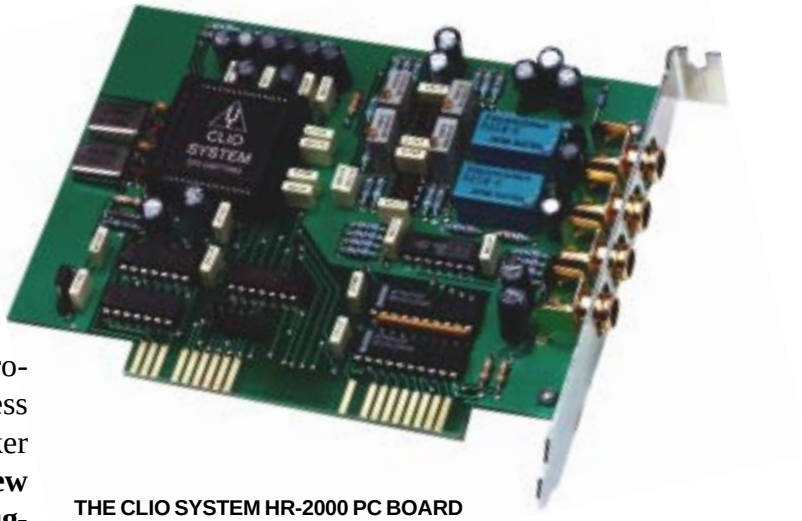
CLIO

ELECTRICAL & ACOUSTICAL TESTS



THE CLIO SYSTEM HR-2000 PC BOARD

CLIO, by Audiomatica, is a complete and reliable electro-acoustic measurement system. CLIO is the easiest and less expensive way to test electronic equipment, loudspeaker systems and execute acoustical room analysis. The **new software release 4.5 and the quality control software plug-in** make CLIO even more attractive adding new functionality to this already complete package.

THE HARDWARE OF CLIO

CLIO, housed on a standard IBM-PC board, works as a precision A/D D/A audio front-end for your PC; once fitted in a laptop providing an ISA slot, gives you the power of a lightweight portable instruments for on-field acoustical measurements; it is capable of generating any pre-defined stimuli like already defined signals: sine, two-tone, burst, white and pink noise, MLS (maximum length sequence) and all the others in its libraries saved on disk; on the other hand it is capable of analyzing the signal present at its inputs both in frequency and time domains; the wide range of programmable output attenuation (resolution of 0.1 dB) and input gain allows an easy interface to the outer world; the software controls the two input channels separately or as a single balanced one. Dual DMA handling permits both generation and acquisition to be performed in background giving maximum flexibility and ease of operation. The CLIO board can be directly connected to a microphone without the need for an external preampifier; the proposed line of the two **MIC-01 and MIC-02 microphones** perfectly match the requirements of a professional measurement system. The optional, battery-operated, **PRE-01 microphone preamplifier** satisfies the needs of laboratory measurements, performs A-weight (or B, or C) filtering and drives long cables to the PC. The new **CLIOQC power amplifier and switch-box** permits frequency response and impedance tests with no change in the wiring connection of the loudspeaker under test and also to switch between two measurement microphones. All internal functions are TTL controlled.

MIC-01 AND MIC-02 MICROPHONES

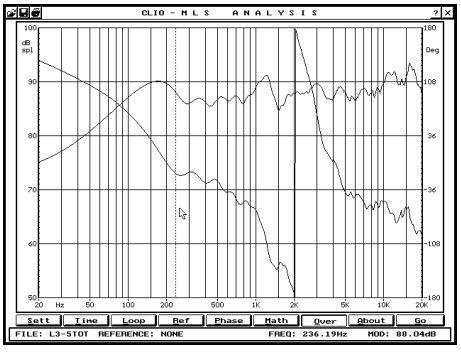
CLIOQC AMPLIFIER & SWITCH BOX
NEW! MODEL 2 (2 INPUT) AND 3 (8 INPUT)

THREE SOFTWARE VERSIONS

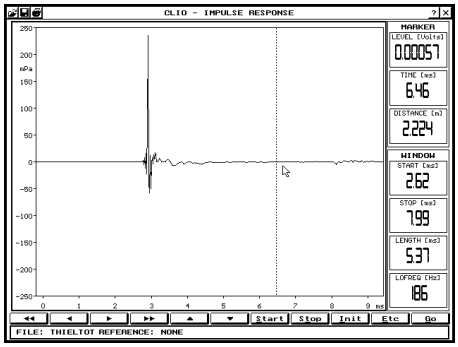
You can enter the CLIO world in three different ways. If you execute, for the first time, electro-acoustic measurements and only need a limited, but still powerful, version of CLIO then choose **CLIO Lite** and its unbeatable price! If you need the full power of our professional package choose **CLIO Standard**. And if you need the extra flexibility required for testing and controlling a production line then add the **Quality Control Plug-in**.

