Audio precision

AUDIO TEST SOLUTIONS | 2020

APx500 Audio Test Software
A versatile, powerful audio test experience

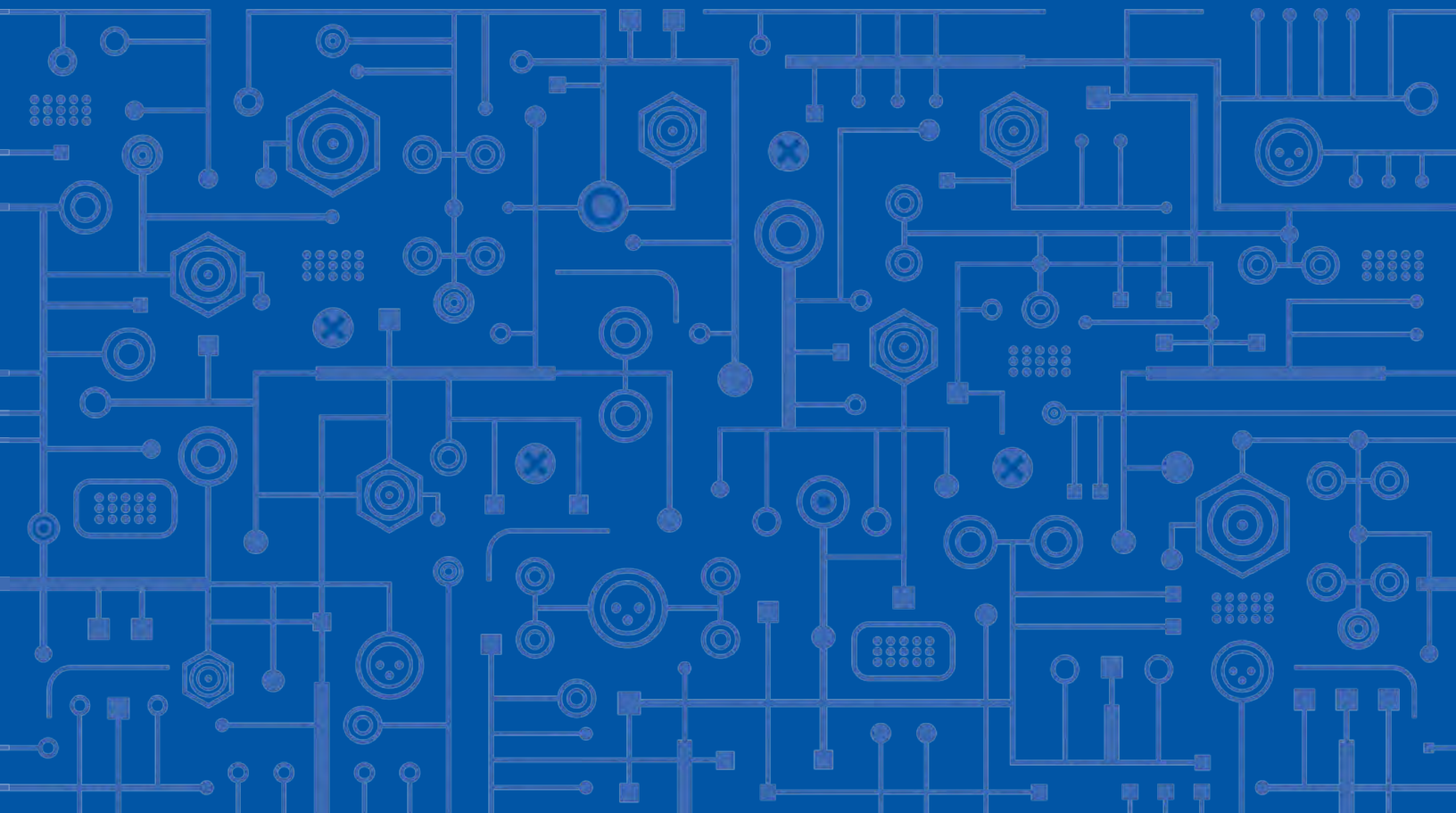
APx B Series & APx Flex Audio Analyzers
The state of the art in audio test

APx Digital I/O Options
Versatility in digital interfaces

Electro-Acoustic Test
Measurement solutions for R&D and Production

Perceptual Audio Test
Options for intelligibility and quality evaluation

Accessories
Expansions for measurement systems



COMPANY PROFILE

AUDIO PRECISION (AP) is a recognized world leader in electronic audio and electro-acoustic test instrumentation. Since 1984, AP's analyzers have helped engineers to design and manufacture innovative solutions ranging from semiconductor devices to consumer, automotive, and professional audio products.

