Min Peak

Your Logo
Insert your jpg logo into setting folder

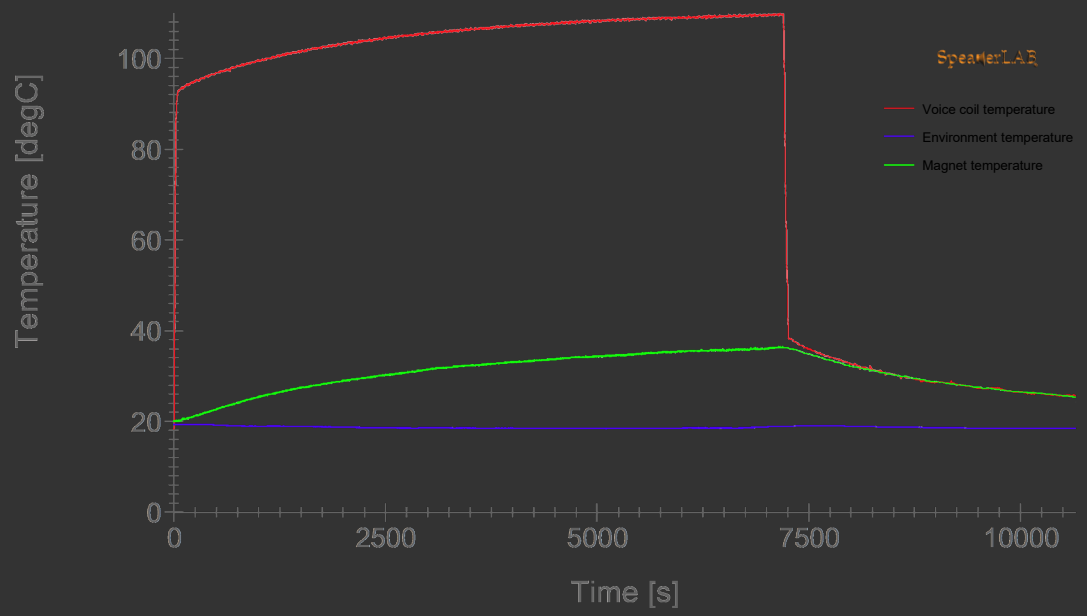
Record data

Diagram page name

DUT Name



SAVED DATA FORMAT: THERMAL TIME CONSTANTS

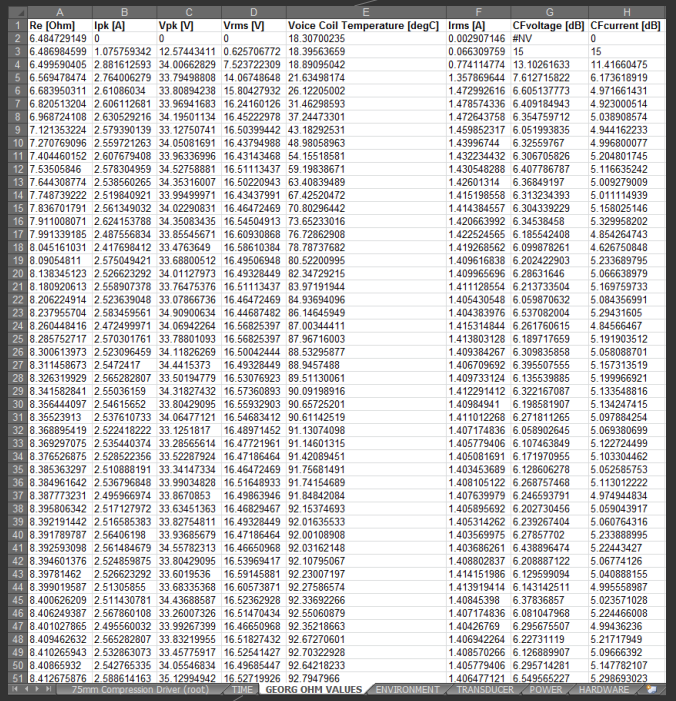


Initial voice coil temperature ---------- 109.595 degC
Initial magnet temperature ---------- 36.265 degC
t0 ---------- 7200.000 s
t1 ---------- 7212.273 s
t2 ---------- 10645.089 s
Tau voice coil ---------- 12.273 s
Tau magnet ---------- 3432.816 s

SAVED DATA FORMAT: STREAMING DATA

All *Streaming Data* are saved in a single file. It's possible to import this file directly in a spreadsheet, from where you can copy all measurements data to edit in a new customized log (for example useful for statistical analysis)

