NTi AUDIO

- Design and Production
- Analog & Digital Audio
- Fast & Accurate Measurements
- Scalable Architecture
- Superior Specifications

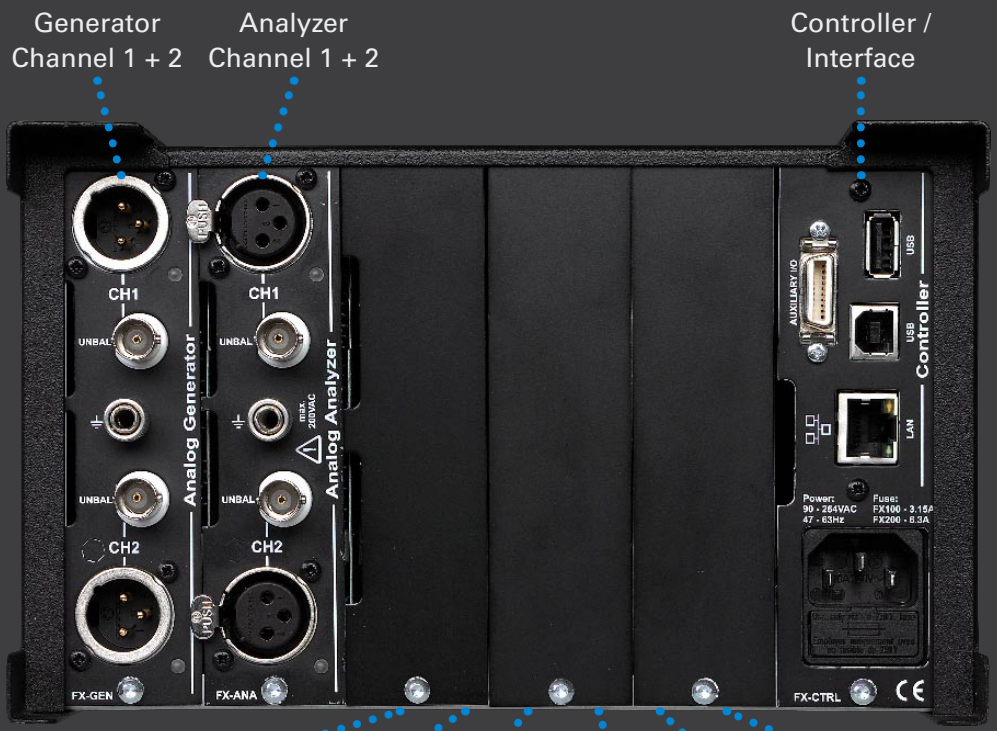
FLEXUS FX100

AUDIO ANALYZER

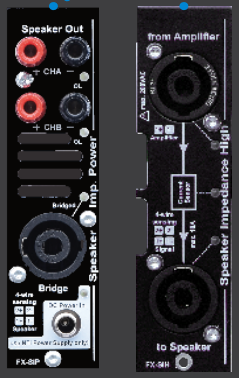
Made in Switzerland

FLEXUS FX100

Professional Audio Analyzer



Analog
Channels 3 + 4



Loudspeaker
Impedance Modules

Input / Output
Switchers

Digital
Audio

AT A GLANCE

Overview

The FLEXUS FX100 Audio Analyzer together with the FX-Control software represent a new generation of professional audio and acoustic measurement systems, designed to deliver precise results, quickly. The intuitive FX-Control drag-and-drop interface allows you to create real-time, simultaneous measurement processes.

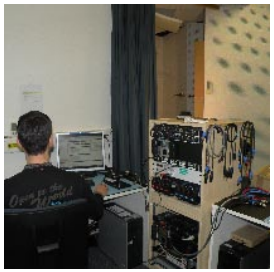
The FX100 modular hardware architecture allows you to customize, for example, for parallel four-channel analog analysis, loudspeaker impedance measurements, switchable multi-channel applications and/or digital analysis.