THE CLIO SYSTEM MEASUREMENT TECHNIQUES
MLS ANALYSIS

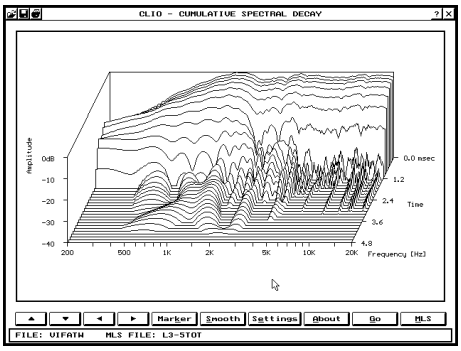
CLIO takes great advantage of the well established MLS analysis technique: the system is stimulated with a pseudo-casual noise and then its **impulse response** is reconstructed, by means of sophisticated algorithms; it is the de-facto standard for accurate anechoic analysis and for room acoustics.



MLS ANALYSIS: AMPLITUDE AND PHASE



IMPULSE RESPONSE



WATERFALL
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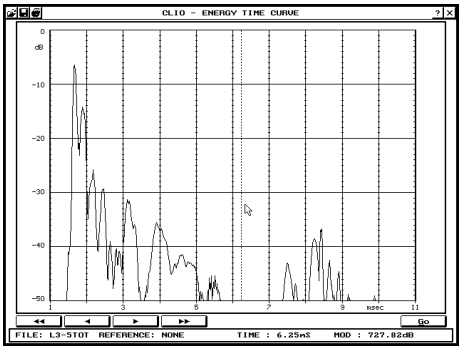


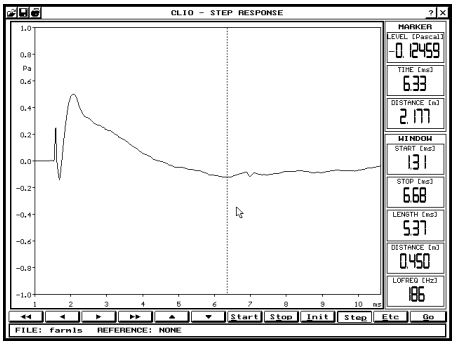
ENERGY TIME CURVE

The measurement is highly accurate and extremely fast to execute; the data recorded by the computer, can be instantly analyzed or stored for later post-processing.
From the impulse response it is possible to obtain:

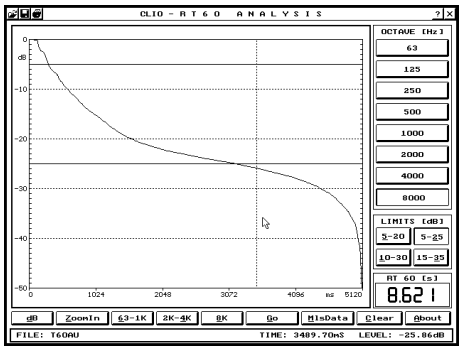
- Frequency response
- Phase response, minimum phase, phase with group delay removed.
- Step response
- Energy-Time curve (ETC)
- Cumulative spectral decay (Waterfall)
- Reverberation time (RT60)

The actual software release 4 permits, among other features, the following:

- Input signal autorange for optimum signal to noise ratio.
- Selectable analysis window
- Manual or continuous programmable time average
- Loop function with continuous measurement refresh
- Mathematical operations on data in memory
- Automatic merge function between near and far field
- Selectable smoothing factor (from 1/2 to 1/12 of octave)



STEP RESPONSE

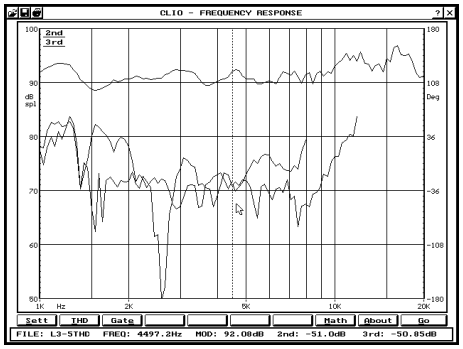


REVERBERANT DECAY (RT 60)
(not available in Lite version)

