

NTI Acoustilyzer AL1 & MiniSPL

Acoustic analyser & measurement microphone

If you work in live sound, you must now comply with the Noise at Work regulations 2005 — and this combination of mic and analyser from NTI is probably the most cost-effective way of doing it.

Hugh Robjohns

Increasingly powerful laptop computers and elaborate software tools have brought the world of acoustic measurements to a larger (if less well-trained) audience, and when it comes to comparative measurements, accurate calibration isn't important. As a result, small PA system alignment and project studio acoustic treatment design has come on in leaps and bounds in recent years.

However, there are times when laptops aren't the ideal solution, and the introduction to the music and entertainment industries in the UK last year of the Noise at Work 2005 regulations placed strict limits on noise exposure (as opposed to simple peak SPLs) that require specific calibrated measurement tools.

One practical and relatively affordable solution comes in the form of the NTI Acoustilyzer AL1. This is actually a variant of the NTI Minilyzer ML1, but it uses a specialised version of operating software that expands and tailors its functionality to realise the requirements of acoustic measurements. While many of the basic acoustic measurement facilities are included in the ML1 as standard, the AL1 takes it to a whole new level and, when partnered with an appropriately calibrated microphone, complies with the requirements of a Class 1 Device.

Overview

The AL1 is a hand-held measurement tool housed in a tough plastic case, weighing a modest 300g with three AA batteries installed to power it (alkaline batteries will provide around 16 hours of operation). A reasonably large 100 x 64-pixel, backlit, monochrome screen displays the control and measurement data, and there are just seven buttons on the front panel to configure and navigate the menus. The whole operation is perfectly intuitive and easily controlled with the unit in one hand.

For acoustic measurements, NTI offer a choice of calibrated microphones. The cheaper MiniSPL option (pictured) provides Class-2 performance, while the M2010 option moves up to Class 1 for frequency response measurements. However, the latter requires an external phantom power

supply, while the MiniSPL mic is battery-powered. All of my tests were performed with the MiniSPL Class 2 microphone attached.

The AL1/ML1 can be interfaced with measurement microphones or other input signals via connectors on the top panel. A female XLR accepts balanced mic or line inputs, while an RCA/Phono socket accepts unbalanced inputs (only one can be used at a time). A 3.5mm headphone output is provided for monitoring purposes, and there is also a built-in microphone for convenient delay time and polarity checking — but its calibration is insufficient for SPL measurements and hence this function is unavailable if the built-in mic is selected.

A mini USB interface allows connection to a computer, for software updates and data export/analysis using the supplied MiniLINK software (PC only).

Once powered up, the display screen (which can be customised) shows the software initialisation progress and device serial number before opening

the basic test option menu screen. On offer are a range of absolute and time-averaged (Leq) sound pressure level modes, with all the usual weighting curves and in wideband, octave or third-octave bandwidths. There is also an RT60 reverberation time mode, real-time FFT, acoustic polarity tester, delay time measurement tool, RMS level and THD+N electrical signal test functions, and a microphone calibration mode. An optional extra software module provides a speech intelligibility (STI) function.

The display, although looking dated and clunky because of its relatively low resolution, is actually completely adequate for the task and is easy to read. Across the top is a set of drop-down menus that double to display the current operating parameters: the measurement function, the screen display mode (graphical bar graphs or numeric readout), the filter weighting, the system configuration and the internal memory status. Using the cursor keys to highlight the measurement function and then pressing the Enter button provides a list of the available options (in this case, SPL/RTA, RT60, FFT, Polarity, Delay, RMS/THD, STI-PA and Calibrate). The desired function is selected by using the cursor keys to highlight it, followed by pressing the Enter key — all very intuitive. Less obvious, but very handy, is the shortcut to change display modes, which involves holding down the Escape key while pressing the left or right navigation keys. »



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**NTI Acoustilyzer AL1
£724 MiniSPL £282**

All of the NTI measurement tools have impressed me — hence why I own an ML1, MiniSPL and MR-PRO myself — and the AL1's functionality, when coupled has continued the theme. If you're in the market for a cost-effective but accurate and versatile acoustics measurement system, I can't recommend this highly enough

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» The usual slow and fast averaging options are provided on the SPL and RTA functions, along with various weighting filter options including the familiar flat (linear), A and C weightings. In addition, when performing SPL or RTA acoustic measurements, two additional options are provided: the X-curve for aligning large cinema installations, and RLB (revised low-frequency B-curve) recently introduced for assessing perceived loudness (primarily in broadcast applications). For the RMS and THD signal measurement modes, the X-curve and RLB functions are replaced with options to high-pass the signal at 400Hz (to ensure all mains-frequency components are removed), or high-pass at 19kHz (to measure pilot-tone in appropriate systems).

The system setup menu allows various functions to be customised, such as the auto shut-off and backlight shut-off times, the LCD contrast, and a means to set up different preferences for four users with their measurements being logged under unique IDs. Finally, the memory menu screen allows measurement results to be saved and interrogated. Results can be stored as numerical data only (smaller file sizes), or numerical plus screenshots (larger file sizes), and the file name is derived from the test mode and a unique sequential test number, within a folder for the user's ID (if so configured). The stored data files can be reviewed or deleted as necessary within the AL1, or transferred to a PC using the MiniLINK software.

