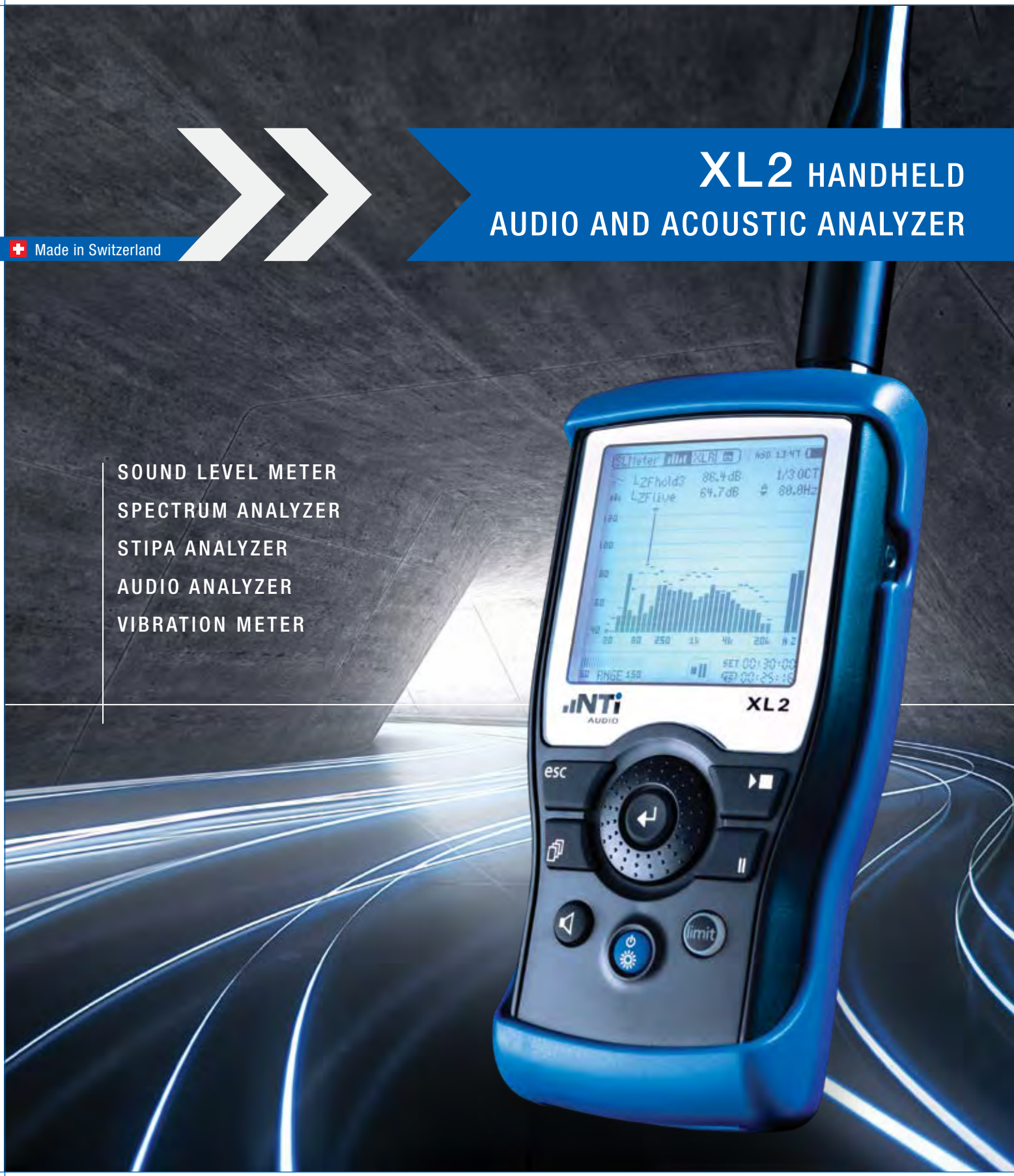
AUDIO & ACOUSTIC MEASUREMENT SOLUTIONS

XL2 HANDHELD
AUDIO AND ACOUSTIC ANALYZER

Made in Switzerland

SOUND LEVEL METER
SPECTRUM ANALYZER
STIPA ANALYZER
AUDIO ANALYZER
VIBRATION METER



www.nti-audio.com

XL2 – Effortless. Powerful. Uncompromising.