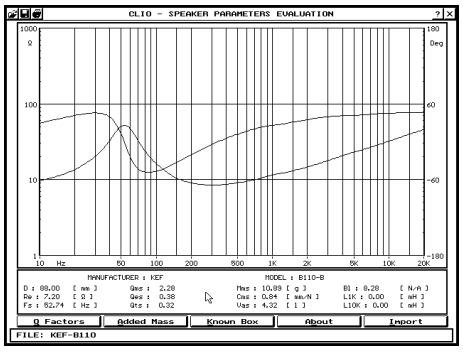
SINUSOIDAL ANALYSIS

CLIO executes sinusoidal analysis with a sophisticated 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:

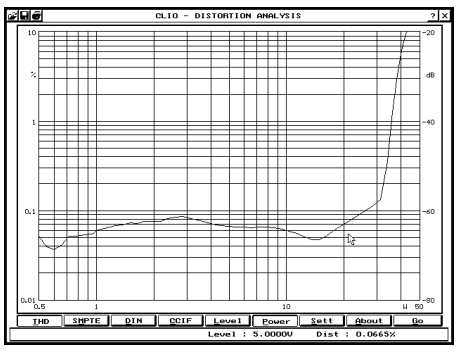
- Frequency and phase response
- Gating system for quasi-anechoic measurements
- File driven shaped amplitude generation
- Second and third harmonic plot vs. frequency
- Harmonic and intermodulation distortion vs. level (SMPTE, CCIF, DIN)
- Polar plots with hardware control of a turntable
- Impedance measurements
- Automatic evaluation of the Thiele-Small parameters
- Real-time interactive measurement of capacitors and inductors



DISTORTION VS. FREQUENCY



THIELE-SMALL PARAMETERS



DISTORTION VS. LEVEL
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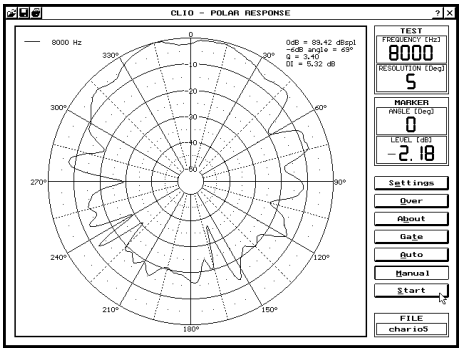

POLAR PLOT
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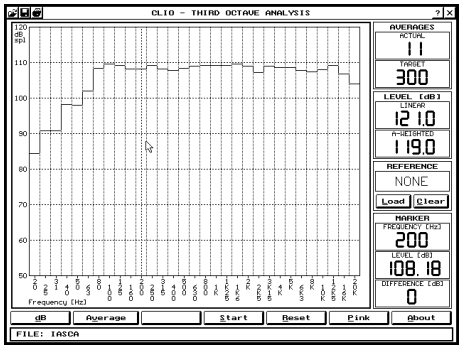
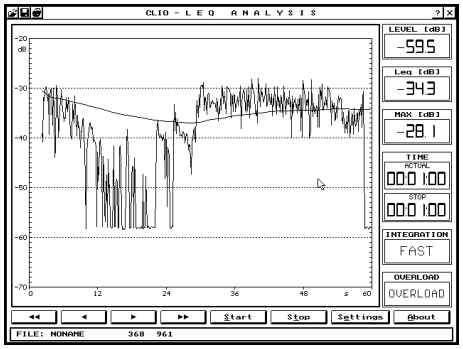
The frequency resolution can be as high as 1/48th of octave; the input signal autorange yields a very high dynamic range; the impedance measurements can be done with a direct connection or with an external amplifier and a sensing resistor both in constant current or constant voltage configurations; the procedure for the evaluation of speaker parameters uses the added-mass or known-volume methods and minimum square error routines.



RTA

THIRD OF OCTAVE ANALYSIS

This classical measurement is implemented with the possibility of using, as stimulus, a pseudo-random pink-noise thus minimizing the number of averages needed; for Car Stereo installers it is also possible to calculate the IASCA score (not available in Lite version).



