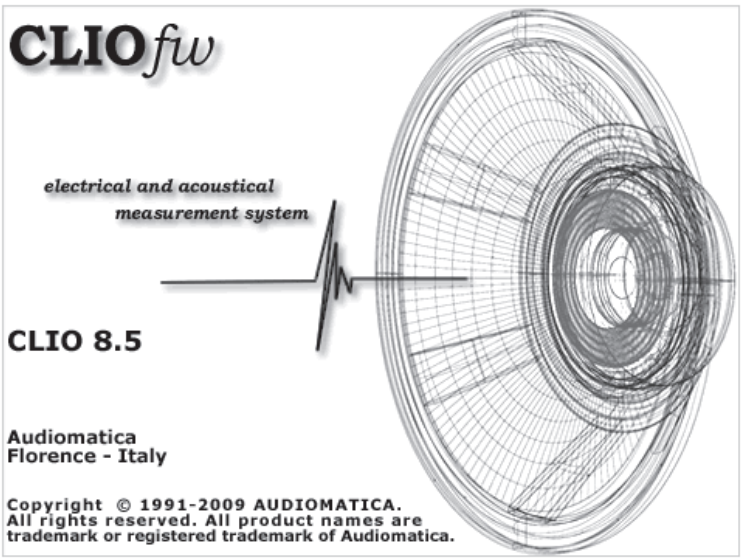
CLIO 8

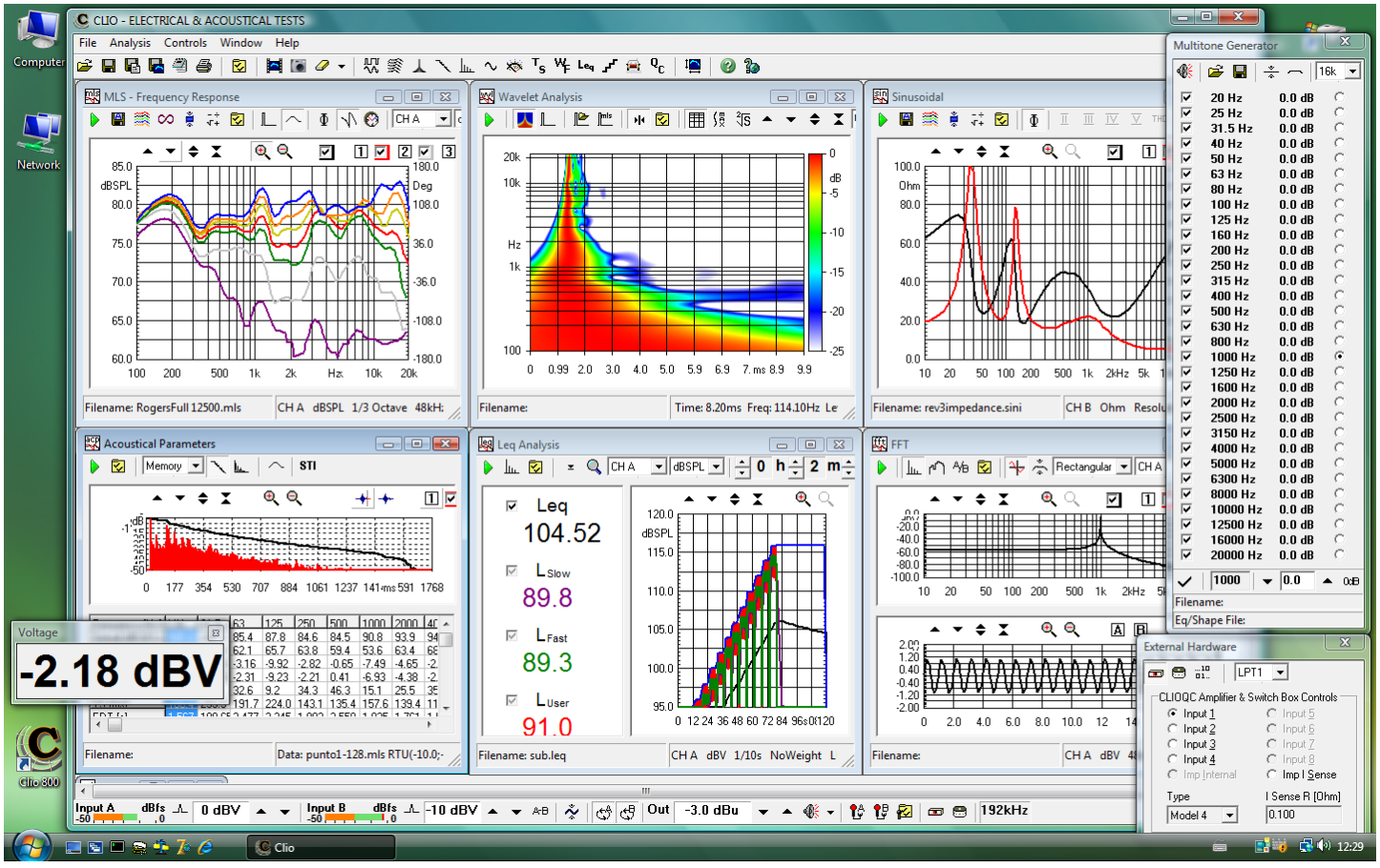
Turns your PC into the most complete easy-to-use electrical and acoustical measurement system ....



