

ACOUSTILYZER

Compact Acoustical Analyzer



- Real Time Analyzer
- Reverberation Time RT60
- Speech Intelligibility STIPA
- Zoom FFT, Delay, THD+N, ...
- Class 0 design
- Long Battery Life (>16h)



The Acoustilyzer AL1 shares a common hardware platform with the Minitlyzer ML1. It greatly expands the Minstruments family with a comprehensive set of acoustical measurement functions. The practical blend of electrical and acoustical functions,

combined with computer connectivity through the standard USB interface positions AL1 to be an indispensable tool for every sound/system contractor, installer and multi-media specialist. For existing Minitlyzer users a Crossgrade package is offered.



Sound Level Meter

Featuring SPL (act, max, min), LEQ, repeatable short time LEQ and logging functionality. RTA display is selectable without interrupting broad band measurements, fulfilling any event monitoring requirement.



Real Time Analyzer, RTA

Fast RTA with 1/3 and full octave resolution also calculates SPL, LEQ and Max/Min for each band. Numerical cursor readout with peak hold. Fast logging of RTA results together with broad band values via PC interface.



Zoom FFT

Extremely fast, real-time Zoom FFT with resolutions up to 0.7Hz over the entire frequency range. The ideal tool for visualization of comb filters and narrow band effects. Features detailed cursor readout and data storage.

Reverberation Time RT60

Octave band RT60 measurements according to ISO3382 with auto trigger, ranging and averaging. Suitable gated pink noise sequences are included on the supplied test signal CD.



Delay Time

Calculates the delay time between electrical reference signal and signal from built-in microphone using designated chirp provided on Test CD. The automatic difference display simplifies the verification of delay line arrangements.



Speech Intelligibility STIPA

The STIPA analyzer option allows reliable measurement of the intelligibility according to the latest IEC standards within 15 sec. Measurements may be referenced to previously acquired noise level spectra. TNO verified algorithm.



Technical Data Acoustilyzer AL1

Sound Pressure Level	<ul style="list-style-type: none"> Leq, short-time Leq, Lmin, Lmax Timer for single and repeated measurements Dynamic range (using MiniSPL): 30 - 130 dB SPL Filters: Flat, A- and C-weighted, X-Curve¹, RLB Logging of SPL/LEQ results into AL1 memory Wideband- and RTA values simultaneously available
Real Time Analyzer	<ul style="list-style-type: none"> 1/3 or full octave band resolution, class 0 filters SPL, LEQ and Max-Min display per band Fast logging of results to the PC
Zoom FFT	<ul style="list-style-type: none"> Real-time Zoom FFT with 50% overlapping, 93 Bins Frequency Range: 10 Hz - 20 kHz Resolution: 187.5 Hz to 0.73 Hz
Reverberation Time	<ul style="list-style-type: none"> Octave band resolution, based on T20 results, according to ISO3382. Automatic averaging with individual result readout and storage Source signal: Gated pink noise (CD included)
Delay Time	<ul style="list-style-type: none"> Propagation delay between electrical and acoustical signal input using built-in mic. Resolution < 0.1 ms, max time: 1 s Dedicated test signal: NTI chirp (CD included)
STIPA (Option)	<ul style="list-style-type: none"> Single value STI and CIS test result. Modulation indices and individual band level results accessible. Error indicator according to IEC 60268-16 2003 release TNO verified algorithm Post processing with recorded spectra supported
Electrical	<ul style="list-style-type: none"> Level RMS, THD+N, Frequency, Polarity Filters: Flat, A- and C-weighted, HP400, TP19k
PC Interface	<ul style="list-style-type: none"> MiniLINK USB interface with PC software and interface cable included

Further technical data continued on next page.

