

Sound Level Meter

Real Time Analyzer

FFT Analyzer

STI-PA Analyzer

Audio Analyzer

# XL2

## HANDHELD AUDIO AND ACOUSTIC ANALYZER



EXELINE

Made in Switzerland 

[www.nti-audio.com](http://www.nti-audio.com)

## INTRODUCTION

The XL2 analyzer forms the unique combination of a state-of-the-art Sound Level Meter, a comprehensive Acoustical Analyzer as well as a powerful Audio Analyzer. The wide range of functionalities are tailored for challenging applications in Installations, Live Sound, Studio, Broadcast and Environmental Noise measurements.

The measurement microphones M4260 (Class 2) and M2210 (Class 1 frequency response) are available for acoustical measurements. The XL2 generates the 48 V phantom power supply for the microphones and reads the included electronic data sheet of the M4260 and M2210 automatically. This promotes faster setup and ensures accurate measurements. Additionally the XL2 logs the calibration data and microphone serial number at each measurement.

The four fast access buttons together with the rotary wheel enable an intuitive instrument operation for precise measurements. The recorded measurement data can be transferred to PC either by the USB interface or directly from the Mini-SD card for later documentation.

## FLEXIBLE USER INTERFACE

A remarkable advantage of the XL2 is the flexible user interface. The measurement screens may be personalized and only a limited subset of the comprehensive functionalities enabled for simplified operator interfaces. Advanced users may access all menus, settings and store their preferred measurement configurations. For basic users offers the XL2 Audio and Acoustic Analyzer fixed operator interfaces with specific pre-defined settings. The XL2 boots up with exactly the required measurement parameters according the pre-defined instrument configurations. This ensures accurate measurements achieved by advanced and basic users.



# FUNCTIONS

## Sound Level Meter

The XL2 provides together with the measurement microphone a precise sound level meter for monitoring of live sound events, environmental noise. For example Actual,  $L_{\min}$ ,  $L_{\max}$ ,  $L_{\text{eq}}$  are measured with frequency weighting A, C, Z and time weightings F and S at the same time. All measurement results are simultaneously available. Customers may log all acquired level information onto a removable Mini-SD card including real time information. Additionally the XL2 offers wav-file recording for a complete documentation of the measured sound pressure levels, as well voice notes might be added for each measurement. The accuracy of the XL2 exceeds IEC 61672-1, class 1. The XL2 measures correction values between the loudest point of the live event and the actual measurement positions according DIN 15905-5 and SLV 2007.

## Real Time Analyzer

In addition to the wide band parameters the XL2 measures in parallel the real time spectrum either in 1/1 or 1/3 octave-band resolution. The RTA perfectly suits tasks, such as optimizing of sound systems.

## FFT Analyzer

The real-time FFT is the ideal tool for visualization of comb filters and narrow band effects. It measures the actual level and the averaged level  $L_{\text{eq}}$  in three ranges over the entire audio band.

## Extended Acoustic Pack (optional)

The Extended Acoustic Pack offers additional features for sound level- and acoustical measurements. These are statistical distribution as percentiles for wideband and RTA levels, TaktMax, sound exposure level, impulse time weighting, high resolution FFT, recording of uncompressed wav-files and a digital I/O interface.

## RT60 Reverberation Time

The XL2 measures the energy decay in the range from 63 Hz to 8 kHz by the Schroeder method. As test signal serves either an impulse source or gated pink noise.

## Delay Time

The delay function suits the accurate setup of delay line arrangements, thus the directionality of the signal source will be optimized. The XL2 measures the delay time between the electrical reference signal and the acoustical signal from the speaker. The required acoustical delay settings are displayed automatically, thus the audio engineer may set the measured delay time directly at the delay device in the rack.

## Speech Intelligibility STI-PA (optional)

The STI-PA function measures the speech intelligibility of public announcement systems according the latest revision of IEC 60268-16:2003 standard. The XL2 displays the measurement results as STI or as CIS results, accompanied by the individual levels and modulation indices of the seven octave bands. The measurement results are acquired from the NTi Audio STI-PA test signal, generated by the included STI-PA Test CD, Minirator MR-PRO or the NTi Audio TalkBox.