Many Functions – Ready for any Challenge

As a measurement expert, you will encounter different and sometimes demanding challenges. The XL2 supports you with many functions and in a wide range of applications. Even in its standard configuration, this precision device offers a wide range of analysis options. It contains all the functions for sound level measurement including a spectral display, level and audio recording, and limit value visualization. For setup and troubleshooting of sound installations, a level and frequency measurement with harmonic distortion analysis is available. Also, speakers and cables can be measured for correct polarity and delay times.

Advanced applications such as speech intelligibility, vibration analysis, reverberation, sound insulation, etc. can be licensed on the same device if required. Thus, the device grows with your needs and minimizes the cost of future investments.

Switch on. Measure. Analyze.

Three seconds after switching on, the meter is ready to measure. The intuitive navigation suits professionals as well as beginners. Simply choose a predefined profile and adjust the measuring parameters as you need. The XL2 provides an extensive range of measuring functions.

One Device – Many Applications

The XL2 is a powerful Sound Level Meter, a professional Acoustic Analyzer, a precise Audio Analyzer, and a substantial Vibration Meter in one unit. Simple operation and plenty of functions distinguishes this quality Swiss product.

Precise Results. Simple Operation.

The Applications

Room & Building Acoustics

- Reverberation RT60
- Airborne Sound Insulation
- Impact Sound Insulation
- Noise Curves

Evacuation / Installed Sound

- Alarm Limits STIPA
- Speech Intelligibility
- Impedance Measurement (MR-PRO)

Noise Measurement

- Unattended Noise Monitoring
- Tonal and Impulsive Noise
- Rating Level
- Noise at Work

Live Sound

- Sound Level Monitoring
- Audio Measurements (THD)
- Measurement Reports

Vibration Measurement

- Acceleration
- Velocity
- Displacement
- Spectral Representation

Quality Control

- Spectral Analysis
- Pass/Fail Testing
- Remote Control

XL2 Sound Level Meter, Audio and Acoustic Analyzer

Live Sound

Live Sound – Level Monitoring

As long as the sound is good and the show entertaining, live sound events can be enjoyed. However, the sound level must always be below the legal limits in order to avoid possible hearing damage to the audience and to not disturb the neighbors. The standard XL2 Sound Level Meter offers this functionality.

Keeping Below the Legal Limits

The pre-defined profiles in the XL2 Sound Level Meter make it easy to comply with the legal limits. Switch on the device, press start - done! The XL2 measures and stores the required levels and informs the user via a tri-color LED or external lights whether the current sound level is within the allowable range. At the same time, if necessary, the device records the entire event in a compressed WAV file.

Professional Reports

Load the measurement data into the NTi Audio Measurement Report Tool, add your logo and print. Compare the displayed levels with the audio recording for a deeper analysis of the event (for example, loud applause that triggered a level violation).

Projector PRO Software for Visualisation of Levels and Limits

Voice Evacuation Systems

Speech Intelligibility STIPA in Evacuation Systems

The XL2, with the STIPA Option, measures the speech intelligibility of the system, taking into account the background noise. Reporting tools that read the XL2 data directly, are available to produce documentation that serves as a basis for the acceptance of such announcement systems.

Reverberation as a key to Good Speech Intelligibility

Large venues, such as railway stations, can have a naturally long reverberation time, which can have a negative effect on speech intelligibility. Measuring reverberation time with the XL2 is effortless and provides a solid basis for the optimal design of a voice evacuation system. An XL2 RT60 measurement is automatically triggered by either an impulse or gated noise sound source.

Impedance Measurement shows Wiring Defects and Reserve Capacity

In distributed audio systems (100V systems), an impedance measurement with the MR-PRO Audio Generator helps to quickly and easily determine if all loudspeakers are in working order and correctly wired. If the installed system needs to be expanded, the impedance or power measurement by the MR-PRO helps to determine the reserve capacity available on the line of speakers.

Voice Paging Level

Establishing an appropriate level for evacuation announcements through the sound system with our instruments is straight forward, in accordance with standards, and delivers professional documentation. At the same time, the complete frequency response is measured.

Room and Building Acoustics

The standard XL2 contains all the necessary functions for measuring room and building acoustics, including reverberation time in octave bands. An intelligent auto-naming process helps with the assignment of each result as a sending/receiving room or ambient level measurement.