Ongoing innovation has been a key theme for the organization since its founding and the APx B Series audio analyzers represent the state of the art in audio test, with models and options to suit every need from R&D to high-speed production test. Industry-leading analog performance, flexible software with a multi-mode UI, and a wide range of digital I/O and software options make APx the most powerful and versatile series of instruments available. And on the topic of software, the introduction of the cost-effective APx500 Flex audio analyzer now allows users to pair APx audio measurement software with ASIO-capable third-party audio interfaces. In addition to market-leading measurement software and a robust line of analyzers, AP also offers an array of test accessories and options for perceptual audio testing.

Headquartered in Beaverton, Oregon, AP products can be found all over the world. With global partners and representatives providing technical support, service and calibration, along with exceptional customer service, AP is dedicated to collaborating with engineers and technicians on every continent.

APx500 AUDIO TEST SOFTWARE

A VERSATILE, POWERFUL AUDIO TEST EXPERIENCE

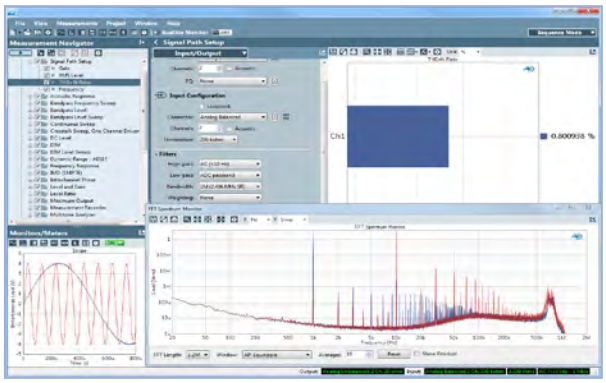
As an expertly designed platform, APx500 audio measurement software provides outstanding market-leading flexibility, scalability and usability, whether paired with an APx B Series audio analyzer or with an ASIO-capable audio interface and APx500 Flex. This high-performance software offers two easy-to-use modes, Sequence Mode and Bench Mode

APx500 Measurement Software metadata recorder tracking HDMI metadata changes.

CODE-FREE AUTOMATION & COMPLETE API

APx500 Measurement Software is the most advanced audio measurement interface available. Complex procedures that include user prompts, limits, and calls to external applications can be created directly in the GUI, saving time and money while ensuring painless updates over time, as no development is required.

Create custom interfaces and application-to-application automation using the comprehensive APx API for integration in VB.NET, C#.NET, MATLAB, and LabVIEW development environments. Projects and automation can be shared with other APx units anywhere in the world.

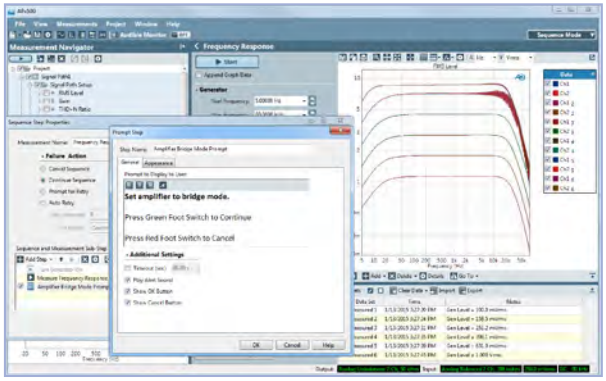


APx500 UI with 24 bit, 1 MHz FFT spectrum display

SHARING PROJECTS & REPORTING RESULTS

All settings for a test are saved in a single project file, making it easy to replicate test setups between R&D and production facilities anywhere in the world. Project files are compatible with all APx instruments and each project is self-contained, so there's never any worry about dependencies or broken links. Users can even embed waveform files and images within a project file.

For customers, contract manufacturers or management, APx automatically generates rich graphic reports, with highlighted pass / fail limits and options to export as PDF, HTML, Excel, CSV, RTF or MATLAB files.