## Audio Analyzer

Together with the balanced XLR and unbalanced RCA inputs includes the XL2 a comprehensive audio analyzer. It measures simultaneously level, distortion (THD+N) and frequency. The internal loudspeaker or headphone output offers audible monitoring of the test signal or just listening to the residual distortion. The optimized low distortion and low noise design enable level measurements down to -112 dBu and residual distortions typically lower than -100 dB, which is unmatched in handheld instruments.

# LIVE SOUND SOLUTIONS

SPL, Leq

RTA

Logging

Wav-File

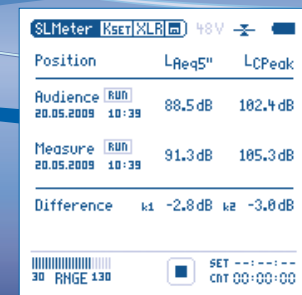
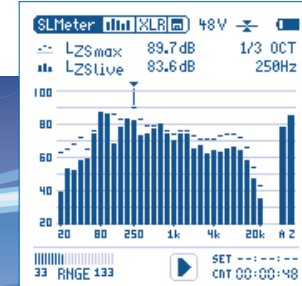
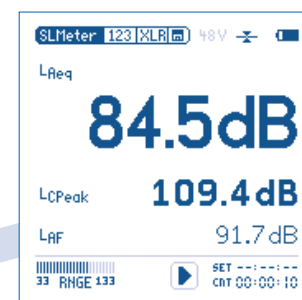
Polarity

Delay

The XL2 Audio and Acoustic Analyzer offers all tools to optimize the performance of live sound systems within one instrument. It complies with the most recent international standards for environmental noise monitoring. The XL2 Acoustic Analyzer fulfills class 1 requirements throughout the hardware and algorithms.

## The broad list of functions compels:

- Sound level meter displays up to five levels simultaneously
- Visual limit indication at exceeding sound levels
- Real time analyzer in 1/3 octave or 1/1 octave resolution
- Logging of all measurements to the internal Mini-SD Card
- Simplified operation using individual setup configurations
- Correction value measurement wizard
- Built-in real time clock
- WAV-file recording to Mini-SD Card (ADPCM)



# INSTALLED SOUND, STUDIO BROADCAST SOLUTIONS

XL2's broad range of functionalities provides contractors and audio engineers a comprehensive set of diagnostic and measurements tools. The instrument is perfectly tailored for installing, commissioning and troubleshooting sound- and audio systems in studios, broadcast and fixed installations.

## The feature list includes:

- Analyzer for acoustic and electrical audio measurements
- Balanced signal input from -112 dBu (2 $\mu$ V) up to 30 dBu (25 V) with residual distortions of typically < -100 dB (0.001%)
- FFT measurement for narrowband analysis, 7 Hz to 20 kHz
- Reverberation time with impulse source or gated pink noise
- Delay and polarity measurements
- Built-in loudspeaker with automatic gain control
- Speech intelligibility STI-PA acc. to IEC 60268-16 (optional)

SPL, Leq

RTA

FFT

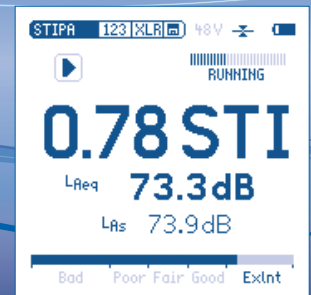
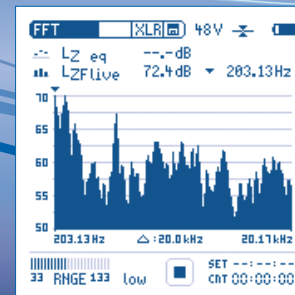
RT60

Delay

Level

THD+N

STI-PA



# MEASUREMENT MICROPHONES

The plug-on measurement microphones M4260 (class 2) and M2210 (class 1 frequency response) form with the XL2 a comprehensive sound level meter and acoustic analyzer. The microphones include an electronic data sheet. Thus the automated sensor detection of the XL2 recognizes the sensitivity and calibration data of the connected microphone automatically.