Steaming Data
All data points saved during the measure session



	A	B	C	D	E	F	G	H
1	Re [Ohm]	Ipk [A]	Vpk [V]	Vrms [V]	Voice Coil Temperature [degC]	Irms [A]	CFvoltage [dB]	CFcurrent [dB]
2	6.484729149	0	0	0	18.30700235	0.002907146	#NV	0
3	6.486984599	1.075759342	12.57443411	0.625706772	18.39563659	0.066309759	15	15
4	6.499590405	2.881612593	34.00662829	7.523722309	18.89095042	0.774114774	13.10261633	11.41660475
5	6.569478474	2.764006279	33.79498808	14.06748648	21.63498174	1.357869644	7.612715822	6.173618919
6	6.683950311	2.61086034	33.80894238	15.80427932	26.12205002	1.472992616	6.605137773	4.971661431
7	6.820513204	2.606112681	33.96941683	16.24160126	31.46298593	1.478574336	6.409184943	4.923000514
8	6.968724108	2.630529216	34.19501134	16.45222978	37.24473301	1.472643758	6.354759712	5.038908574
9	7.121353224	2.579390139	33.12750741	16.50399442	43.18292531	1.459852317	6.051993835	4.944162233
10	7.270769096	2.559721263	34.05081691	16.43794988	48.98058963	1.43996744	6.32559767	4.996800077
11	7.404460152	2.607679408	33.96336996	16.43143468	54.15518581	1.432234432	6.306705826	5.204801745
12	7.53505846	2.578304959	34.52758881	16.51113437	59.19838671	1.430548288	6.407786787	5.116635242
13	7.644308774	2.538560265	34.35316007	16.50220943	63.40839489	1.42601314	6.36849197	5.009279009
14	7.748739222	2.519840921	33.99499971	16.43437991	67.42520472	1.415198558	6.313234393	5.011114939
15	7.836701791	2.561349032	34.02290831	16.46472469	70.80296442	1.414384557	6.304339229	5.158025146
16	7.911008071	2.624153788	34.35083436	16.54504913	73.66233016	1.420663992	6.34538458	5.329568202
17	7.991339185	2.487556834	33.85545671	16.60930868	76.72862908	1.422524565	6.185542408	4.854264743
18	8.045161031	2.417698412	33.4763649	16.58610384	78.78737682	1.419268562	6.099878261	4.626750848
19	8.09054811	2.575049421	33.68800512	16.49506948	80.52200995	1.409616838	6.202422903	5.233689795
20	8.138345123	2.526623292	34.01127973	16.49328449	82.34729215	1.409965696	6.28631646	5.066638979
21	8.180920613	2.558907378	33.76475376	16.51113437	83.97191944	1.411128554	6.213733504	5.169759733
22	8.206224914	2.523639048	33.07866736	16.46472469	84.93694096	1.405430548	6.059870632	5.084356991
23	8.237955704	2.583459561	34.90900634	16.44687482	86.14645949	1.404383976	6.537082004	5.29431605
24	8.260448416	2.472499971	34.06942264	16.56825397	87.00344411	1.415314844	6.261760615	4.84566467
25	8.285752717	2.570301761	33.78801093	16.56825397	87.96716003	1.413803128	6.189717659	5.191903512
26	8.300613973	2.523096459	34.11826269	16.50042444	88.53295877	1.409384267	6.309835858	5.058088701
27	8.311458673	2.5472417	34.4415373	16.49328449	88.9457488	1.406709692	6.395507555	5.157313519
28	8.326319929	2.565282807	33.50194779	16.53076923	89.51130061	1.409733124	6.135539885	5.199966921
29	8.341582841	2.55036159	34.31827432	16.57360893	90.09198916	1.412291412	6.322167087	5.133548816
30	8.356444097	2.54615662	33.80429095	16.55932903	90.65725201	1.40984941	6.198581907	5.134247415
31	8.35523913	2.537610733	34.06477121	16.54683412	90.61142519	1.411012268	6.271811265	5.097884254
32	8.368895419	2.522418222	33.1251817	16.48971452	91.13074098	1.407174836	6.058902645	5.069380699
33	8.369297075	2.535440374	33.28566514	16.47721961	91.14601315	1.405779406	6.107463849	5.122724499
34	8.376526875	2.528522356	33.52287924	16.47186464	91.42089451	1.405081691	6.171970955	5.103304462
35	8.385363297	2.510888191	33.34147334	16.46472469	91.75681491	1.403453689	6.128606278	5.052585753
36	8.384961642	2.536796848	33.99034828	16.51648933	91.74154689	1.408105122	6.268757468	5.113012222
37	8.387773231	2.495966974	33.8670853	16.49863946	91.84842084	1.407639979	6.246593791	4.974944834
38	8.395806342	2.517127972	33.63451363	16.46829467	92.15374693	1.405895692	6.202730456	5.059043917
39	8.392191442	2.516585383	33.82754811	16.49328449	92.01635533	1.405314262	6.239267404	5.060764316
40	8.391789787	2.56406198	33.93685679	16.47186464	92.00108908	1.403569975	6.27857702	5.233888995
41	8.392593098	2.561484679	34.55782313	16.46650968	92.03162148	1.403686261	6.438896474	5.22443427
42	8.394601376	2.524859875	33.80429095	16.53969417	92.10795067	1.408802837	6.208887122	5.06774126
43	8.39781462	2.526623292	33.6019536	16.59145881	92.23007197	1.414151986	6.129599094	5.040888155
44	8.399019587	2.51305855	33.68335368	16.60573671	92.27586574	1.413919414	6.143142511	4.995558987
45	8.400626209	2.511430781	34.43688587	16.52362928	92.33692266	1.40846398	6.37836857	5.023571028
46	8.406249387	2.567860108	33.26007326	16.51470434	92.55060879	1.407174836	6.081047968	5.224466008
47	8.401027865	2.495560032	33.99267399	16.46650968	92.36218663	1.40426769	6.295675507	4.99436236
48	8.409462632	2.565282807	33.83219955	16.51827432	92.67270601	1.406942264	6.22731119	5.21717949
49	8.410265943	2.532863073	33.45775917	16.52541427	92.70322928	1.408570266	6.126889907	5.09666392
50	8.40865932	2.542765335	34.05546834	16.49685447	92.64218233	1.405779406	6.295714281	5.147782107
51	8.412675876	2.588614163	35.12994942	16.52719926	92.7947966	1.406477121	6.549565227	5.298693023