Measuring Airborne and Impact Noise

The measured results can then be loaded into the optional Sound Insulation Reporter or Room Acoustics Reporter software packages. Sound Insulation Reporter creates the averaging curves and determines the standard insulation values D, Dn, DnT und R' in a matter of seconds. At the push of a button, you will then be able to create ready-made reports – with your logo.

Reverberation Time Optimization

Room Acoustics Reporter similarly supports the assessment of a room. It offers simulation options for calculating the target reverberation time by inserting various insulation materials that can be selected from a comprehensive catalog.

Sound Insulation Reporter Software

Noise Measurement / Remote Monitoring

The XL2 Sound Level Meter provides all the functions needed to measure and monitor noise. Its removable SD card offers plenty of space to record levels, spectra and audio files. The data can also be read out during an ongoing measurement via its USB interface.

With the weatherproof case and the type-approved WP30 microphone protection, self-sufficient remote measurement stations can be created. The NetBox gives communication capabilities to the XL2 via LAN or mobile data and allows access to the device via a web browser.

With NoiseScout in the Cloud

For professional, cloud-based remote monitoring of construction sites, airports, etc., the NoiseScout cloud portal is available. Monitor any number of measurement stations and visualize their data. The system generates email warnings, including audio snippets, when level limits are exceeded. All measured values and audio files are available for download by the user.

Rating Level from Data Explorer

For post-processing, the measurement data can be loaded from the cloud or from the measuring device into the Data Explorer PC software for comprehensive analysis. Periods containing tonal or impulsive noise are automatically marked and the Rating Level L_r calculated.

Outdoor Case with XL2

Data Explorer Software

Vibration Meter

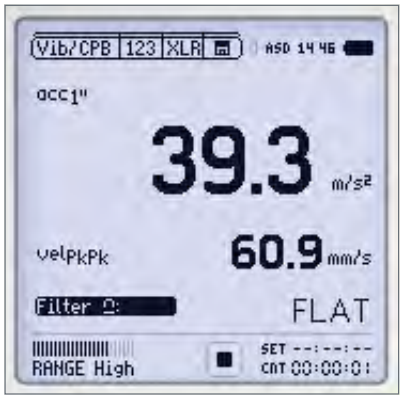
With the Vibration Option and an attached accelerometer, the XL2 is well suited for vibration analysis or as an efficient and cost-effective solution for industrial vibration quality control.

The device measures acceleration for frequencies down to 0.7 Hz and calculates velocity and displacement. The results can be displayed in metric or imperial units, or as a dB value with adjustable reference level. With various filters and time weightings, a gliding RMS level for easy reading, and peak readings, the Vibration Meter is ideal for a wide range of applications.

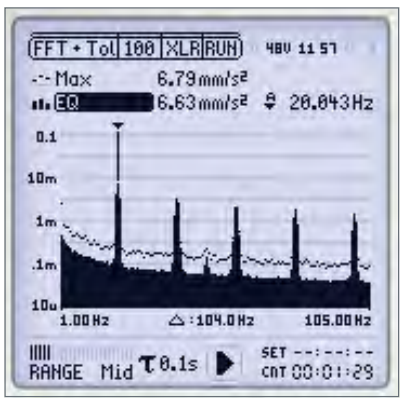
Spectral Results and Logging

All vibration results can be displayed as a 1 / n-octave spectrum or linearly as FFT. The frequency range can be set to suit the application.

Results are logged in plain text format. In addition, if required, the vibration signal can be saved as a compressed WAV file. All measurement data, together with an optional voice memo, is stored on the SD card; providing capacity for long-term measurements.



Broadband Vibration Measurement



Spectral FFT Representation for Vibration Analysis

Manufacturing Quality Control

Whether you need to measure structure-borne noise with an accelerometer or sound with a microphone, the XL2 can be easily integrated into your production line.

Pass/Fail Testing

The optional Spectral Limits function is particularly suitable for performing pass/fail measurements. First, a number of spectral measurements are averaged from a series of known good samples. Spectral fail limits are then calculated using a tolerance rule. Using these, the XL2 can then autonomously measure the spectrum of all products and visualize the result.

For the frequency analysis, a high-resolution zoom FFT or a spectrum with a resolution of up to 1/12 octave is available.