The FLEXUS system is at home in R&D, service and manufacturing environments.

Outstanding Features

The FLEXUS FX100 Audio Analyzer and FX-Control software are convincingly suited to a variety of audio measurement applications. The FLEXUS system offers a number of outstanding features and benefits:

- Comprehensive functionality
- Maximum measurement speed
- High-precision results
- Ease-of-use and automation
- Extensive documentation
- Modular hardware concept
- Robust and reliable
- First-class worldwide support



Research & Development

The wide range of available standard test signals, measurements and auxiliary functions as well as the intuitive FX-Control software are ideal for use in research and development laboratories.

Manufacturing

The FX100 excels in the quality control of mass-production because of its ease of integration as well as the extremely rapid and comprehensive verification of test samples.

Acoustic Measurements

Besides the typical requirements, in acoustic applications, of frequency response measurements and the analysis of audible defects, the FX100 is also able to produce quasi-free-field results within a reverberant space.

Service & Repair

Service technicians appreciate the outstanding flexibility of the FLEXUS system and its ease of operation. At the same time, the system can be adapted quickly to changing requirements.

FX-CONTROL SOFTWARE

Intuitive Operation

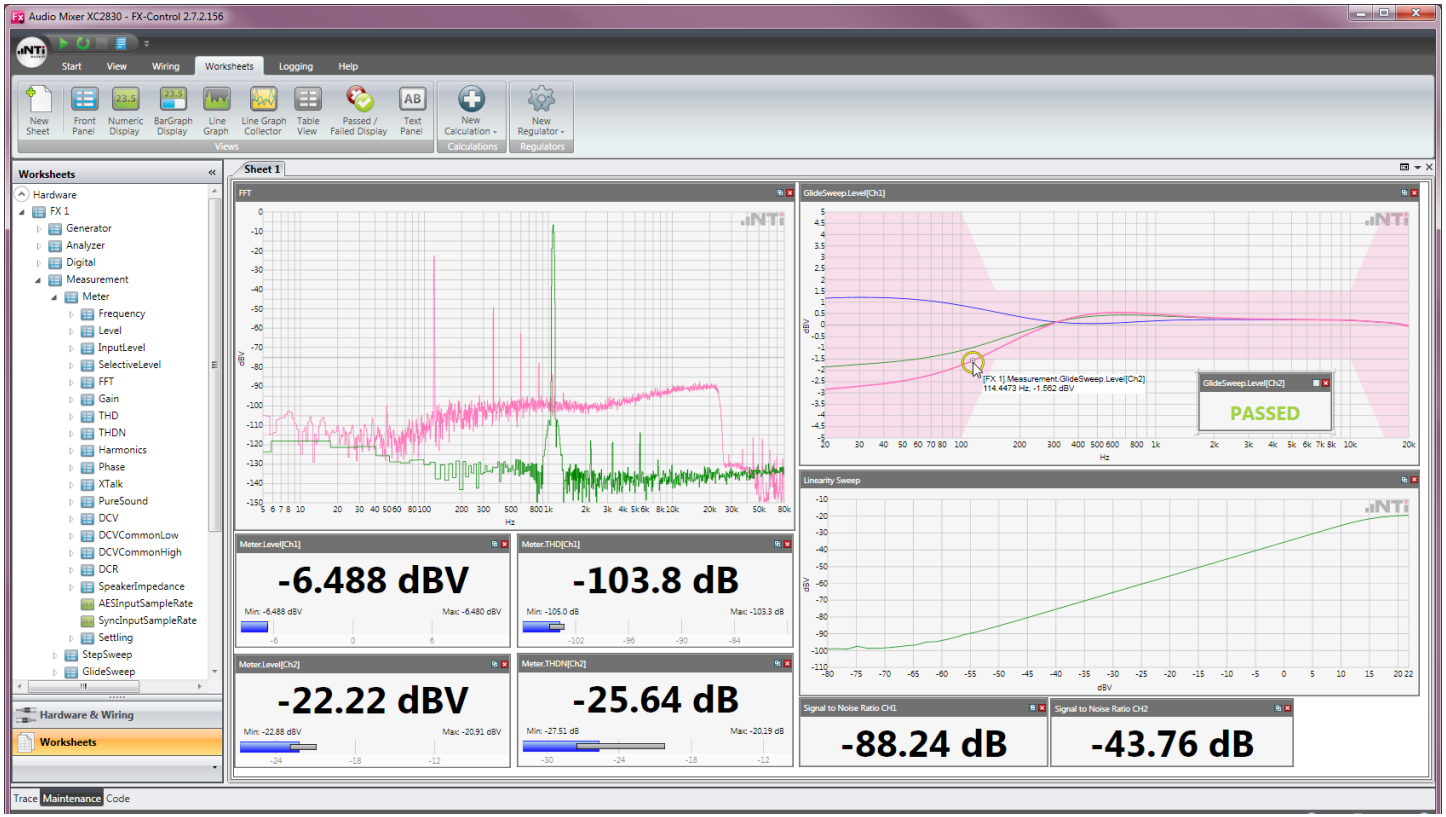
The Windows-based FX-Control software is standard issue with the FX100. It provides a comprehensive interface for robust control of the FX100 including many useful functions. Fully-configurable charts display the details of the measurement results. Test parameters and measurement functions can be defined in multiple windows.