M4260 Measurement Microphone



M2210 - Enhanced Performance Measurement Microphone

	M4260	M2210 - Enhanced Performance
Microphone Type	Omni-directional, pre-polarized condenser, free field microphone	
Capsule / Transducer	1/4" permanently installed capsule	1/2" detachable capsule with 60UNS2 thread
Flatness	Class 2 (IEC61672-1)	Class 1 (IEC61672-1)
Frequency Range	5 Hz - 20 kHz	5 Hz - 20 kHz
Residual Noise Floor typ.	29 dB(A)	19 dB(A)
Linear Measurement Range with XL2	35 dB(A) - 144 dB acc. IEC 60804	28 dB(A) - 144 dB acc. IEC 60804
Maximum SPL	144 dB SPL @ THD 3%, 1 kHz	144 dB SPL @ THD 3%, 1 kHz
Sensitivity typical	-31.7 dBV/Pa ±4 dB (26 mV/Pa) @ 1kHz	-34 dBV/Pa ±3 dB (20 mV/Pa) @ 1kHz
Temperature Coefficient	±0.02 dB/°C @ -10°C to +50°C (14°F to 122°F)	-0.01 dB/°C @ -10°C to +50°C (14°F to 122°F)
Electronic Data Sheet	NTi Audio ASD according IEEE P1451.4 V1.0, Class 2, Template 27	
Output Impedance	100 Ohm balanced	
Power Supply	48 VDC phantom power, 3 mA typical	
Dimensions	Length 150 mm (5.9"), diameter 20.5 mm (0.8")	
Connector	Balanced 3-pole XLR	

## ACCESSORIES

**Battery Charger**  
with Spare Battery



**Exel System Case**  
delivery without content



**Ever-ready Pouch**



**Mains Power Adapter**



## ORDER INFORMATION

Product	NTi Audio #
XL2 + M4260	600 000 340
XL2 + M2210 - Enhanced Performance	600 000 350
XL2 without Measurement Microphone	600 000 330
M4260 Measurement Microphone, Class 2	600 040 025
M2210 Measurement Microphone, Class 1 Frequency Response	600 040 020
Calibration Certificate for XL2, M4260 or M2210	600 000 018

ASD Cable (special audio cable for the transmission of the electronic data sheet from measurement microphone to the XL2, length = 5 metre)	600 000 336
Battery Charger with Spare Battery	600 000 332
Spare Battery	600 000 337
Mains Power Adapter	600 000 333
Ever-ready Pouch	600 000 335
Exel System Case	600 000 334
XL2 STI-PA Option	600 000 338
Extended Acoustic Pack	600 000 339