■ **CLIO 8.5**, by Audiomatica, is the new measurement software for the CLIO System. The CLIO System is the easiest and less expensive way to measure:
- electrical networks
- electronic equipment
- loudspeaker systems
- telephones & hearing aids
- environmental noise
- rooms acoustics
- quality of production lines

CLIO 8.5 runs on a standard PC computer driving the measurement hardware and accessories supplied by Audiomatica; the power, precision and reliability of the resulting instrument is 100% warranted.

CLIO 8.5 is a new design based on a huge work which is the synthesis of more than 16 years experience and excellence in electro-acoustic measurement systems and gives you all the power and flexibility you need.
CLIO 8.5 refines all the well established measurement techniques already implemented in the CLIO system while adding several new functionality.
CLIO 8.5 is one of the first measurement systems fully compliant with Windows Vista.



■ CLIO 8.5 MAIN SOFTWARE RELEASES AND VERSIONS

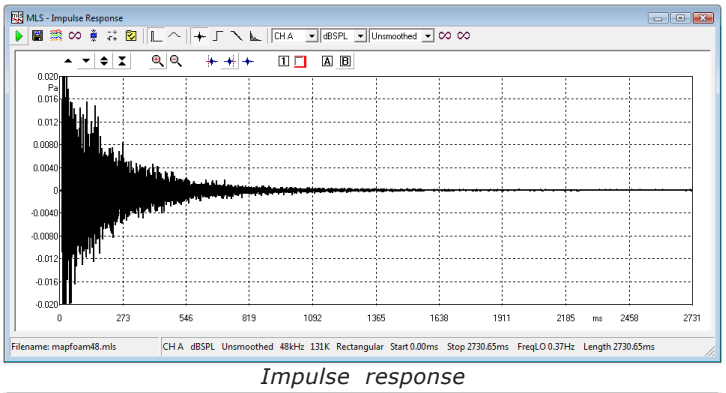
CLIO 8.5 comes in different releases to run the proper Audiomatica analyzer hardware.
CLIO 8.5: Controls the SC-02 + PB4281 PCI/USB Audio Interface (18 bit @ 48kHz).
CLIO 8.5 FW: Controls the FW-01 Firewire Audio Interface (24 bit @ 192kHz).
CLIO 8.5 comes also in different versions up to **Quality Control Version** for state-of-the-art testing and controlling a production line

■ CLIO 8.5 MEASUREMENT TECHNIQUES

Compared to other measurement systems, **CLIO 8.5** concentrates the power of many different instruments into a single one.
Three different measurement techniques are available for system identification and characterization:
■ **MLS & LogChirp analysis** using either pseudo-random noise or logarithmic chirps as stimuli
■ **Sinusoidal Sweeps** using sinusoidal signals
■ **FFT, RTA and 'Live' Transfer Function** letting you the choice of any stimulus, even live music.
While other instruments offer one single possible measurement choice, **CLIO 8.5** gives you three alternatives permitting to view the physical phenomenon like frequency response, impedance or other parameters, from three different points of view. The final result will be then validated by the consistency of these measurements: as any expert technician knows, this is the correct approach that should always be adopted.
The following specialized control panels are dedicated to other **specific measurements**:
■ **Sound Level Meter** a IEC61672 integrating sound level meter with Leq and frequency analysis
■ **Linearity and Distortion** measures the non linear behavior of an electronic equipment
■ **Interactive L-C-R Bridge** permits passive components measurement on the fly
■ **Wow&Flutter Meter** with time and frequency analysis
■ **Frequency Counter**
Beyond measured results you get sophisticated **post-processing tools** for:
■ **Thiele&Small Parameters** for loudspeaker characterization
■ **ISO 3382 Acoustical Parameters & STI** for rooms and auditoria characterization
■ **Waterfall plots** to evaluate sound decay as 3D or Color graphs
■ **Directivity analysis** for loudspeaker characterization as Color maps, Circular or 3D plots
■ **Wavelet analysis** for joint time-frequency loudspeaker characterization
Using all the aforementioned measuring and post-processing techniques it is possible to tailor powerful **Quality Control** scripts that will manage and identify any production line of electronic or electro-acoustic devices.