It is this outstanding ease-of-use and flexibility that makes even the most complex measurement processes quick and simple to manage.

Standardized Computation Elements

A particular advantage of the FX-Control software is that you can extend the standard range of measurement functions by customized calculation items and regulators. For instance, arithmetic basic functions such as addition or multiplication, boolean operators, interpolation or smoothing etc. are supported.

Thus, you may create separated analysis of selected portions of a trace, determine outcomes by linking several obtained results, automatically derive and dynamically adjust tolerance limits and much more.

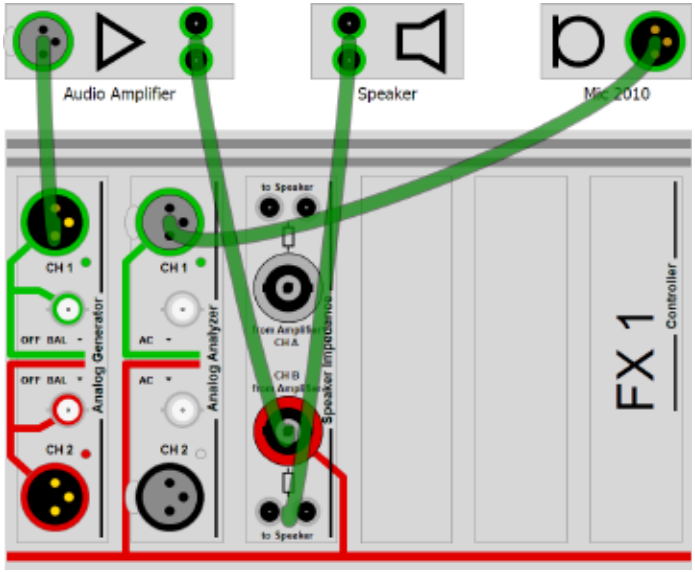


Example of a customized measurement setup

Wiring Assistant

FX-Control allows you to show graphically how the FX100 is physically connected to external components. Use this wiring assistant to give you a clear overview of the process and ensure that the selected input and output channels and the associated settings match the real signal path.

The wiring assistant diagram is also stored with the project data as an invaluable guide for reproducing the physical environment of the test at a later date.