75mm Compression Driver (root) / TIME / GEORG OHM VALUES / ENVIRONMENT / TRANSDUCER / POWER / HARDWARE

Roots
Groups of streaming data distributed on 7 sheets

RECOMMENDATIONS & WARNINGS

- Connect all cables and, in PRO version, the *Magnet Temperature Sensor*, then turn on hardware about 30 minutes before beginning of the test, for temperature stabilization
- For precise comparative measurement always perform measures to the same initial conditions and environment should be fairly stable with constant temperature or humidity
- The DUT has to have a temperature similar to test room (introduce DUT inside the room at least 2h before measure). However SpeakerLAB PTA notify differences of the DUT compared to environment conditions
- Always put *eSensor* in vertical position
- Use only DUT without passive crossover
- Work with PTA Lite version in the same test room of DUT
- Make sure all signal and power cables from the SpeakerLAB PTA hardware to amplifier are connected
- Always connect the Signal OUT of SpekerLAB PTA to the signal input of Power Amplifier
- To reduce ground loop connect power amplifier main power in the same point of SpeakerLAB PTA main power
- Use power amplifier with 20 Vrms minimum capability, we suggest to use at last double power in comparison to your maximum requirement
- Make sure DUT is well connected to SpeakerLAB PTA, if oxide is present, or the power connectors are not well fastened to DUT, the reading could be not precise
- For Web Manager version, to see real time measurement from remote devices, allow port 8000 on firewall. The first time we suggest to test connection without firewall
- Avoid to plug or unplug USB peripherals and other hardware during SpeakerLAB PTA is working
- Avoid covering air channels in front and rear side of SpekerLAB PTA
- Avoid covering with metal parts the wireless antenna on front side of SpekerLAB PTA and USB device plugged into pc
- Insert SpeakerLAB PTA USB Cable or Wireless Dongle, in the same USB port in which it has been installed, otherwise, if device is not recognized, repeat driver installation procedure in the new USB port
- Warning Code 5001, 5003: Hardware is power off or USB port is off line
- Warning Code 5002: Read error on hardware
- Warning Code 5004: Hardware limit
- If SpeakerLAB Power Test Analyzer doesn't power on, and the Streaming Led light is off or in a stalled status, while holding front Push Button, then unplug main power connector and contact factory sending the Log.txt file in SpeakerLAB\Temp directory.