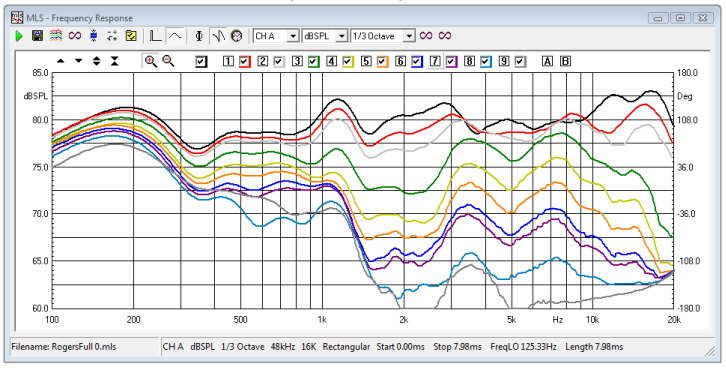
■ MLS & LOG CHIRP ANALYSIS

CLIO 8.5 implements linear systems measurement with the well established MLS analysis technique now enriched by the possibility of using Logarithmic Chirps. The result is the system's **impulse response** measurement, by means of sophisticated algorithms; this lets you perform accurate anechoic analysis of loudspeakers and room acoustics evaluation. The measurement is highly accurate and extremely fast to execute; the data recorded by the computer, can be instantly analyzed or stored for later processing.



Impulse response

What MLS & LogChirp analysis gives you:
■ Frequency response
■ Phase response, minimum and excess.
■ Group Delay
■ Impedance measurement
■ Step response
■ Energy-Time curve (ETC)
■ Schroeder reverberant decay
■ Selectable analysis window
■ Manual or continuous programmable time average



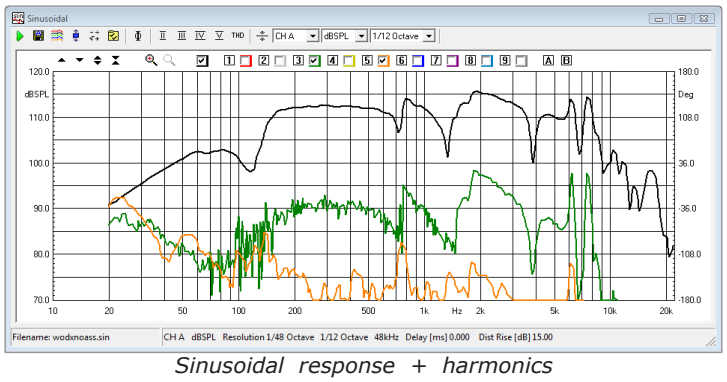
Frequency response

- Loop function with continuous measurement
- Mathematical operations on data in memory
- Automatic merge between near and far field
- Selectable smoothing (1/2 to 1/12 of octave)

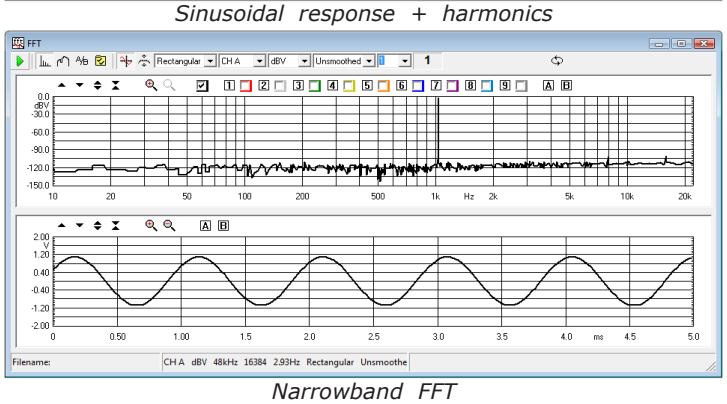
SINUSOIDAL ANALYSIS

CLIO 8.5 executes sinusoidal analysis with a digital filtering of input signal to achieve the highest noise-immunity; in this way you add the power of the PC to the most traditional frequency analysis. The sinusoidal technique is oriented to:

- Frequency response
- Phase response
- Continuous and stepped sweeps
- Frequency resolution from 1/3 to 1/48 oct.
- Impedance measurement
- 2nd, 3rd, 4th, 5th harmonic and THD plot vs. frequency
- Gating system with auto-delay for quasi-anechoic measurements



Sinusoidal response + harmonics



Narrowband FFT

FFT, RTA & 'LIVE' TRANSFER FUNCTION

These measurements are implemented with an interactive control panel that permits the simultaneous display of time and frequency domains. Three operating modes:

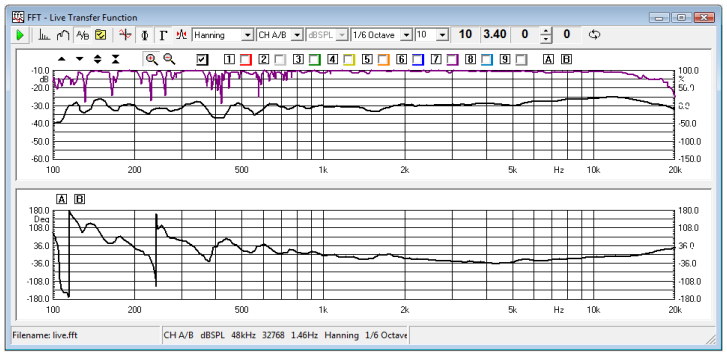
- Narrowband FFT
- Octave bands RTA
- 'LIVE' transfer function

The main features are:

- Two channels measurement and display
- Internal trigger with programmable delay
- FFT from 256 points up to 128k points
- Linear or exponential averaging
- Max hold and min hold functions
- Linear or logarithmic frequency axis
- 1/3 octave or 1/6 octave RTA display
- Equal Loudness Contours display
- Frequency smoothing

With FFT it is possible to easily execute bursted distortion measurements delivering, for a definable short period of time, very high power to the load.

Octave bands RTA



'LIVE' transfer function

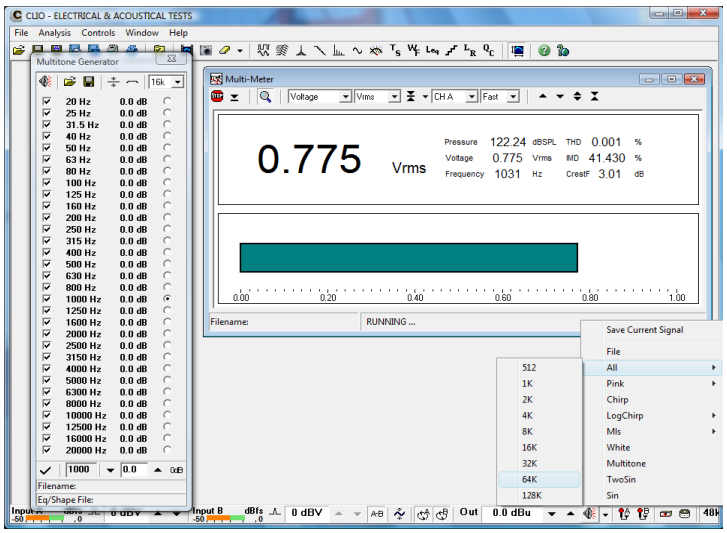
MULTI-METER & SIGNAL GENERATOR

This multi-meter control panel is a real-time, interactive, measuring instrument giving the following functionality:

- SPL Meter (dBSPL, dBA, dBC)
- Millivoltmeter (V, dBV, dBu, dBr)
- Frequency Counter (Hz)
- Distortion meter: THD and IMD (%, dB)
- L-C-R Bridge (H, uF, Ohm)
- Crest Factor
- Fast and Slow integration

The programmable signal generator is capable of the following functions or signals generation:

- Sinusoids with burst and FFT bin round
- Two sinusoids

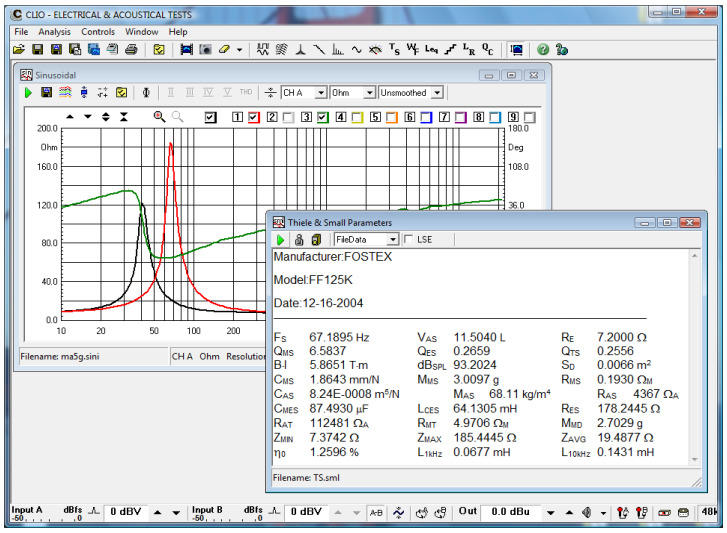


Multimeter and signal generator

- Multitones & All Tones
- Linear or Logarithmic Chirps
- MLS (Maximum Length Sequences)
- Pink and White noise
- Wave files (.wav) playback and save

IMPEDANCE MEASUREMENTS AND THIELE&SMALL PARAMETERS

The impedance measurements can be done with a direct connection to the analyzing hardware or with an external amplifier and a sensing resistor both in constant current or constant voltage configurations; the evaluation of speaker parameters uses the added-mass or known-volume methods and least square error routines.

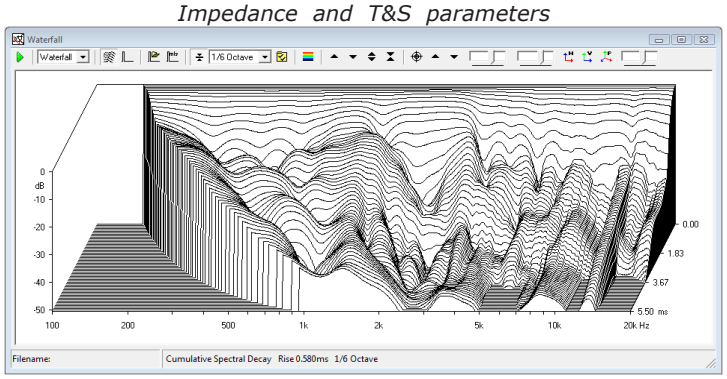


Impedance and T&S parameters

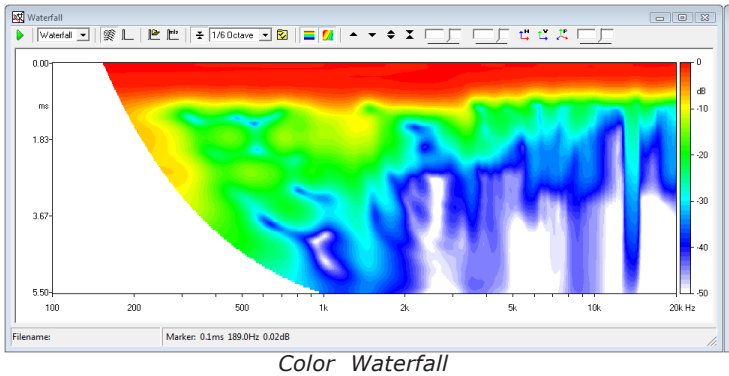
WATERFALL, DIRECTIVITY

The Waterfall and Directivity post processing routines give **CLIO 8.5** the possibility of making 3D or Color plots by adding a third dimension (time or degrees) to classical amplitude-frequency graphs. Waterfalls are used to characterize the anechoic sound decay of a loudspeaker or the sound decay in a room.

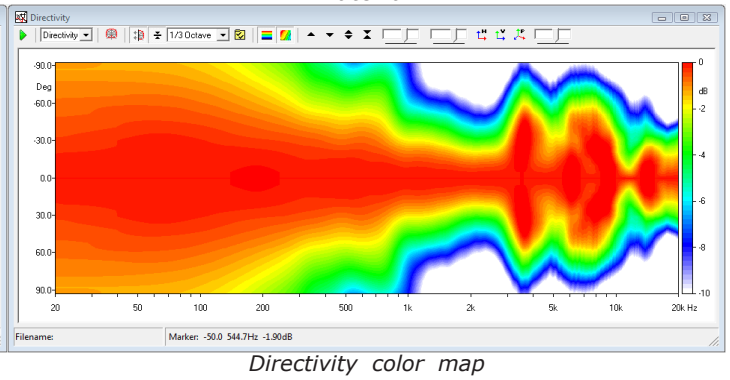
The Waterfall post processing permits the following 3-D or Color types of analysis:



Waterfall



Color Waterfall



Directivity color map

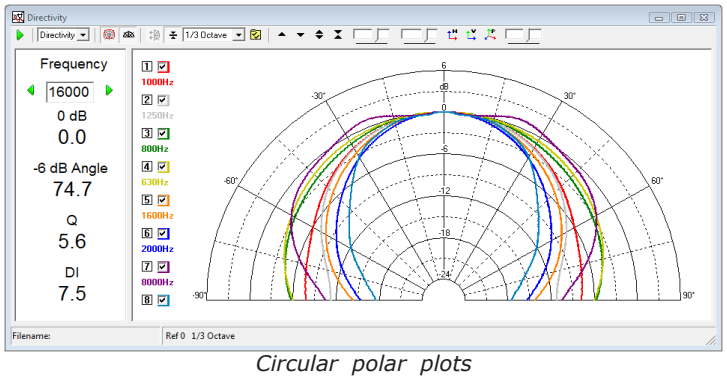
- **Cumulative spectral decay (CSD)**
- **Energy Time Frequency (ETF)**

Directivity analysis characterizes the radiation of a loudspeaker versus vertical or horizontal angle. The Directivity post processing permits the following analysis:

- **3-D directivity (waterfall like)**
- **Color map directivity**
- **Classical polar plots**

To help characterizing the radiation of a loudspeaker in space also available (in QC software version) are the following:

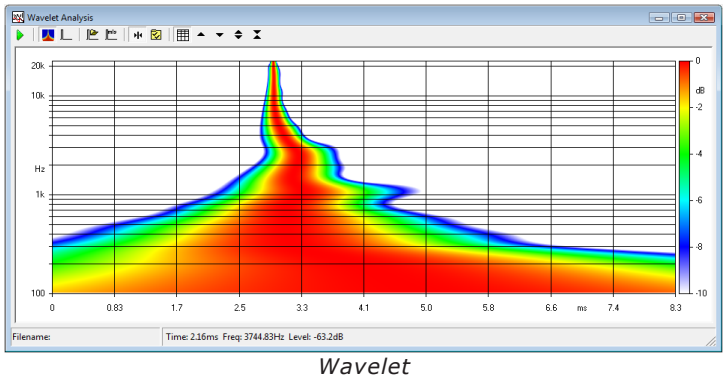
- **3-D turntables control**
- **3-D measurement manager**



Circular polar plots

WAVELET ANALYSIS

The Wavelet Analysis tool allows to post-process impulse responses and to create color plots of the energy of the signal versus time and frequency. The tool is similar to the Energy Time Frequency analysis but, since it is based on wavelet transform

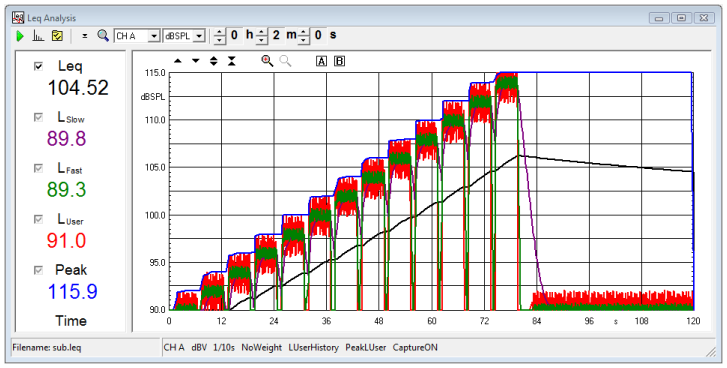


Wavelet

instead of Fourier Transform, does not suffer from a fixed time-frequency resolution.

■ Leq ANALYSIS

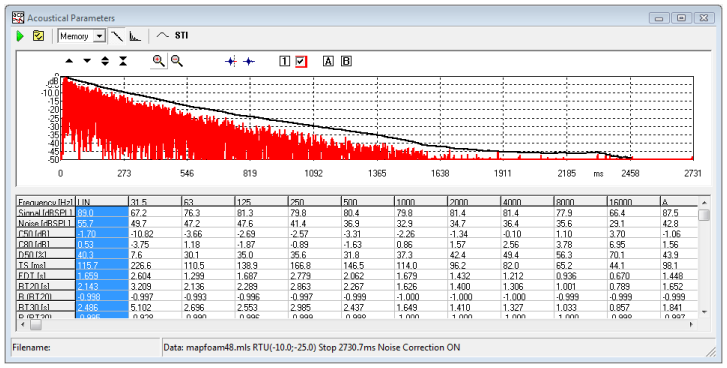
With the Leq Analysis control panel it is possible to execute **real-time capture and level measurement** of any kind of signal present at CLIO's input. The behaviour of the instrument closely resemble that of a graphical level recorder plus direct-to-disk data capture. When analyzing an acoustical event this control panel gives you complete informations about the equivalent continuous sound level (Leq) and related quantities according to IEC 61672 standard; if used together the FFT frequency analysis you get a complete **integrating sound level meter**.