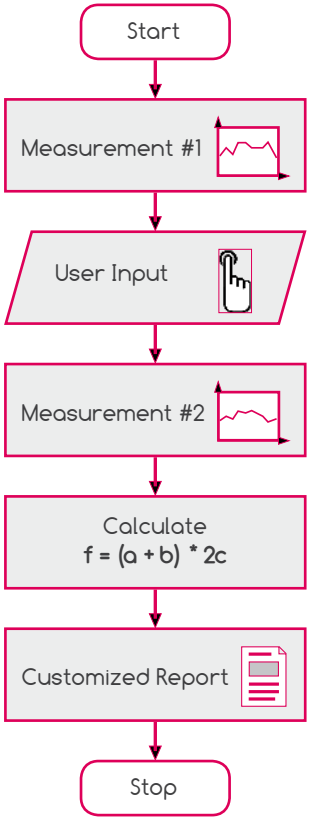
Application Programming

The complimentary Microsoft® .NET API can be integrated into all Microsoft .NET programming languages. Sample programs in C#.NET and Visual Basic.NET are available. In addition, a complete LabVIEW™ driver library exists for the integration of the FX100 into an existing quality control system.

Individual Test Sequences

Recurrent tasks can be easily translated into automated sequences with the FX-Control software. To this end, there is a structured set of self-explanatory commands available.

Processes that include, for example, data input from the operator, calling external procedures or producing customized reports can be created without the user having to have special programming skills.



Example of an automated test sequence including operator input

ANALOG AND DIGITAL SIGNAL ANALYSIS

FX100 Base Unit

The 2-channel analog basic version of the FX100 supports a wide range of test signals and audio measurements in a variety of modes.

Meter Mode

Generate test signals with specific levels and/or frequencies and continuously analyze the response of the device under test. The Meter mode also includes a high-resolution FFT spectral analysis with a block length of up to 2 MB.

StepSweep

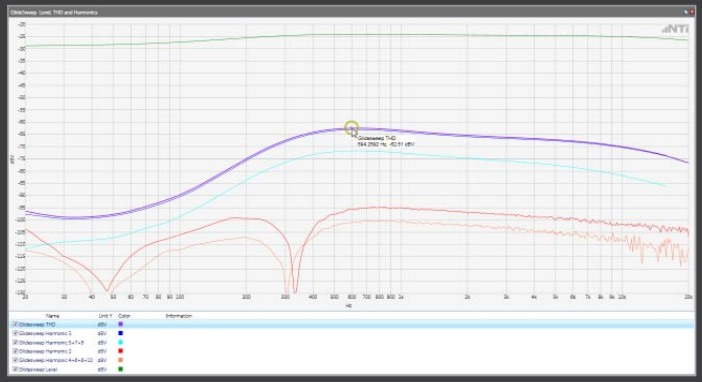
The conventional StepSweep is suitable for applications where, for example, the test signal is required to switch amongst specified frequencies and/or amplitudes at pre-determined intervals. The flexibility in defining these frequency and amplitude transitions allows a quick determination of the linearity of a device under test simply by examining the relationship between the input and output signals. By displaying the THD value against the input level, the effects of overload (clipping, distortion) are represented graphically within seconds.

GlideSweep

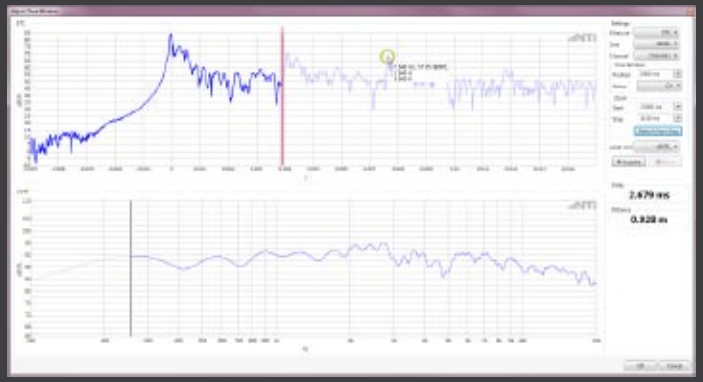
Fast and comprehensive audio analysis is a central requirement for laboratory as well as manufacturing applications. Quick GlideSweeps (chirps) allow you to simultaneously measure frequency response, distortion, audible defects, phase, latency and more.