Spectral Limits with Tolerances

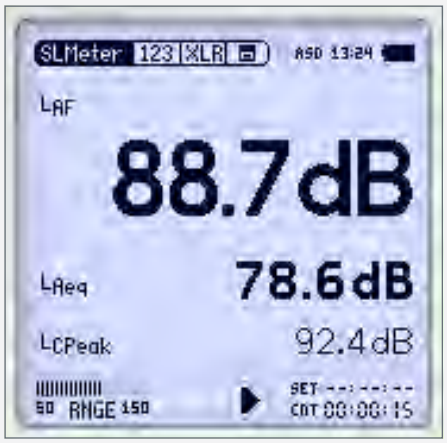
Automation

With its digital inputs and outputs, the XL2 can communicate directly with a controller. The measurement can be started via an external signal and the measurement result displayed as a PASS/FAIL signal.
Using the Remote Measurement Option, the entire control and the reading of the measurement results can be realized via the USB interface.

Stack Light

Functions

Sound Level Meter

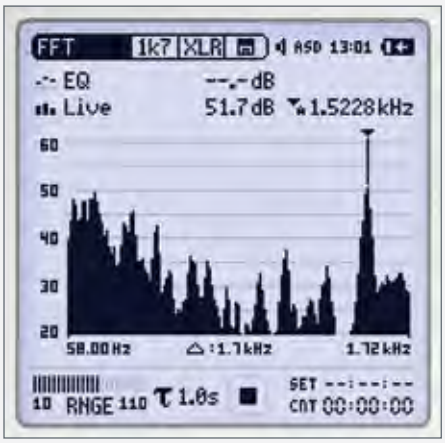


The XL2 with measurement microphone is a precise Sound Level Meter. All measurement results are available simultaneously, e.g. Leq, Lmin, Lmax, and LCpeak, with the frequency weighting A, C, Z and the time weighting Fast, Slow and optional Impulse.

Spectral Analyzer

Real-time analysis RTA is an ideal tool for optimizing sound systems. In addition to the broadband levels, the XL2 simultaneously measures the real-time spectrum in 1/3 or 1/1 octave band resolution.

FFT Analyzer



The real-time FFT is the ideal tool for detecting comb filters and resonant frequencies. The XL2 measures the actual level and the time-averaged Leq level in three frequency ranges.

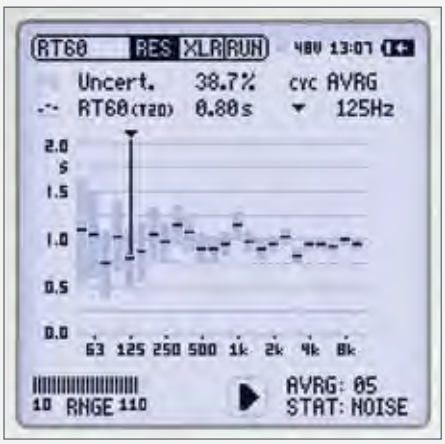
Polarity, Delay, Oscilloscope

Other measurement functions determine the speaker polarity, help with the setup of delay lines or represent the signal in an auto-ranging oscilloscope.

Audio Analyzer

With a balanced XLR and unbalanced RCA input, the XL2 is a high-performance audio analyzer. It simultaneously measures balance, RMS level, frequency, and harmonic distortion (THD + N).

Reverberation Time RT60



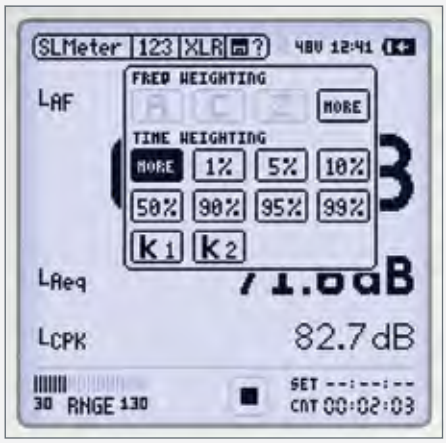
Measure the reverberation time in a room with automatic triggering from an impulse or gated pink noise sound source.

Options

Speech Intelligibility STIPA

The XL2 measures STI and CIS values for speech intelligibility of evacuation and announcement systems in accordance with the IEC 60268-16 and DIN VDE 0833-4 standards. A correction of the determined speech intelligibility by the addition of the spectrum of the ambient noise is possible.