Accessories for Acoustilyzer and Minitlyzer



MiniSPL Battery powered Measurement Microphone
NTI Art.No 600 000 022



ML1 Adapter -20dB Electrical Attenuator
NTI Art.No 600 000 014



System Case for Minitlyzer + Mic
NTI Art.No 600 000 020



Pouch for ML1/AL1 Soft pouch with belt-loop
NTI Art.No 600 000 012



MiniLINK USB PC Interface for ML1, Software
NTI Art.No 600 000 033

NTI article codes :

Acoustilyzer AL1 (MiniLINK included)	600 000 080
ML1-AL1 Firmware Crossgrade (for all Minitlyzer ML1 users, MiniLINK required)	800 000 012
STIPA Measurement Option	800 000 013

Technical Data Minitlyzer ML1 + Acoustilyzer AL1

Input Connectors	XLR balanced, RCA unbalanced
Input Impedance	40 kOhm balanced, 20 kOhm unbalanced
Input RMS (upper meas. limit)	+20 dBu balanced, +14 dBu unbalanced use ML1 Adapter 20 dB for balanced levels up to 40 dBu
Max. DC Input	±50 V
Residual Noise	< 12 µV, XLR-input shorted
Internal Microphone	Omni directional (for Polarity and Delay measurements only)
Monitor Output	Jack 3.5 mm (1/8"), suitable for all common headsets
Display	Backlit graphic LCD, 64 x 120 pixels
Batteries	3x AA batteries (alkaline) Typical battery lifetime > 16 hrs
Dimensions (LxWxH)	163 x 86 x 42 mm (6.4" x 3.38" x 1.63")
Weight	300 g (10.5 oz) incl. batteries
Temperature	0° to +45°C (32° to 113° F)
Humidity	< 90 % R.H., non condensing

Technical Data Minitlyzer ML1

Measurements	Level-RMS, Level-Relative, THD+N, k2, k5, vu+ PPM, Frequency, Polarity, Signal Balance Error, Frequency Sweep, Time Sweep, 1/3 rd Octave Spectrum, Scope, AFIS measurements supported (with MiniLINK)
Level	Units: dBu, dBV, V _u Accuracy: ± 0.5 % @ 1 kHz Flatness: ± 0.1 dB Bandwidth: 20 Hz to 20 kHz Resolution: 3 digits (dB-scale) or 4 digits (V-scale)
Frequency	Range: 10 Hz to 20 kHz Resolution: 4 digits Accuracy: < ± 0.1 %
THD+N	including 2 nd to 5 th harmonics analysis (ML1 only) Meas. Bandwidth: 10 Hz to 20 kHz Resolution: 3 digits (dB-scale) or 4 digits (%-scale) Residual THD+N: balanced < -85 dB @ -10 dBu to +20 dBu unbalanced < -74 dB @ 0 dBu to +14 dBu
vu & PPM (vu-Indicator and Peak Program Meter)	according to IEC 60268 and DIN 45406 PPM Type I, II and Nordic. Both meters with adjustable reference and with a analog & numerical peak-hold readout.
Polarity Test	Positive/Negative detection through internal microphone or XLR/RCA connector. Checks polarity of midrange-speakers, woofers and cables. MR1 test signal
Signal Balance Error	Indication range 0.0 % to 100 % Deviation from perfect balance in % or *1
Sweep	Level vs. Frequency or Level and THD+N and Frequency vs. Time
1/3 rd Octave	Spectrum acc. IEC 1260, class II and ANSI S1.11-1976, class II from 50 Hz to 20 kHz, Bargraph for Level RMS 20 Hz to 20 kHz
Scope	Auto triggering, auto ranging, auto scaling
Filters	Flat, A-weighting, C-message, Highpass 22 Hz / 60 Hz / 400 Hz, Voice bandpass, XCurve ¹

NTI article codes :

Minitlyzer ML1	600 000 011
Minitlyzer ML1 incl. MiniLINK USB PC Interface	600 000 030

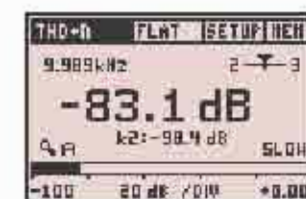


The Minitlyzer ML1 is a powerful, complete Audio Analyzer in a palm-sized format. Its comprehensive set of easy to access measurement functions simplify the process of system verification, diagnostics and repairs of even very complex audio installations.