# TECHNICAL SPECIFICATIONS XL2

Sound Level Meter	
Product Configurations	<ul style="list-style-type: none"> <li>XL2 with M2210 microphone: Class 1 frequency response according to IEC 61672, IEC 60651 Type 1 frequency response according ANSI S1.4</li> <li>XL2 with M4260 microphone Class 2 according to IEC 61672, IEC 60651; Type 2 according ANSI S1.4</li> </ul>
Conforms with Standards	IEC 61672, IEC 60651, IEC 60804, ANSI S1.4, ANSI S1.43, DIN 15905-5, DIN 45645-2, SLV 2007 and optional DIN 45645-1
Measurements	<ul style="list-style-type: none"> <li>SPL actual, <math>L_{eq}</math>, <math>L_{min}</math>, <math>L_{max}</math>, <math>L_{Cpeak}</math></li> <li>Gliding <math>L_{Aeq}</math> with <math>t = 5', 10', 15'</math> and <math>60'</math></li> <li>All measurement results are simultaneously available</li> <li>Correction value measurement wizard</li> <li>Noise curves NC, NR, PNC, RC with post processing</li> <li>Noise exposure level LEX with post processing</li> <li>Logging all data or subsets in selectable intervals</li> <li>Recording of WAV-files (ADPCM) and voice notes</li> <li>Limit monitoring showing exceeding sound levels</li> <li>Digital I/O interface for control external peripherals</li> <li>Level resolution: 0.1 dB</li> <li>Internal noise: 1.3 <math>\mu</math>V A-Weighted</li> </ul>
Functions Extended Acoustic Pack (optional)	<ul style="list-style-type: none"> <li>Percentiles: 1%, 5%, 10%, 50%, 90%, 95%, 99%</li> <li>Time weighting: Impulse</li> <li>Sound Pressure Level <math>L_{Aeq}</math>, Sound Exposure Level <math>L_{AE}</math></li> <li>TaktMax and values as specified in DIN 45645-1</li> <li>High-resolution FFT, up to 0.4 Hz resolution in the range of 5 Hz - 20 kHz</li> <li>Recording of WAV-files (24 bit, 48 kHz)</li> <li>Reverberation time RT60 in 1/3 octave resolution</li> </ul>
Weighting	<ul style="list-style-type: none"> <li>Frequency Weighting: A, C, Z, X-Curve<sup>-1</sup> acc. ISO2969</li> <li>Time Weighting: Fast, Slow, optional: Impulse</li> </ul>
Real Time Analyzer RTA	<ul style="list-style-type: none"> <li>Frequency resolution: 1/3 octave, 1/1 octave, wide band</li> <li>Frequency range: 6.3 Hz to 20 kHz, level resolution: 0.1 dB</li> <li>Band pass filters conform IEC 61260 class 0, ANSI S1.11-2004, class 1</li> </ul>
Acoustic Analyzer	
FFT Analysis	<ul style="list-style-type: none"> <li>Real time FFT with LZf and <math>L_{eq}</math></li> <li>Level resolution: 0.1 dB</li> <li>Ranges: 7 Hz - 215 Hz, 58 Hz - 1.72 kHz, 484 Hz - 20.5 kHz</li> <li>Optional: High-resolution FFT in the range of 5 Hz - 20 kHz</li> </ul>
Reverberation Time RT60	<ul style="list-style-type: none"> <li>1/1 octave bands results from 63 Hz - 8 kHz, based on T20</li> <li>Optional: 1/3 octave bands results from 50 Hz - 10 kHz, based on T20</li> <li>Range: 10 ms - 14 seconds</li> <li>Measurement according to ISO3382 by Schroeder-method</li> <li>Test signal: Impulse source or gated pink noise generated by the MR-PRO, MR2 or the included NTi Audio Test CD</li> </ul>
Delay Time	<ul style="list-style-type: none"> <li>Propagation delay between electrical reference signal and acoustical signal using the internal microphone</li> <li>Range: 0 ms - 1 second (0 m - 344 m), Resolution: 0.1 ms</li> <li>Test signal: NTi Audio delay test signal of MR-PRO, MR2 or Test CD</li> </ul>
Polarity	<ul style="list-style-type: none"> <li>Checks polarity of speakers and line signals</li> <li>Positive/Negative detection of wideband and individual 1/1 octave bands through internal microphone or XLR/RCA connector</li> <li>Test signal: NTi Audio polarity test signal of MR-PRO, MR2 or Test CD</li> </ul>
STI-PA Speech Intelligibility (optional)	<ul style="list-style-type: none"> <li>Single value STI and CIS test result according to IEC 60268-16, 2003 release, DIN VDE 0833-4, IEC 60849, DIN VDE 0828-1</li> <li>Modulation indices and individual band level results with error indicator, post processing with recorded spectra supported</li> <li>Test signal: NTi Audio STI-PA signal of MR-PRO, TalkBox or Test CD</li> </ul>