Leq analysis

■ ACOUSTICAL PARAMETERS & STI

With the Acoustical Parameters control panel it is possible to evaluate the acoustical behaviour of a room and carry out sophisticated post processing of a measured impulse response to calculate the acoustical parameters as defined by the **ISO 3382** standard or the **Speech Transmission Index**. These quantities describe the behaviour of auditoria, concert halls and are applicable to any room intended for speech or music reproduction.

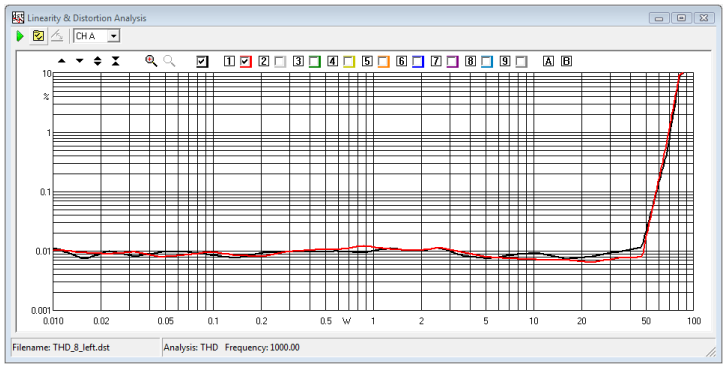


ISO 3382 Acoustical Parameters

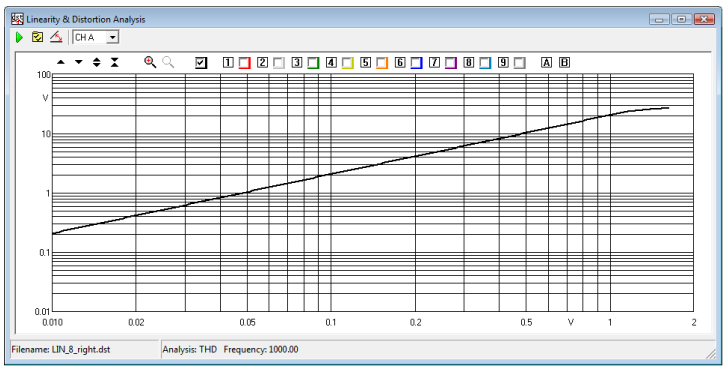
■ LINEARITY AND DISTORTION

Linearity and Distortion analysis is a complete tool to inspect the non linear behavior of any electronic equipment as power amplifiers or preamplifiers.

- Up to 1250W/8Ohm (higher with external attenuator)
- THD vs. input or output
- SMPTE, DIN, CCIFF Intermodulation
- DUT's gain and deviation from linearity



Distortion vs. output power



Linearity analysis

■ WOW & FLUTTER ANALYSIS

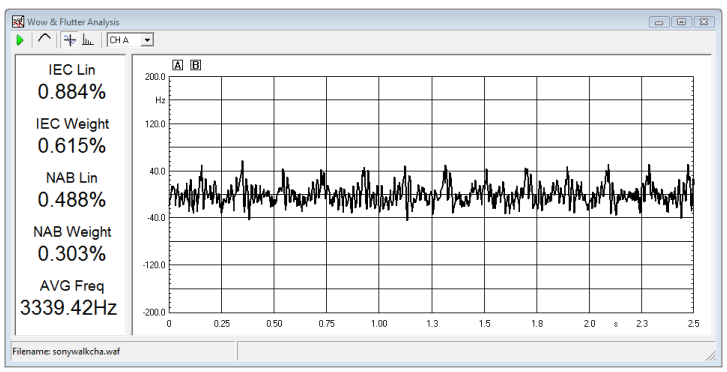
CLIO 8.5 executes Wow & Flutter analysis measuring the frequency modulation that follows instantaneous speed variations due to mechanical imperfections in analog recording or playback devices.