TIME HISTORY & Leq
(not available in Lite version)

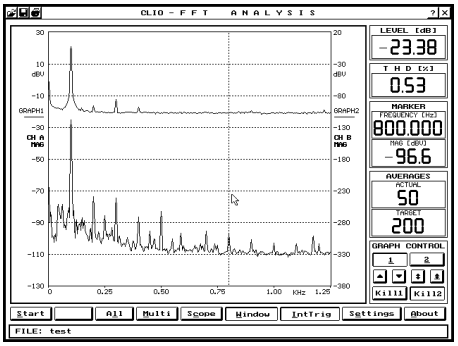
EQUIVALENT LEVEL MEASUREMENT

CLIO executes the real-time calculation (integration of the input signal) of the equivalent level Leq; the value is displayed together with the time history of the signal; this is useful for environmental noise monitoring and as a classical paper recorder.

FFT ANALYSIS AND OSCILLOSCOPE

These measurements are implemented with interactive control panels that easily permit to switch back and forth between time and frequency domains.
The main features are:

- Two channels measurement and display (time and frequency)
- Internal trigger with programmable delay (time and frequency)
- Real-time THD calculator
- FFT up to 4096 points
- Transfer function between input channels
- Modulus, real and imaginary parts display
- Linear or logarithmic frequency axis
- Linear or dB amplitude scale
- Alltone signals for real-time transfer function
- Multitone signals generation



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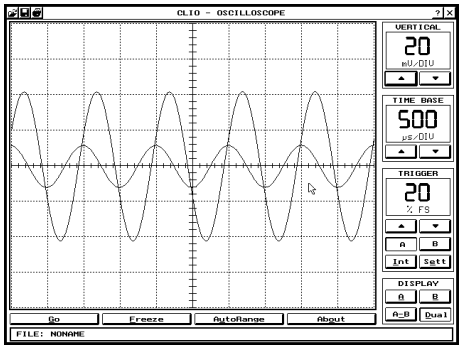
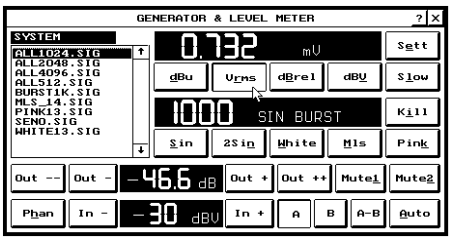
With FFT it is possible to easily execute bursted distortion measurements delivering, for a definable short period of time, very high power to the load.



DUAL CHANNEL OSCILLOSCOPE

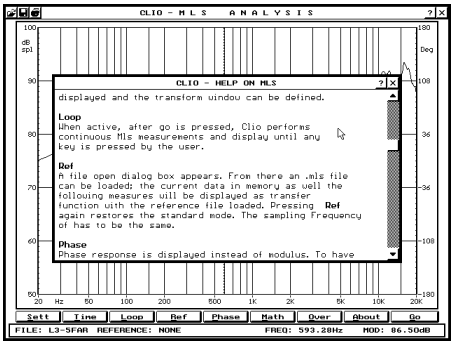
SIGNAL GENERATOR AND MILLIVOLTMETER



and is recallable from any other measurement menu; it permits the generation of all pre defined stimuli, the output amplitude control, the input channel selection and input gain control; the input level may be viewed as Vrms, dBu, dBV, dBSPL or dB relative.

THE RELEASE 4.5 USER INTERFACE

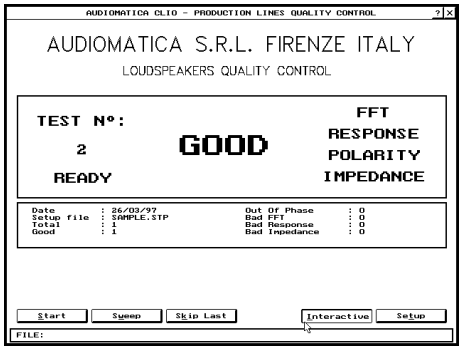
The actual CLIO system software release 4.5 uses an intuitive "Windows-Like" user interface; the various control panels, result of Audiomatica's decennial experience in programming and audio measurements, give you the impression of facing a real instrument. The software displays multiple curves giving you powerful editing capabilities together import and export facilities as a link to simulation programs. The context-sensitive Help On-Line simplifies, even the first time, CLIO's use.