A test engineer adds footswitch interaction to a sequence without a single line of code required.

APx500 AUDIO ANALYZERS

APx AUDIO ANALYZERS represent the state of the art in audio test, with models and options to suit every need from R&D to high-speed production test. Industry-leading analog performance, flexible software with a multi-mode UI, and a wide range of digital I/O and software options make APx audio analyzers the most powerful and versatile series of instruments we've ever produced.

APx555B HIGH-PERFORMANCE, MODULAR 2-CHANNEL AUDIO ANALYZER

The New Standard: The APx555B is the highest performance and most versatile audio analyzer ever made, specifically designed for audio engineers requiring the lowest distortion and greatest flexibility possible.

APx500 FLEX AUDIO ANALYZER

Created for test scenarios where hardware performance requirements are secondary to test system price—such as production line test of speakers, headphones and microphones—the APx500 Flex Audio Analyzer is a cost-effective solution which enables the use of APx audio measurement software with ASIO-capable third-party audio interfaces.

APx52x B SERIES MODULAR 2-AND 4-CHANNEL PERFORMANCE ANALYZERS

The APx52xB is a flexible, performance-oriented 2-or 4-channel analyzer with support for high-performance analog options and all APx digital options. Pair with SWR-2755 Switchers to expand channel count up to 192 inputs and 192 outputs.

APx58x B SERIES 8-AND 16-CHANNEL MODULAR ANALYZERS

Ideal for multichannel devices, the APx58xB offers 2 or 8 analog output and 8 or 16 analog input channels with support for all APx digital options.

APx515B 2-CHANNEL AUDIO ANALYZER

The APx515B is a fixed-configuration analyzer with a small footprint, designed for high-speed-production, electro-acoustic test, and a range of R&D applications.

HEARING INSTRUMENT AUDIO ANALYZER

Designed to meet the needs of hearing instrument manufacturers, the APx511B offers the specific measurements and I/O required for hearing instrument production test, including automated routines for IEC60118-7 and ANSI S3.22.

APx500 FLEX AUDIO ANALYZER | FEATURES

The APx500 Flex audio analyzer—APx500 measurement software and an APx500 Flex Key—allows users to pair an ASIO-capable audio interface with AP's versatile and powerful APx audio measurement software. In its base configuration, Flex is configured for two channels and includes a core set of fundamental measurements and functionality (see box at right).

APx500 Flex–Base Configuration*

- File Analysis
- Sequence Mode
- Input Signal Monitors
- Level & Gain
- THD+N
- Loudspeaker Production Test (incl. Rub & Buzz)
- Stepped Frequency Sweep
- Pass/Fail Measurement
- Signal Acquisition Measurement

**Included with all channel options*

Configuration options for four or eight channels are also available, along with a trio of Flex Packs that each offer different groups of more advanced measurements (see below). Perceptual audio measurements—including ABC-MRT and POLQA—can likewise be used with Flex. Finally, for the user that needs the base configuration plus just one more measurement, APx500 Flex has an *à la carte* menu of measurements from which to choose.

FLEX PACK 2

- Crosstalk
- Crosstalk Sweeps
- DC Level
- DC Level Sweeps
- DUT Delay
- Frequency
- Frequency Response
- Interchannel Phase
- Level Ratio
- Measurement Recorder
- Noise
- Noise Recorder
- Q-Peak Noise
- SNR
- SINAD
- Stepped Level Sweep

FLEX PACK 3

- Continuous Sweep
- Digital Error Rate
- Dynamic Range
- IMD
- IMD Frequency
- Sweep
- IMD Level Sweep
- Input Sample Rate
- Maximum Output
- Maximum Output (CEA-2006)
- Multitone Analyzer
- Regulated Frequency Sweep
- Signal Analyzer

FLEX PACK 4

- Acoustic Response
- Bandpass Frequency Sweep
- Bandpass Level
- Bandpass Level Sweep
- Cumulative Spectral Decay
- Impedance/Thiele-Small
- Noise Recorder
- Modulated Noise
- Polar Plots
- Transfer Function