Frequency Sweep

ML1 automatically triggers to a sweep sequence with any step width and records the frequency response. The MR1, a test CD or any other stepped sweep may be used as signal source. After capture all sweep data is available



THD+N

Supports Total Harmonic Distortion plus Noise (THD+N) as well as 2nd to 5th selective harmonic distortion as dB value or in %. Input level and frequency measurement runs in parallel and BAL indicator finds defective cables



Level

Continuously measures absolute input levels either in volts, dBu or dBV and the signal frequency. Relative measurements are also supported. Connecting MiniSPL further supports SPL and LEQ measurements.

MINILYZER

Analog Audio Analyzer

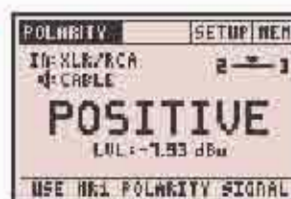
- Level: RMS, Rel, SPL, LEQ
- THD+N, 2nd to 5th Harmonics
- Frequency and Time Sweeps
- Scope, vu+PPM, Polarity
- Balanced & Unbalanced Input
- High Accuracy (±/ 0.1dB)



The smart user interface aids operators of all skill levels by setting all ranges automatically and providing complete results on a single screen. An optional USB interface supports data storage, documentation and firmware updates.

Polarity

Finding wrongly connected speakers is as simple as moving ML1 into the sound field of the speaker under test and its polarity will be displayed. The same measurement through the XLR input is ideal for cable tests.



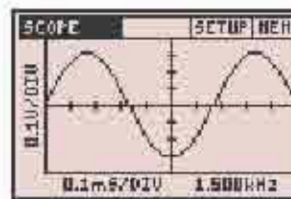
Time Sweep

Intermittent faults are often hard to find. The time sweep records the RMS level, frequency and the THD+N value simultaneously, helping to monitor the audio signal during a long period of time for later analysis.



Scope

Provides a quick and robust look at the waveform of the balanced audio signal, quickly finding clipping amplifiers etc. The auto-scale and auto-trigger functionality are normally only found in expensive stand alone scopes.



MiniLINK

ML1 USB Interface

- Local Data Storage
- Documentation
- Online Data Logging
- Presentations
- USB Interface
- Update kit for all ML1/DL1



The MiniLINK USB interface transforms the Minstruments into a new set of affordable and connected measurement tools. MiniLINK is a standard feature of the Acoustilyzer and is available as upgrade kit for all existing Minilyzers and Digilyzers.

MiniLINK supports documentation and data acquisition of the entire analyzer functionality in conjunction with the MiniLINK PC software. Communication and power supply is enabled as soon as the supplied Mini USB cable is connected to the PC. Alternatively to store data and bitmaps into the analyzers memory, MiniLINK supports online data logging for most measurement functions.



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MINIRATOR

Analog Audio Generator



- Pink & White Noise
- Sine Wave
- Sine Wave Sweeps
- Polarity Test Signal
- Low Distortion, High Accuracy
- Balanced & Unbalanced Outputs

Minirator MR1 is a powerful analog Audio Generator providing a comprehensive set of analog audio test signals required in professional audio environments. Convenient, reliable and well optimized - it fits into your pocket as well as your budget.



Sine Output
A pure sinusoidal waveform is required for almost every audio measurement. The wide level range from -76dBu up to +6dBu and selectable frequencies over the full audio band allow the MR1 to replace any signal source.



Sweep
In the sweep mode the output signal is sequentially stepped through all available frequencies. Analyzers like the Minilyzer can automatically trigger to this signal and record the frequency response of a device under test.



Polarity
The saw-tooth waveform of the polarity test signal is an ideal stimulus with only moderate stress to speakers. Minilyzer ML1 takes advantage of this and correctly analyzes the polarity of the incoming signal.



This handy Audio Generator enables you to stimulate any analog device with a broad range of appropriate signals for performance checking, maintenance and repairs. Battery powered from 2 AA cells with a lifetime > 20h.

Pink Noise
Pink Noise is the most important test signal in conjunction with a RTA analyzer as it features equal power per octave, providing a flat response curve. The MR1 Pink Noise signal has a very low crest factor.