The FX100 Audio Analyzer provides this facility as well as a number of unique and extremely useful additional functions. An outstanding feature of the FX100 is its ability to analyze GlideSweep signals originating from an external playback device such as a smart phone or mp3 player. First simply export the test signal as a wav- or mp3-file from the FX100 to the device. Then, using the device to play the signal, measure the audio characteristics of the device with the FX100.

By manually adjusting the time window of the impulse response, it is possible to perform anechoic acoustic measurements in a reverberant room with the FX100. The acoustic reflections from nearby surfaces are thus hidden. This is of particular interest for testing acoustic devices such as loudspeakers or microphones.



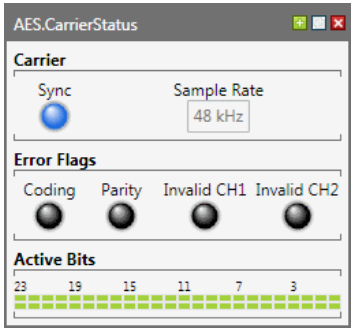
GlideSweep measurement with analysis of level, THD and harmonics



Time-gating for anechoic measurements

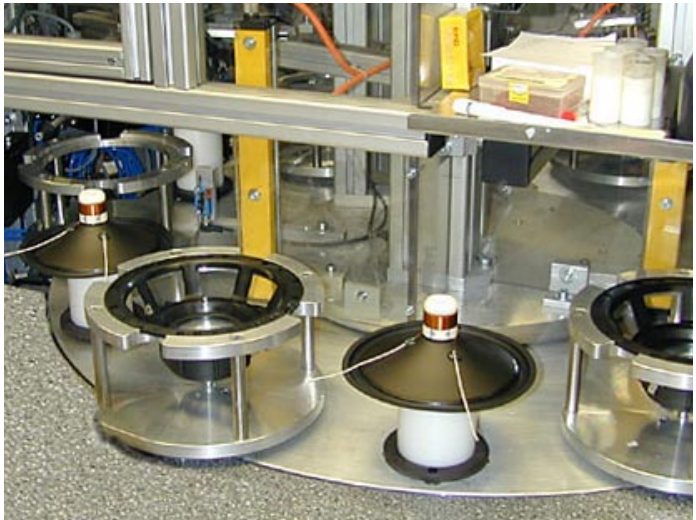
Digital Extension

The FX-AES module contains two complete channels of digital audio in standard AES3 format with sample rates up to 192 kHz. This adds digital signal generator and analyzer capabilities to the FX100, allowing for the complete analysis of a device under test in a pure D-D and mixed A-D or D-A mode. The interface includes two XLR and BNC connectors with selectable input impedance as well as optical TosLink connectors. The sync-input allows the generator clock to be synchronized to an external clock reference.



PureSound™ Loudspeaker Testing (optional)

The unique PureSound™ technology reliably detects, with a perfect correlation to the human ear, manufacturing errors such as metal particles in the magnetic gap, incorrectly-centered coils or wires touching the cone, even in a noise factory environment.



SYSTEM INTEGRATION

Shortest Measurement Time

The uncompromised quest for maximum measurement speed makes the FX100 Audio Analyzer the optimal solution for all applications in which accurate results are required in the shortest possible measurement time.