APx500 B SERIES–FEATURES	APx511B	APx515B	APx52xB	APx58xB	APx555B
Analog input channels	1 auto-ranging	2	2 (APx525) 4 (APx526)	8 (APx582/585) 16 (APx586)	2
Analog output channels	2	2	2	2 (APx582) 8 (APx585/586)	2
Analog Analyzer Performance					
Bandwidth	>20 kHz	>90 kHz	>90 kHz	>90 kHz	>1 MHz-2 channels
Maximum Rated Input Voltage	48 Vpp	125 Vpk	230 Vpk	160 Vpk	230 Vpk
Analog Generator Performance					
Sine Frequency Range	100 Hz-20 kHz	2 Hz-80.1 kHz	0.1 Hz-80.1 kHz	0.1 Hz-80.1 kHz (APx582) 5.0 Hz-80.1 kHz (APx585/586)	0.001 Hz-80.1 kHz, DAC 5 Hz-204 kHz, analog
Maximum Amplitude (balanced)	16.12 Vpp	16.00 Vrms	21.21 Vrms 26.66 Vrms (option AG52)	21.21 Vrms (APx582) 14.40 Vrms (APx585/586)	26.66 Vrms
System Performance					
Residual THD+N (20 kHz BW)	-80 dB + 1.4 µV	-102 dB + 1.4 µV	-105 dB + 1.3 µV	-103 dB + 1.3 µV	-117 dB + 1.0µV
Residual Input Noise (20 kHz BW)	1.4 µV	1.4 µV	1.3 µV	1.3 µV	1.0 µV
Analog Options List					
BW52 High Bandwidth (2 Ch-1 MHz)	–	–	(Opt)	–	Standard
AG52 Square Wave, DIM	–	–	(Opt)	–	Standard
Tone Burst	–	–	–	–	Standard
Intermodulation Distortion	–	(Opt)	Standard	Standard	Standard
Digital Options List					
ASIO	–	(Opt)	Standard	Standard	Standard
Digital I/O (AES3/SPDIF)	–	Standard	Standard	Standard	Standard
Advanced Digital I/O (ADIO)*	–	–	(Opt)	(Opt)	Standard
HDMI	–	–	(Opt)	(Opt)	(Opt)
Bluetooth	–	–	(Opt)	(Opt)	(Opt)
PDM	–	–	(Opt)	(Opt)	(Opt)
Digital Serial I/O	–	–	(Opt)	(Opt)	(Opt)
Advanced Master Clock (AMC)*	–	–	(Opt)	(Opt)	Standard
Reference/Sync (AMC module)					
AES11 DARS Reference In/Out	–	–	(Opt)	(Opt)	Standard
Sync In/Out	–	–	(Opt)	(Opt)	Standard
Trigger In/Out	–	–	(Opt)	(Opt)	Standard

*** ADIO includes AMC module**

*** All features are representations of APx B Series audio analyzers only. For information on APx500 Flex, please see page 4.**

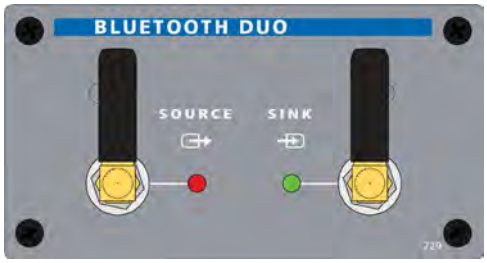
APx DIGITAL I/O OPTIONS

ADVANCED DIGITAL I/O

Advanced Capabilities for AES/SPDIF/TOSLINK

The APx ADIO module enables the generation of advanced impairments for sophisticated test of devices via AES/SPDIF/TOSLINK. It also includes the Advanced Master Clock (AMC) module, which handles input and output clock signals for synchronizing an APx with external equipment (or vice versa). AMC also provides jitter generation and measurement functionality for jitter-enabled I/O modules such as ADIO, PDM and DSIO.