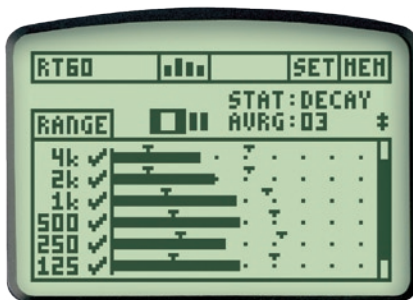
In use

I've owned and used an ML1 Minilyzer for many years, so the AL1 immediately felt very familiar to operate. However, the menu functions were very different because of the more specialised software (the ML1 can be crossgraded as a cost option, by the way, to incorporate all the AL1's functionality, and the AL1 can be crossgraded to include the ML1's functions).

The most important measurement mode for the majority of users is likely to be the sound level meter functions, and here there are useful options for instantaneous SPL, maximum and minimum logging, and time-averaged (Leq) — the last three taking advantage of a built-in, user-configurable timer to stop or reset measurements after a programmed duration. The Leq mode can be used to assess sound exposure as required in the Noise at Work regulations, and when fitted with a calibrated MiniSPL microphone the AL1 conforms with the Class-2 requirements cited in the act. Leq measurement logs can be stored in the AL1 (and are preserved even if the batteries fail), and then transferred to computer for further analysis or presentation.

The Real Time Analyser (RTA) mode shows the audio spectrum in octave or third-octave bands and can be used to align PA systems, amongst other applications. Usefully, the SPL, max, min and Leq values for each band can be analysed by cursoring along the spectrum display.

Much of this functionality is present in the ML1 software, but the reverberation time measurement functions were completely new to me. The reference gated noise signal required for this test is provided on a supplied audio CD, as well as in the NTI Minirator signal generator (another very handy device to add to the tool box). The noise signal is run through one or more speakers in the test environment, and once the direct and reverberant sound level is stable the test signal is stopped. The AL1 recognises the interruption and starts its RT60



measurement, displaying the RT60 values for a five-octave range (125Hz to 4kHz) as a bar graph and with numerical time values. Multiple measurements can be averaged to provide more consistent results, and the system can also display correlation and uncertainty percentages, which are used to justify the statistical accuracy of RT60 measurements.

The FFT mode is an alternative to the RTA function, and is particularly useful for examining narrow-band effects such as comb-filtering and acoustic interference, which an RTA simply can't reveal. The NTI system provides resolution down to 0.7Hz with user-adjustable upper and lower frequency limits, and the display can be zoomed to examine any frequency range of interest. It's simple to use and fascinating (or scary, depending on the situation!) to play with.

The polarity test mode can be performed with the built-in mic or an attached mic (I continued to use the MiniSPL), but also requires the use of the NTI Minirator as a test signal source (this was supplied with the review kit). The test signal is clearly asymmetrical, allowing the AL1 to analyse the polarity and display the result as positive or negative.

The delay time mode is intended for measuring the propagation delays involved in larger systems with multiple speaker arrays. It does this by measuring the delay between the electrical source signal (a bespoke 'chirp' provided on the supplied test signal CD) and the acoustic signal captured by the built-in microphone. The result is displayed as a delay time in milliseconds and a distance in meters or feet. There is even an option to enter the ambient temperature so that the conversion from time to distance is accurate! To provide the timing reference the test signal can be split and fed to both the loudspeaker being tested and the AL1, connecting it via XLR or phono input, but a clever option is an automatic sync mode that obviates the need for a permanent wired connection to the AL1. To

use this feature, the AL1 is connected to receive the output of the test CD, and after a short while it indicates it has synchronised. It can then be disconnected and relocated (within 100 seconds) to the measurement position, where it can capture the acoustic signal from the speaker under test.

The AL1's electrical measurement options are restricted compared to the ML1, understandably, but still include the essentials of RMS level (in dBu, dBV, dB SPL and Volts), distortion (THD+N) in decibels or percentages, and electrical balance of XLR connections.

The Speech Intelligibility option is used to assess the speech transmission index (STI) or common intelligibility scale (CIS) of speech reproduction systems such as announcement systems. Bespoke speech test signals are provided on a CD to test the replay chain, and an optional 'Talk Box' powered speaker can be used to test the complete microphone/amplifier/replay chain, effectively simulating a standardised human voice source. The aim is to get an STI reading greater than 0.45 (fair), with anything above 0.6 being classed as good, and above 0.75 as excellent.

The MiniLINK software installed without problems on my laptop and proved simple and logical to use, allowing stored data to be downloaded from the attached AL1 and reviewed on screen. Numerical measurement data can also be exported as text files to Microsoft Excel (or other spreadsheet packages) for further analysis or display. Usefully, the MiniLINK software also supports real-time data logging from an attached AL1, and the unit can even be controlled remotely using the computer keyboard's arrow, enter and escape keys. The MiniLINK tools page enables firmware upgrades and software crossgrades, as well as customisation of the startup screen.

Conclusion

The AL1 is an impressive acoustics measurement tool that provides a comprehensive and well-specified range of measurement modes in an easy-to-use device at an attractive price — at least in comparison with other professional acoustic measurement systems. Anyone working with PA systems would be well advised to explore this option, since it can not only provide all the signal level, frequency response, polarity testing, time alignment, peak SPL and RTA tools you may be used to, but also extend them with the ability to check the increasingly (and legally) important Leq figures and enable very accurate FFT analysis, useful in pinpointing a variety of acoustic problems. There are cheaper acoustic analysers around, but none that I know of are as well specified, equipped, versatile or easy to use — and the inclusion of Class 2 Leq measurement capability (when partnered with the MiniSPL) puts it in a different league to most other acoustic analysers. If I were running a commercial PA system, that feature alone would make this a must-buy. ■ PM

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