HELP ON LINE

THE QC (QUALITY CONTROL) MEASUREMENT MENU PLUG-IN

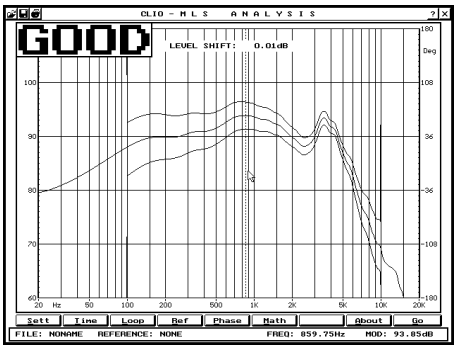
The QC software represents Audiomatica's "on-field developed" solution for any production facility; it is a **plug-in** software that enhances CLIO 4.5 giving the possibility of no-compromise testing of production lines. The QC plug-in is functionally "inside" the main system software giving the developing engineer all the functionality of the standard software; during production tests it may present simple "go-no go" masks in order to be run by inexperienced operators.



THE QC CONTROL PANEL

The QC software is file-driven and permits the following measurements:

- Definable sinusoidal continuous sweeps for classical "ear-driven" tests
- Level tests with bargraph display
- FFT with totally definable masks and signals to allow ultra-fast tests of:
  - THD
  - IMD
  - Level
  - Noise
  - Frequency response
- Impedance with sinusoidal stimulus. Featuring:
  - Definable limits
  - Thiele/Small parameters QC test.
- Frequency response with MLS analysis. Featuring:
  - Absolute or relative response check
  - Global level check with definable tolerance and visual shift compensation
  - Definable offset to check devices with different sensitivity
  - Standard deviation within the batch
- Polarity



FREQUENCY RESPONSE AND QC MASKS

The check masks may be easily viewed to self-explain the executed QC test. Data files can be autosaved for off-line post processing and reporting.

The QC software can also interact with the outer world by means of I/O TTL signals in order to realise a fully automated testing environment; custom controls have been tailored for the CLIOQC Amplifier & SwitchBox.

TECHNICAL SPECIFICATIONS

GENERATOR

Type: two channels 16 Bit sigma-delta D/A Converter
Frequency range: 1Hz-22KHz(+0-1dB)
Frequency accuracy: >0.01%
Frequency resolution: 0.01 Hz
Output impedance: 100 Ohm
Maximum output level (Sine): 12dBu (3.1 V RMS)
Attenuation: 0.1 dB steps (from +12 to -63 dB) + mute
THD+Noise (Sine): 0.015%

ANALYZER

Type: two channels 16 bit sigma-delta A/D Converter
Input range: +30 ÷ -40 dBV
Input impedance: 64 KOhm (5.6 KOhm mic input)
Phantom: 8.2V

MISCELLANEOUS

Sampling frequency: 51.2KHz÷1.6KHz
Card type: 14 cm. 8 bit PC slot card
Card connections: four RCA plugs
Adaptor cables to speakers terminals

MICROPHONE MIC-01 (MIC-02)

Type: Condenser Electret
Accuracy: ±1 dB 20Hz÷10KHz, ±2 dB 10÷20KHz (direct field)
Maximum level: 130 dB SPL
Dimensions:8mm diameter, 25 cm long
Accessories: 2.7m cable, stand adaptor
MIC-02: As MIC-01 but 12 cm long

PC CHARACTERISTICS

80486 DX-33 or more; one 8-bit half-size free slot; VGA video board or more; 2 MBytes RAM; Hard-Disk; co-processor is required.

PREAMPLIFIER PRE-01

Frequency response:7Hz÷110KHz (-3 dB)
Weighting filters: A,B,C (IEC651- Type I)
Phantom supply: 8.2V (5600 Ohm)
Gain: 0 or 20 dB
Dimensions (cm): 12.5x5x19
Weight: 900 g
Accessories: 2 x 9V cells

CLIOQC AMPLI&SWITCHBOX

Two (Model 2) or eight (Model 3) line/ microphone inputs with selectable phantom power (8.2V); TTL controlled internal switches for impedance measurements; amplifier current sensing.
Output power: 10W
THD (1 kHz): 0.004 %
Dimensions (cm): 23x9x23
Weight: 2.7 kg
110-120/220-240V AC Mains powered.

CLIO

ELECTRICAL & ACOUSTICAL TESTS

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