- IEC and NAB standards
- Time and frequency display

■ CLIO 8.5 USER INTERFACE

The various control panels give you the impression of facing a real instrument. The software displays multiple curves giving you powerful editing capabilities together import and export facilities as a link to simulation programs. Featuring:

- Measurement session management
- ASCII data output
- EMS, Bitmap, PNG, GIF, JPEG graphics export



Wow & Flutter

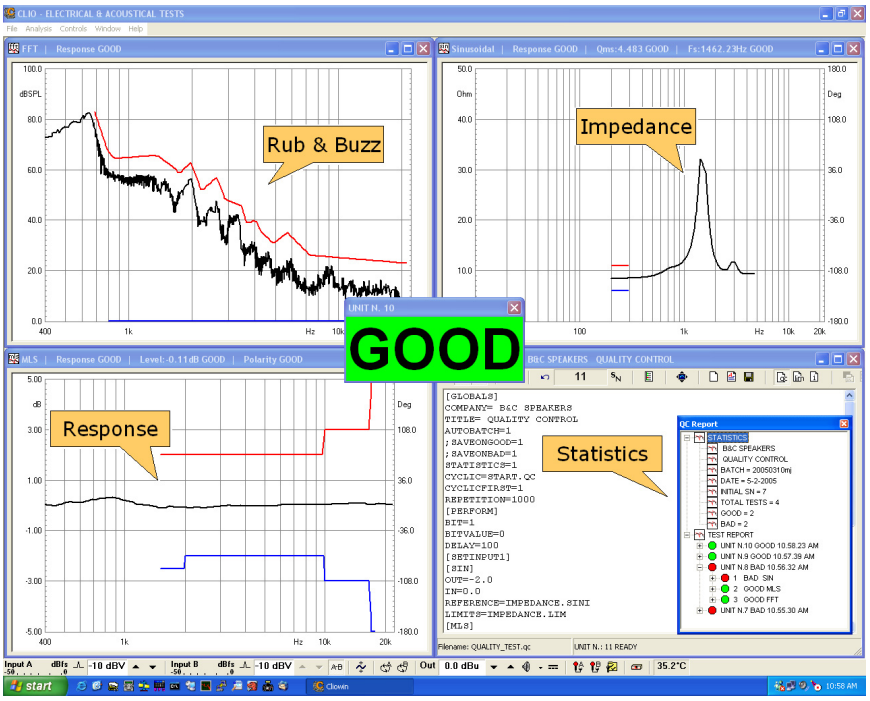
■ QUALITY CONTROL

The **Quality Control** software extension for **CLIO 8.5** is a powerful suite for executing state of the art production line testing. **CLIO 8.5 QC** implements all the measurement techniques found in the standard software adding a versatile script processor that handles the test sequence most appropriate for your needs. **CLIO 8.5 QC** is able to test the production of loudspeakers, drivers, microphones, amplifiers and any other electroacoustic device.

CLIO 8.5 QC can interact with external hardware or production line controllers in addition to PC peripherals, computer networks or with custom written software to implement a fully automatic line.

CLIO 8.5 QC is also able to behave as a **TCP/IP measurement server** to implement your custom written code. Some of the measurements possible:

- Frequency response using MLS, LogChirp or Sinusoidal Sweep
- Impedance response using MLS, LogChirp or Sinusoidal Sweep
- Rub & Buzz detection
- Polarity
- Single harmonic or THD response with Sinusoidal Sweep
- Narrowband FFT analysis with definable stimulus
- T&S parameters
- Sensitivity
- Frequency
- THD
- IMD
- Noise



■ POWERFUL HARDWARE CONTROL

The key feature of the CLIO System running **CLIO 8.5** is the precision, laboratory grade, **hardware control** that gives you complete, instant access to all the measurement parameters and let you easily interact via software to adapt your measurement interface to any environmental need; using CLIO you get **results** that are 100% warranted by the hardware interface built by Audiomatica.

- Stereo input and output control
- Peak Meter to monitor input signal
- 0.1dB output level control
- Output DC voltage control

- **CLIO 8.5** integrates the software control for the new **Model 5 Amplifier, Switching and Testing box:**
- USB controlled
- 50W (8Ohm) output stage w/DC control
- 4 input w/phantom supply (programmable 0÷24V)
- 2 DC voltage measuring input
- I-Sense output with DC current measuring
- General Purpose I/O bits

■ PC REQUIREMENTS

- **CLIO 8.5 FW:** P4 or Dual Core 2Ghz, XP or Vista
- **CLIO 8.5:** Pentium III, Windows 2000 or XP

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