Extended Acoustic Pack

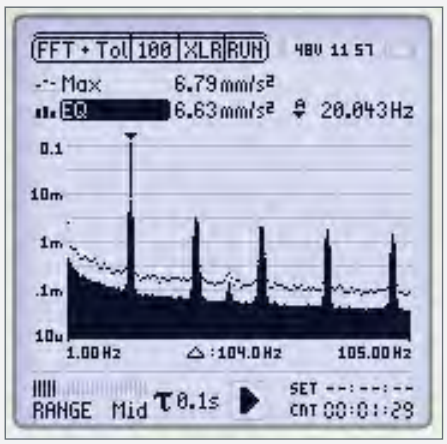


The Extended Acoustic Pack Option provides advanced acoustic measurement possibilities. The option enables the recording of linear wav files, percentile statistics, sound exposure levels, spectral logging in 100 ms intervals, RT60 in 1/3 octave resolution, event monitoring, and much more.

Spectral Limits

The Spectral Limits Option extends spectral analysis with 1/6 and 1/12 octave resolution, zoom FFT, reference curve recording, relative display, extensive tolerance management for pass/fail testing, and Noise Curves.

Vibration Option



The Vibration Option turns the XL2 into a flexible vibration meter, with FFT analysis and data logging, for frequencies down to 0.7 Hz.

Cinema Meter Option

The Cinema Meter Option enables calibration and control of cinema speaker systems in accordance with the SMPTE ST 202: 2010 and RP 200: 2012 standards.

Sound Insulation Option

PC software to analyze, visualize, and generate standards-compliant reports for airborne, impact, and facade sound insulation measurements.

Sound Power Option

PC software for detailed data analysis and automatic generation of comprehensive sound power measurement reports in accordance with the ISO 3741, 3744, 3746, and ANSI-ASA standards.

Remote Measurement Option

Measurement data can be captured directly on a PC in real time via the USB interface to the XL2, e.g. with MS Excel or LabView.

Data Explorer Option

PC software for quick, professional analysis of sound level data. Data Explorer supports acousticians and experts in evaluating measurement data.

TA Option (Type Approval)

Upgrades the XL2 to the XL2-TA, which, together with the M2230 measurement microphone, forms a type-approved sound level meter in accordance with the IEC 61672 and IEC 61260 standards.

Measurement Microphones

M2230 / M2211 / M2215

M4261

All microphones are 48 V phantom powered and include a chip with an electronic data sheet. After connecting the microphone, the XL2 reads this data sheet and recognizes the microphone model and the calibration data. This promotes faster setup and ensures accurate measurements.

MODEL	DESCRIPTION
M2230	Class 1 measurement microphone with metal diaphragm for measurements in accordance with the IEC 61672 standard (type-approved with XL2-TA)
M2230-WP30	Class 1 Outdoor measurement microphone, consists of M2230 Microphone and WP30 Weather Protection (type-approved)
M2211	General purpose measurement microphone with metal diaphragm and Class 1 frequency response
M2215	Measurement microphone with metal diaphragm for high acoustic levels (up to 153 dB) and Class 1 frequency response
M4261	**Cost-effective Class 2 measurement microphone for general sound level testing, commissioning and service of audio-acoustic installations**

	M2230 / CLASS 1 Certified	**M2211 / CLASS 1** Frequence Response	**M2215 / CLASS 1** Frequence Response (High SPL)	**M4261 / CLASS 2**
Microphone Type	Omni-directional, pre-polarized condenser, free field microphone			
Capsule / Transducer	1/2" detachable with 60UNS2 thread			1/4" fixed
PreAmplifier	MA220 (included)			–
Flatness Acc. IEC61672-1	Class 1			Class 2
Frequency Range	5 Hz – 20 kHz			
Residual Noise Floor typical	16 dB(A)	21 dB(A)	25 dB(A)	27 dB(A)
Linear Range with XL2	24 dB(A) - 137 dB	29 dB(A) - 144 dB	33 dB(A) -153 dB	33 dB(A) - 146 dB
Maximum SPL THD 3 %, 1 kHz	137 dBSPL	144 dBSPL	153 dBSPL	142 dBSPL
Sensitivity typ. @ 1 kHz	$-27.5^{\pm 2}$ dBV/Pa (42 mV/Pa)	$-34^{\pm 3}$ dBV/Pa (20 mV/Pa)	$-42^{\pm 3}$ dBV/Pa (8 mV/Pa)	$-36^{\pm 4}$ dBV/Pa (16 mV/Pa)
Temperature Coefficient <	-0.01 dB/°C	±0.015 dB/°C		±0.02 dB /°C
Temperature Range	–10 °C to +50 °C / 14 °F to 122 °F			0 °C to 40 °C / 32 °F to 104 °F
Pressure Coefficient	-0.005 dB/kPa	-0.02 dB/kPa		-0.04 dB/kPa
Influence of Humidity	< ±0.05 dB (non-condensing)			< ±0.4 dB
Humidity Range	5% to 90% RH, non-condensing			
Long Term Stability	> 250 years / dB			not defined
Electronic Data Sheet	NTi Audio ASD in accordance with IEEE P1451.4 V1.0 / Class 2, Template 27			
Power Supply	48 VDC phantom power, 3 mA typical			
Connector	Balanced, 3-pole XLR			
Dimensions	Length 150 mm (5.9"), diameter 20.5 mm (0.8")			
Weight	100 g, 3.53 oz			83 g, 2.93 oz
NTi Audio #	600 040 050	600 040 022	600 040 045	600 040 070