Safety ⚠

Primary power supply connection with protective earth conductor is required. Power supply connection with removed earth contact could cause high voltages at the enclosure of the device. Do not use adapters that disable ground. To reduce the risks of fire or electric shock do not expose the apparatus to rain or moisture. Make sure the AC mains voltage is correct and is the same as that printed on the rear of the amplifier. Damage caused by connecting the device to improper AC voltage is not covered by the warranty. Make sure the power is off before making any input or output connections.

Caution! ⚠

Risk of electric shock. Do not open the enclosure of device. Hardware has a switching less circuit. When operating the device, certain parts of the module can carry hazardous voltage (eg. power supply, amplifier/DUT bus bar). When do not operating the device, if main power supply connector is plugged and the device is off, only a certain points can carry hazardous power supply voltage, these points are also marked with “Caution!” logo on the upper surface of PCB, however in all points there is any power consumption. Ignoring these warning can lead to injury and/or cause serious damage.

SPECIFICATIONS

RECOMMENDED OPERATING CONDITIONS v. PRO [v. LITE]

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Power Supply Voltage	V_{AC}	100/200		130/250	V
Power AC-Frequency	F_{AC}	48		62	Hz
Operating Temperature	T_A	0 (32)	25 (77)	45 (113)	°C (°F)
Storage Temperature	T_{AS}	-25 (-13)	25 (77)	70 (158)	°C (°F)
Cooling	C	Continuous speed fan, front to rear airflow			
Input Power	P	8 [15]	10 [18]	14 [25]	W

ELECTRICAL CHARACTERISTICS v. PRO [v. LITE]

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
ANALOG LINE INPUT					
Input Voltage (peak)	V_{IN}	-10		10	V
Input Impedance	R_{IN}		10k		Ω
Input Frequency Range ±1 dB	F_{IN}	10		20k	Hz
THD+Noise (Sine) @ 1 kHz			0.03		%
Input Crosstalk Attenuation		100			dB
ANALOG MICROPHONE INPUT					
Input Voltage (peak)	V_{IN}	-10		10	V
Phantom Voltage NOTE 0	Phm_V	3		14	V
Phantom Current NOTE 0	Phm_A	0.004		0.4	A
Input Impedance	R_{IN}		50k		Ω
Input Frequency Range ±1 dB	F_{IN}	10		20k	Hz
THD+Noise (Sine) @ 1 kHz			0.03		%
Input Crosstalk Attenuation		100			dB
ANALOG LINE OUTPUT					
Output Voltage (peak)	V_{OUT}	-10		10	V
Output Impedance	R_{OUT}		600		Ω
Output Frequency Range ±1 dB	F_{OUT}	10		20k	Hz
THD+Noise (sine) @ 1 kHz			0.03		%
Output Crosstalk Attenuation		100			dB

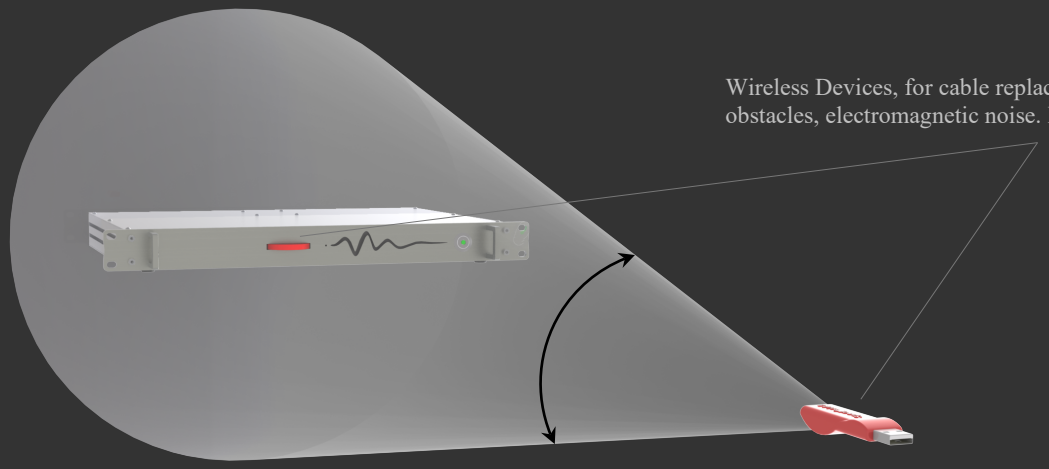
DUT					
Voice Coil Resistance NOTE 1	R_e	0.5	4 ÷ 16	35	Ω
Voice Coil Wire Materials	Cu, Al, CCAW, Ag, Au				
Magnet Temperature	T_M	0 (32)		200 (392)	°C (°F)
POWER AMPLIFIER					
Maximal Input Level				10	dBu
Input Sensitivity at Rated Output Power			0 (775)		dBu (mV)
Current (peak) NOTE 2	I_{pk}			± 50 [± 15]	A
Current (rms)	I_{RMS}		20 [5]		A
Voltage (peak) NOTE 2, NOTE 3	V_{pk}			± 200 [± 100]	V
INTERNAL NOISE GENERATOR					
Spectral Characteristic	Pink, White or shaped noise according IEC 60268, EIA 426B				
Crest Factor	CF	6		18	dB
DEVICE COMMUNICATION					
USB	Full Speed v 2.0 with Galvanic Isolation (optional) in accordance with CSA 60950-1-03 and IEC 60950-1, IEC 60601-1, DIN V (VDE V 0884-10):2006-12				
Wireless	IEEE 802.15 Standard Compliant, ISM Band 2.405-2.475 GHz				