Audio Analyzer	
Level RMS	<ul style="list-style-type: none"> <li>True RMS detection in V, dBu, dBV and dB SPL</li> <li>Range XLR/RCA input: 2 <math>\mu</math>V - 25 V (-112 dBu to +30 dBu)</li> <li>Accuracy: <math>\pm 0.5\%</math> @ 1 kHz, flatness: <math>\pm 0.1</math> dB @ 12 Hz to 21.3 kHz</li> <li>Bandwidth (-3 dB): 2 Hz to 23.6 kHz</li> <li>Resolution: 3 digits (dB scale), 5 digits (linear scale) or 6 digits (x1 scale)</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>Range: 9 Hz to 21.3 kHz, resolution: 6 digits</li> <li>Accuracy: <math>\pm 0.003\%</math></li> </ul>
THD+N (Total Harmonic Distortion + Noise)	<ul style="list-style-type: none"> <li>Range: -100 dB to 0 dB (0.001% to 100%)</li> <li>Minimum level: &gt; -90 dBu</li> <li>Fundamental bandwidth: 10 Hz - 21.3 kHz, bandwidth: 2 Hz - 23.6 kHz</li> <li>Resolution: 3 digits (dB scale) or 4 digits (linear scale)</li> <li>Residual THD+N @ XLR/RCA input: &lt; 2 <math>\mu</math>V</li> </ul>
Scope	Auto ranging, auto scaling
Filter	Frequency weighting A, C, Z, Highpass 400 Hz, Highpass 19 kHz, Bandpass 22.4 Hz - 22.4 kHz acc. IEC468-4
Input / Output Interfaces	
Audio Inputs	<ul style="list-style-type: none"> <li>XLR balanced with input impedance = 200 kOhm, phantom power: +48 V switchable, automated sensor detection for M4260/M2210</li> <li>RCA unbalanced with input impedance &gt;30 kOhm</li> <li>Built-in condenser microphone for polarity testing, delay measurements and voice note recording</li> </ul>
Audio Outputs	<ul style="list-style-type: none"> <li>Built-in speaker</li> <li>Headphone connector 3.5 mm MiniJack Stereo</li> </ul>
USB Interface	USB mini connector for data transfer to PC and charging of Li-Po battery
Digital I/O	Optional 1-wire interface for control of external peripherals
TOSLink	24 bit linear PCM audio signal output (prepared for later firmware extension)
Memory	Mini-SD card, 2 GByte, removable, storing ASCII data, screenshots, voice notes and WAV-files
Power Supply	<ul style="list-style-type: none"> <li>Rechargeable Li-Po battery included, type 3.7 V / 2260 mAh, typical battery lifetime &gt; 4 hours</li> <li>Dry cell batteries type AA, 4 x 1.5 V, typical battery lifetime &gt; 4 hours</li> <li>Linear external power supply 9 VDC (charges Li-Po battery in operation)</li> </ul>
General	
Clock	Real time clock with lithium backup battery
Calibration	<ul style="list-style-type: none"> <li>Recommended calibration interval: one year</li> <li>Microphone calibration supported with external calibrator</li> <li>Calibration certificate for new instruments optional available</li> </ul>
Mechanics	<ul style="list-style-type: none"> <li>Tripod mount and wire stand mounted on rear side</li> <li>Display: 160 x 160 pixels grey scale with LED back light</li> <li>Dimensions: 180 mm x 90 mm x 45 mm (7.1" x 3.5" x 1.8")</li> <li>Weight: 480 g (1 lbs) including built-in Li-Po battery</li> </ul>
Temperature	Operation: +5 °C to +45 °C (41° - 113°F) Storage: -10 °C to +60 °C (14° - 140°F)
Humidity	5% to 90% RH, non condensing
Electromagnetic Compatibility	CE compliant: EN 61326-1 Class B, EN 55011 class B, EN 61000-4-2 to -6 & -11

## NTi AUDIO WORLDWIDE

### **NTi Audio AG**

Im alten Riet 102  
9494 Schaan  
Liechtenstein / Europe  
Phone: +423 239 60 60  
Fax: +423 239 60 89  
info@nti-audio.com

### **NTi Americas**

P.O. Box 231027  
Tigard, Oregon  
97281, United States  
Phone: +1 503 684 7050  
Fax: +1 503 684 7051  
americas@nti-audio.com

### **NTi China**

Room 722, 7F, Building 6-3A,  
No 1388, Bin He Rd.  
215000 Suzhou  
Phone: +86 512 6802 0075  
Fax: +86 512 6802 0097  
china@nti-audio.com

### **NTi Japan**

Ryogokusakamoto Bldg. 1-8-4  
Ryogoku 130-0026 Sumida-ku  
Tokyo, Japan  
Phone: +81 3-3634-6110  
Fax: +81 3-3634-6160  
japan@nti-audio.com