Ordering Information

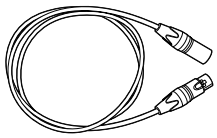
PRODUCT	NTi Audio #
XL2 + M2230	600 000 355
XL2 + M2211	600 000 351
XL2 + M4261	600 000 341
XL2 Analyzer (no microphone)	600 000 330

XL2 Options	NTi Audio #
Speech Intelligibility STIPA	600 000 338
Extended Acoustic Pack	600 000 339
Remote Measurement	600 000 375
Spectral Limits	600 000 376
Type Approval	600 000 377
Cinema Meter	600 000 379
Data Explorer	600 000 430
Sound Insulation Reporter	600 000 432
Room Acoustic Reporter	600 000 440
Vibration Option	600 000 436

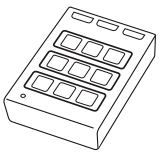
ACCESSORIES

Precision Calibrator
600 000 388

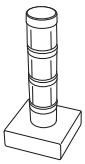
Calibration Certificate
600 000 018



ASD Cable 5, 10, 20 M
600 000 336/64/65

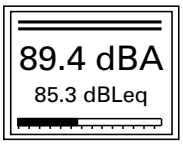


Limit Light
600 000 600



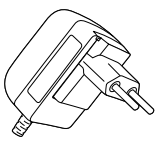
Stack Light
600 000 610

NetBox with Modem
600 000 458

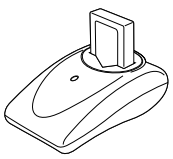


XL2 Projector Pro
(free software)

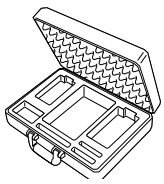
XL2 Input Keypad
600 000 384



Mains Power Adapter
International # 600 000 333



Battery Charger
600 000 332



XL2 System Case
600 000 334

Ever-ready Pouch
600 000 335

Complete Solutions

Tailored Sets in a Case

For each application, we offer a specially tailored set of measurement instruments in a rugged case. It contains:

- XL2 AUDIO AND ACOUSTIC ANALYZER
- REQUIRED OPTIONS AND ACCESSORIES
- MEASUREMENT MICROPHONE

Related Products

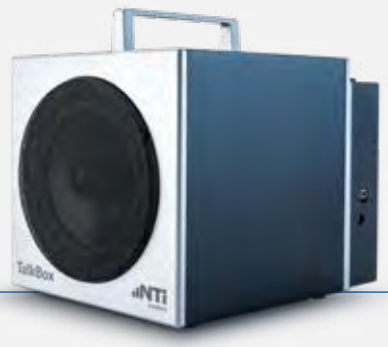
Signal Generators

Analog Audio: Minirator MR-PRO
Digital Audio: Digirator DR2

Flexus FX100

Analog and Digital Audio Analyzer for Quality Control and Service

TalkBox



Calibrated Acoustic Generator (STIPA Reference & other signals)