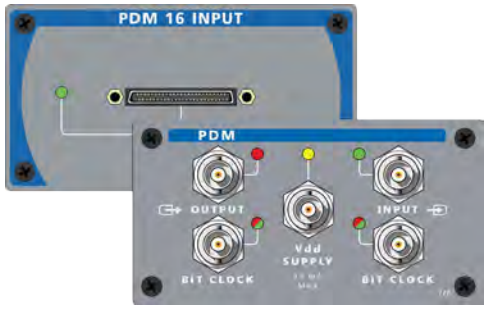
BLUETOOTH WIRELESS



Integrated BLUETOOTH® Wireless Technology

APx's Bluetooth Duo module provides dedicated source and sink radios, higher RF power, and improved RF shielding, with all Bluetooth controls integrated into the APx analyzer software. The module supports A2DP, HFP, HSP, and AVRCP profiles, with codec support for SBC, AAC, aptX, aptX-LL, aptX-HD, CVSD, and wideband speech (mSBC). (For earlier generations of APx analyzers, AP's legacy Bluetooth module is still available when pre-4.5 software versions are required).

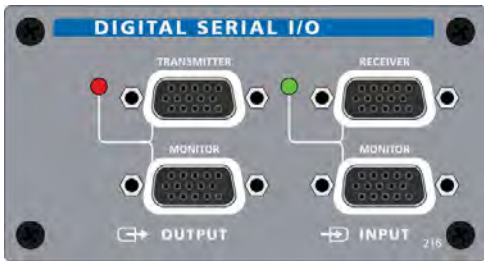
PDM



Complete PDM Analysis for MEMS Mics, Mic Arrays & Smart Devices

APx B Series analyzers offer powerful PDM options to engineers evaluating audio devices that have a PDM output. The PDM 16 module provides sample-accurate inter-channel phase information for up to 16 channels and supports anechoic chamber test setups with an acoustically silent remote pod. The PDM module, while limited to 2 channels, offers variable DC voltage, variable sample rate, PSR (power supply rejection) measurement and jitter measurement for testing devices' full operating parameters.

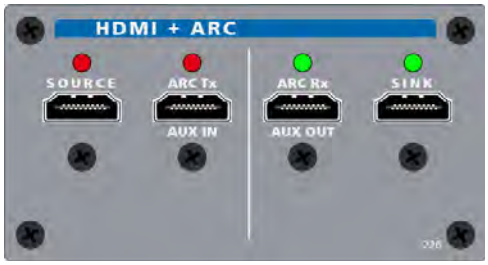
DIGITAL SERIAL



Multichannel Chip-Level Connectivity

Digital serial capability is essential in R&D for evaluating designs at the circuit board level. The Digital Serial I/O (DSIO) option provides a direct multichannel connection to chip-level interfaces such as I2S, TDM, and other popular serial interface formats including left-justified, right-justified, and DSP.