White Noise
White Noise is the most important test signal in conjunction with FFT Analyzers as it has an equal power per Hertz between 20Hz and 20kHz. It is therefore the ideal test signal for the Acoustilyzer AL1 Zoom FFT function.



Power Save
In the configuration section MR1 offers selectable level units (dBu, dBV, Volt) and features programmable Auto-Power-Off function. The stepping speed of the sweep is also pre-programmable between 50ms and 5s per step.



Technical Data Minirator MR1

Outputs	Balanced XLR, unbalanced RCA, phantom power resistant		
Waveforms	Sinusoidal, Square, White Noise, Pink Noise, Polarity		
Frequency Range	20 Hz - 20 kHz in 31 steps (Sine) 20 Hz - 5 kHz in 25 steps (Square)		
Sweep Capabilities	20 Hz - 20 kHz with sinusoidal signals		
Sweep Speed	0.05, 0.5, 1, 2, 3, 4, 5 seconds per step		
Units	dBu, dBV, V selectable		
Level Ranges	Waveform	Range	Steps Inc.
	Sine, Square, White Noise, Sweep	-76 dBu to +6 dBu -78 dBV to +4 dBV 0.13 mV to 1.6 V	42 ± 23 %
	Pol Test	-76 dBu to +4 dBu -78 dBV to +2 dBV 0.13 mV to 1.25 V	41 ± 23 %
	Pink Noise	-56 dBu to -4 dBu -58 dBV to -6 dBV 4 mV to 500 mV	27 ± 23 %
Flatness	± 0.5 dB		
Accuracy	± 0.5 dB		
THD+N	< -72 dB (0.025 %) typical @6 dBu < -55 dB (0.18 %) or 100 µV over all max.		
White Noise	20 Hz - 20 kHz, Crest factor = 2.12		
Pink Noise	20 Hz - 20 kHz, Crest factor = 3.27		
Output Impedance	200 Ohm balanced & unbalanced		
Auto Power Off	10, 30, 60 minutes or OFF		
Batteries	2 x 1.5 V Dry or NiCad type cell, LR6, AA, AM3 types		
Battery Lifetime	> 20 hours of continuous operation typical		
Temperature Range	0° C to 45° C (32° F to 113° F)		
Humidity	< 90 % R.H., non condensing		
Dimensions (LxWxH)	140 x 74 x 25 mm (5.5" x 2.9" x 1.00")		
Weight	170 g (6 oz) incl. batteries		

Accessories



Pouch for MR1
Soft pouch with belt-loop
NTI Art.No 600 000 101

NTI article code:

Minirator MR1

600 000 100

MiniSPL

Measurement Microphone



- 1/2" Measurement Mk.
- Battery Powered
- Balanced Output
- Omni-directional
- Individually Adjusted
- Auto Power-Off Control

The MiniSPL is the ideal accessory for the Acoustilyzer AL1 and Minilyzer ML1. Its self-powered design, the individual factory adjustment and the auto power-off control combine to make MiniSPL an accurate, easy to handle yet affordable measurement microphone.

The servo-loop output stage design supports long cable connections between the analyzer and the microphone - up to several hundred meters. MiniSPL is also recommended and easy to use in conjunction with PC based measurement systems with high quality audio cards.

Technical Data MiniSPL

Microphone Type	1/2", omni-directional, pre-polarized condenser free field transducer	
Sensitivity	(20 ± 2) mV/Pa, (-34 ± 1) dBV/Pa @ 1kHz balanced output	
Frequency Response	100 Hz - 1250 Hz ± 1 dB 20 Hz - 20 kHz ± 3 dB in accordance with IEC 61672, class 2	
Peak Acoustic Input	130 dB _{pk} @ 1 kHz	
Noise	30 dB _{pk} , A-weighted	
Output Impedance	200 Ohm (XLR balanced)	
Power Supply	1 x AA battery 1.5V, battery lifetime typical 300 hrs, no phantom power required, phantom power resistant	

NTI article code:

MiniSPL

600 000 022



Minstruments

For Analog Audio



Acoustilyzer AL1

Minilyzer ML1

Minirator MR1

MiniSPL

MiniLINK