XL2 Technical Specifications

SOUND LEVEL METER	
Product Configuration in accordance with IEC 61672 / ANSI S1.4	• XL2 with M2230 microphone Class 1 certified with Shroud • XL2 with M2211 or M2215 microphone Class 1 Frequency response • XL2 with M4261 microphone Class 2
Complying Standards	IEC 61672, IEC 60651, IEC 61260, IEC 60804, ANSI S1.4, ANSI S1.43, DIN 45657
Functions	• SPL actual, L_{min}, L_{max}, L_{peak}, L_{eq}, gliding L_{eq} • Optional: Percentile statistics, sound exposure level, takt maximal level • All measurement results simultaneously available • Correction value measurement wizard • Logging all data or subsets in selectable intervals • Recording of wav files and voice notes • Limit monitoring showing exceeding sound levels • Digital I/O interface for external peripherals control
Weighting	• Frequency weighting: A, C, Z (simultaneous) • Time weighting: Fast, Slow, Peak, optional: Impulse
Details	• Measurement bandwidth (-3dB): 4.4 Hz to 23.0 kHz • Level resolution: 0.1 dB • Internal noise: 1.3 µV A-weighted
Real-Time Analyzer RTA	• Wide band • 1/1 octave band: 8 Hz - 16 kHz • 1/3 octave band: 6.3 Hz - 20 kHz • Capturing for comparative measurements

ACOUSTIC ANALYZER	
FFT Analysis	• Real-time FFT with actual level, L_{eq}, L_{min}, L_{max} • Level resolution: 0.1 dB • Optional: Pass/Fail testing
Reverberation Time RT60	• 1/1 octave band results from 63 Hz – 8 kHz (T20, T30) • Optional: 1/3 octave band results from 50 Hz – 10 kHz
Delay Time	Propogation delay between electrical reference signal and acoustic signal using the internal microphone
Polarity	• Checks polarity of speakers and line signals
1/12 Octave Analysis (optional)	• Aktual level, L_{eq}, L_{min}, L_{max} • Selectable 1/1, 1/3, 1/6, 1/12 octave resolution • Pass/Fail testing
Speech Intelligibility STIPA (optional)	• Single value STI and CIS (IEC 60268-16: 1998, 2003, 2011) internal ambient noise correction and automatic averaging of measurements in accordance with DIN VDE 0833-4 • Modulation indices and individual band results

INPUT / OUTPUT INTERFACES	
Audio Inputs	• XLR balanced with input impedance 200 kOhm, phantom power: +48 V switchable • RCA unbalanced, Input impedance > 30 kOhm • Built-in condenser microphone for polarity testing, delay measurements and voice note recording
Audio Outputs	• Built-in speaker • 3.5 mm minijack, stereo headphone connector
USB Interface	• Mini USB connector for data transfer to PC, remote measurement, XL2 Projector and battery charging
Digital I/O	Connection interfaces to accessories • XL2 Input Keypad • Limit Light, Stack Light • Digital PCB I/O Adapter
Memory	• SD Card included (8 GByte), removable, storing measurement data in ASCII format, screenshots, voice notes and wav files. Expansion to max. 32 GB with # 600 000 386
Power Supply	• Rechargable Li-Po battery included (3.7 V / 2260 mAh) • Dry cell batteries type AA, 4 x 1.5 V, (Alkaline) • Linear external power supply 9 VDC / 1 A (charges battery during operation) • USB power supply

AUDIO ANALYZER	
Level RMS	• True RMS detection in V, dBu, dBV, and dBSPL • Range XLR/RCA input: 2 µV to 25 V (–112 dBu to +30 dBu) • Accuracy: ±0.5 % @ 1 kHz • Flatness: ±0.1 dB @ 12 Hz to 21.3 kHz • Bandwidth (–3 dB): 5 Hz to 23.6 kHz
Frequency	• Range: 9 Hz to 21.3 kHz • Accuracy: < ±0.003 %
THD+N	• Range: –100 dB to 0 dB (0.001 % to 100 %) • Residual THD+N @ XLR/RCA input: < 2 µV
Scope	• Auto ranging, auto scaling
Filter	• Frequency weighting: A, C, Z • Highpass 100 Hz, 400 Hz, 19 kHz • Bandpass 22.4 Hz – 22.4 kHz

GENERAL	
Clock	Real-time clock with lithium backup battery
Temperature	–10 °C to +50 °C (14 °F to 122 °F)
Humidity	5 % to 90 % RH, non-condensing

NTi AUDIO

XL2

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All information is subject to change without notice.
XL2, M2230, M2211, M2215, M4261, Minirator MR-PRO, MR2, NoiseScout,
Data Explorer, Sound Insulation Reporter, Room Acoustics Reporter,
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