Maximum Flexibility

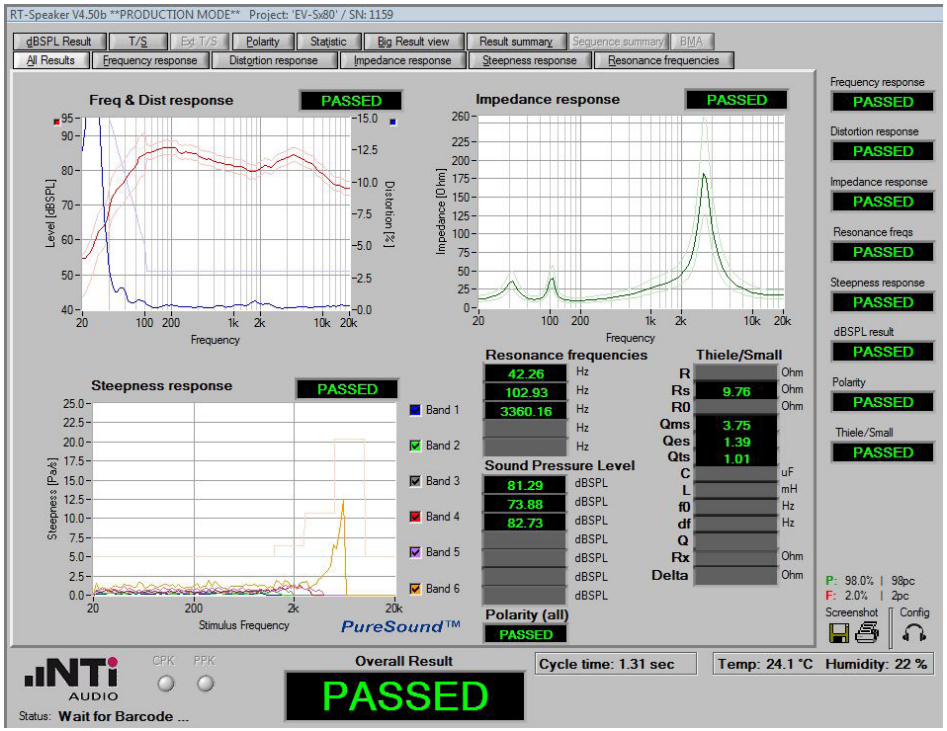
The modular concept of the FX100 Audio Analyzer provides a decisive advantage in adapting to changing requirements. Thus, the 2-channel base unit may at any time and easily be upgraded to either 4 channels, or up to 12 internal switchable inputs or outputs, or up to 80 external switchable input or output channels. Other useful plug-in modules for speaker impedance measurement and digital audio signals are available.

Straightforward Automation

RT-Speaker and RT-MicFX are two other sophisticated software packages that combine with the FLEXUS FX100 Audio Analyzer for the testing of loudspeakers and microphones respectively. Through the interfaces of these software packages, test systems can be progressively and practically fine-tuned. The packages further provide the facilities to integrate peripheral devices, manage projects, store data and customize reports of the measurement results. Also, frequent changeovers in a modern production plant can be accomplished quickly and safely.

The Microsoft .NET or LabVIEW™ driver libraries allow the direct integration of the FX100 into higher-level systems, communicating through the integrated controller module available in the FX100 base unit.

THE LEADING LOUDSPEAKER TEST SYSTEM



RT-Speaker overview of the measurement results

Smooth Setup of Pass/Fail Criteria

As soon as a new product goes into production, the significance of the Pass/Fail criteria must be considered. This adjustment represents a major challenge because both the relevance of measurements as well as the level of the yield depends directly on optimizing these tolerance limits.

The FX100 + RT-Speaker test system facilitates this process considerably, thanks to its informative user interface and several practical functions. As examples, the concept of nested classes and the reference recording mode simplifies the rapid identification of clearly intact or defective parts as well as limit sample. The desired Pass/Fail criteria can thus be quickly and reliably established.

Acoustic Quality Control

Verifying electro-acoustic transducers in a harsh manufacturing environment requires a sensitive, yet rugged and fast test system. The FX100 Audio Analyzer with the PureSound™ option for detecting audible defects provides a trusted and proven solution. The system supports all kinds of acoustic measurements such as level, distortion, T/S parameters etc. as well as statistical analysis such as trend analysis, histograms and Cpk/Ppk process control.

Simple Operation

A big advantage is the practical and clearly-understandable structure of the software. It leads the user intuitively through the parameterization process.