PERFORMANCE

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Duration of measurement NOTE 4	T	10			s
Intermittent Cycle Mode	On/Off				
On Period	T_{on}	2		7200	s
Off Period	T_{off}	2		7200	s
Sample Time	T_S		0.004		s
Display Time	T_D	1		60	s
Web Time NOTE 5	T_W		1		s
Voice Coil Resistance Accuracy NOTE 6, NOTE 7			± 0.05		Ω
Voice Coil Temperature Accuracy NOTE 6, NOTE 7			± 1		°C
Magnet Temperature Accuracy NOTE 6				± 2.2	°C
Temperature Accuracy NOTE 6				± 1	°C
Humidity Accuracy NOTE 6				± 3.5	% RH
Pressure Accuracy NOTE 8				± 2	% FSS
Altitude Accuracy			± 100		m
Automatic Power Control NOTE 9	P_e	0 (off)			W
Automatic Voltage Control	V_{RMS}	0 (off)			V

GENERAL SPECIFICATIONS v. PRO [v. LITE]

PARAMETER	DESCRIPTION
Dimensions	483 x 392 x 44 mm (19 x 15.4 x 1.7 in) 19 in/1 Unit [483 x 366 x 44 mm (19 x 14.4 x 1.7 in) 19 in/1 Unit]
CardBoard Packaging Dimensions	
Net Weight	4.8 kg (10.6 lb) [3.8 Kg (8.4 lb)]
Shipping Weight	5.5 kg (12.1 lb) [4.5 Kg (9.9 lb)]
Construction	INOX and Aluminium chassis. INOX screws and power push button
CE	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive
EMC	CEI EN 61326-1(2007-3_1/EC), CEI EN 61000-3-2(2007-04/A1/A2), CEI EN 61000-3-3(2008-09_2), EN 61000-4-2(2010-01), CEI EN 61000-4-3 (2007-04_3/A1/IS1), CEI EN 61000-4-4(2006-01_2/A1/EC), CEI EN 61000-4-5(2007-10_2), CEI EN 61000-4-6(2011-10), CEI EN 61000-4-11(2006-02_2)
SAFETY	CEI EN 60335-1(2004-04_3), CEI EN 61010-1:2011-03



NOTE 0: on request
NOTE 1: I_{dc}~7mA @ 10Ω
NOTE 2: For higher currents and voltages ask to factory for special PRO version
NOTE 3: Use power amplifiers with balanced input to achieve best signal to noise ratio. Unbalanced amplifiers may show decreased noise performance and are susceptible to ground loop problems (such as humming at 50/60Hz), in this case we suggest USB optical isolation, or wireless version. Exclude intelligent input protection such as peaks limit, muting or DSP protection. Avoid DC coupling. Digital Amplifiers (Class D-Type) may also be used
NOTE 4: For long duration of measurement consider free HDD space
NOTE 5: For Web Manager version connect to the URL **http://yourIPaddress:8000/speakerlab.html** to see real time measurement from remote devices. Check port 8000 on your firewall.
NOTE 6: T_A= 25°C
NOTE 7: Double accuracy available on request
NOTE 8: Full Scale Span (FSS) is the algebraic difference between the output signal for the highest and lowest specified pressure.
NOTE 9: Applied Power is calculated on both R_e and Z_{min}

www.speakerlab.it

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