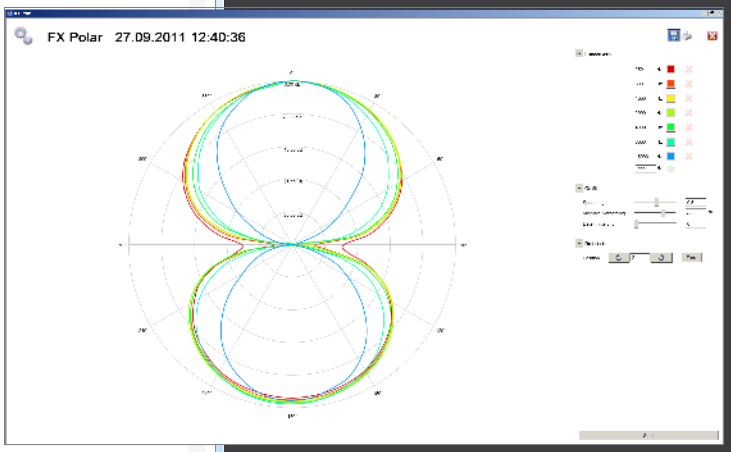
There is also a strict separation of administrator and user modes, allowing the user rights to be adjusted as the process becomes more familiar.

The Right Solution for You

The RT-Speaker software is available in various editions, covering all types of loudspeaker testing from manual to fully automated.

MICROPHONE TEST SYSTEM

Frequency response, sensitivity and distortion



Polar plot

Wide Range of Applications

The FX100 Analyzer + RT-MicFX software are excellent for comprehensive quality control of microphones, be they capsules (electret, condenser or dynamic), digital MEMS microphones or contained in complete products such as studio microphones, headsets or mobile phones.

The test system captures frequency response, distortion (THD), sensitivity and signal-to-noise-ratio (SNR) in the shortest possible time.

Polar Diagrams

In combination with the optional turntable, the system can determine the directional characteristic of microphones through the recording of polar plots.

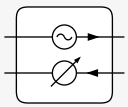
Other Options

If required the system can be expanded, with an ampere meter or ambient sensors, to capture additional parameters such as the microphone power consumption, ambient temperature, altitude and barometric pressure.

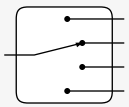
MODULAR EXTENSIONS

The three empty slots in the FX100 base unit can be used, for example, to expand the FX100 from 2 to 4 analog channels, or to add a loudspeaker impedance module or digital module.

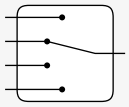
For multi-channel measurements the FX100 can be expanded by internal and/or external switchers, thus handling up to 80 input or output channels. The FX-Control software also supports the parallel control of multiple FX100 devices.



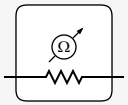
Kanalerweiterung
2 CH -> 4 CH
600 060 010



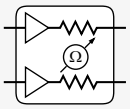
Ausgangs-
umschalter FX-OS
600 060 016



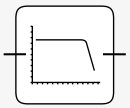
Eingangs-
umschalter FX-IS
600 060 013



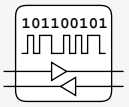
Impedanzmodul
FX-SIH (25mA–10A)
600 060 021



Impedanzmodul +
Verstärker FX-SIP
600 060 022



Filter für Class D
Verstärker FX-DF
600 060 026



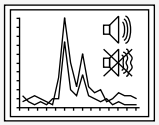
Digitales Audio
FX-AES
600 060 024

OPTIONS AND ACCESSORIES

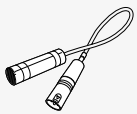
Measurement Microphones

The M2010 and M2015 are high-quality measurement microphones for use in research, development, manufacturing and service. Their compact design provides flexibility, especially in tight spaces. Features are:

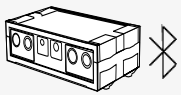
- 1/2“ omni-directional free-field microphone with class 1 frequency response
- Dynamic range of 24-145 dB (M2010) and 34-155 dB (M2015)
- Phantom voltage 48 VDC, Frequency range 20 Hz - 20 kHz



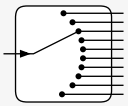
PureSound™
Fehleranalyse
830 000 200



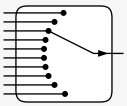
Messmikrofone
M2010: # 600 040 010
M2015: # 600 040 015



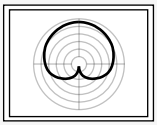
Bluetooth Box
600 061 021



OS-0210
Ausgangsumschalter
600 010 430



IS-1002
Eingangsumschalter
600 010 425



Turntable TT01
600 061 020

SPECIFICATIONS

Analog Audio Generator	
Test Signals	Sine, StepSweep, GlideSweep, White Noise, Pink Noise
Level Range	10 µV to 12.45 V (–100 dBV to 21.9 dBV)
Level Accuracy	±0.04 dB
Level Flatness	< ±0.01 dB (10 Hz to 20 kHz)
Frequency Range	5 Hz to 80 kHz
THD+N, Harmonic Distortion	–104 dB @ 1 kHz, 0 dBV (typical)
Analog Audio Analyzer	
Measurement Functions	• Level (selective & wideband) • Gain • FFT • Frequency • THD, THD+N, Harmonics k2-k35 • Phase • Crosstalk • Polarity • Signal latency • DC-Level, DC-Impedance, • optional: PureSound™ Rub&Buzz • optional: AC-Impedance
Sweeps	Frequency Sweep, Time Sweep, Level Sweep, Table Sweep
GlideSweep	100 ms to 40 s for internal/external sweeps
Level Range	• < 1.0 µV to 141 V (max 200 Vp) • Channel-independent auto ranging
Level Accuracy	±0.04 dB @ 1 kHz
Level Flatness	< ±0.015 dB (20 Hz to 20 kHz)
Frequency Range	DC, 5 Hz to 80 kHz
THD+N	–107 dB @ 1 kHz, 0 dBV (typical)
Crosstalk	≤ –125 dB + 1 µV (10 Hz to 20 kHz)
Signal Latency	0 to 19 seconds
Input Bias Supply	2 VDC, 48 VDC Phantom Power, ICP®

Digital Audio Generator	
Formats	AES3, S/PDIF and TosLink (XLR, BNC, Optical)
Test Signals	Sine, StepSweep, GlideSweep, Noise
Channel Status	Adjustable key parameters
Sampling Rate	22 kHz to 220 kHz
Digital Audio Analyzer	
Formats	AES3, S/PDIF and TosLink (XLR, BNC, Optical)
Measurements	• Same as analog audio analyzer (if applicable) • Channel Status, Input Sampling Rate
Sampling Rate	22 kHz to 220 kHz
External Sync.	Wordclock, Video PAL/NTSC, AES3
General	
Analog Audio Input / Output	• 2 or optional 4, • Independent signal / level / frequency selection • XLR and BNC connections
Extensions	3 empty slots in the base unit for modular extension
Interfaces	• USB 2.0 communication with the PC • Headphone audio output, 6.3 mm stereo jack
Pass / Fail Display	• Digital I/O interface • Two-color LED with Green / Red distinction
FX-Control Software	• PC software application with access to all functions of the instrument • Parallel measurement with internal / external triggering • Calculation function for further processing of results • Measurement reports in the following formats: txt, csv or xlsx • Extensive tolerance functions and display of the measurement setup
Programming	Supports Microsoft .NET Framework 3.5 (e.g. C#.NET, Visual Basic.NET), LabVIEW™
Design	Desktop or ½*19" rack chassis, 3 units high
Order Information	# 600 060 000 (2-channel base unit)

More specifications at www.nti-audio.com/FX100

info@nti-audio.com
www.nti-audio.com

dth 5000 - 10.14

Made in Switzerland