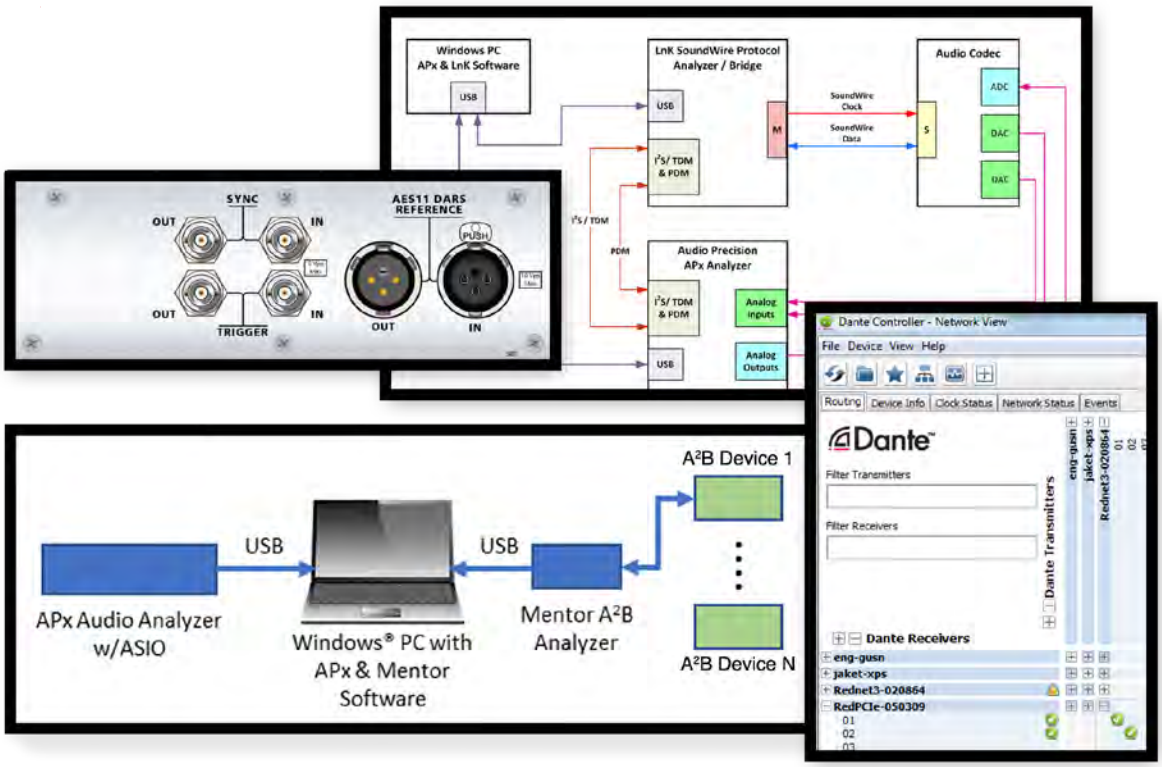
HDMI + ARC



Systematic Test for HDMI+ARC

The APx HDMI option allows engineers to measure HDMI audio format compatibility on devices such as surround sound receivers, set-top boxes, smartphones, tablets, TVs, and DVD or Blu-ray Disc™ players. APx can stream both lossless and compressed formats from pre-encoded audio test files, making it easy to troubleshoot component compatibility and issues related to downsampling, downmixing, or transcoding.

APx DIGITAL I/O OPTIONS continued



ADVANCED MASTER CLOCK

Jitter Measurements, External Triggering, and Clock Synchronization

The Advance Master Clock (AMC)—standard on the APx555B and optional for the APx52x and APx58x B Series audio analyzers—provides jitter, trigger, and clock synchronization features. AMC also offers jitter generation and analysis capabilities. As an option, AMC may be ordered with a new instrument or retrofitted to existing APx analyzers manufactured after 2012 (excluding APx515 or APx511).

DANTE ™ AUDIO TEST

Measurements for Networked Audio Components

With either Dante Virtual Soundcard or Focusrite RedNet PCIe Dante soundcard installed, audio engineers can use APx's ASIO interface and analog or digital I/O to stream test signals to the DUT and measure its response. The converse is also applicable with the stimulus applied to the DUT's audio inputs and the analyzer measuring the response supplied by the Dante interface.

SOUNDWIRE ™ AUDIO TEST

Closed-Loop Soundwire Device Testing

Combining an APx B Series audio analyzer with LnK's protocol analyzer creates a closed-loop measurement system for the real-time evaluation of chipset and mobile product designs incorporating MIPI's SoundWire interface. It offers additional real-time test capabilities, including the measurement of propagation delay, acoustic response and other transient behaviors.

AUTOMOTIVE AUDIO BUS® AUDIO TEST

Closed-Loop, Multichannel A²B Testing

For next-generation automotive systems, the combination of APx500 B audio analyzers and software, and Mentor's A²B Analyzer System, software and ASIO driver, allows developers to easily create a complete, closed-loop multichannel A²B audio test system. Interface options include analog, Bluetooth®, digital serial (TDM) and PDM.

APx ELECTRO-ACOUSTIC OPTIONS

THE ELECTRO-ACOUSTIC TEST SOFTWARE options for APx B Series analyzers form a comprehensive solution, allowing designers and production engineers to test electro-acoustic products end-to-end. Measurements, results, reports and automation can be easily shared among platform family members, allowing designers and production engineers to collaborate and ensure quality, even when separated by great distances.

RESEARCH & DEVELOPMENT

The APX-SW-SPK-RD option delivers a complete suite of measurements and results tailored to the needs of designers and engineers developing electro-acoustic audio products. It includes key measurements and results such as complete Thiele-Small characterization; time-gated, quasi-anechoic Acoustic Response; Impedance analysis; plus the Loudspeaker Production Test measurements.

PRODUCTION

The APX-SW-SPK-PT option enables high-speed production test of electro-acoustic devices, providing key loudspeaker measurements in a single one-second sweep. Results include Rub & Buzz detection, essential Thiele-Small parameters, and impedance magnitude and phase. A proprietary modulated noise measurement is also provided to aid in detecting enclosure air leaks.

APx1701B

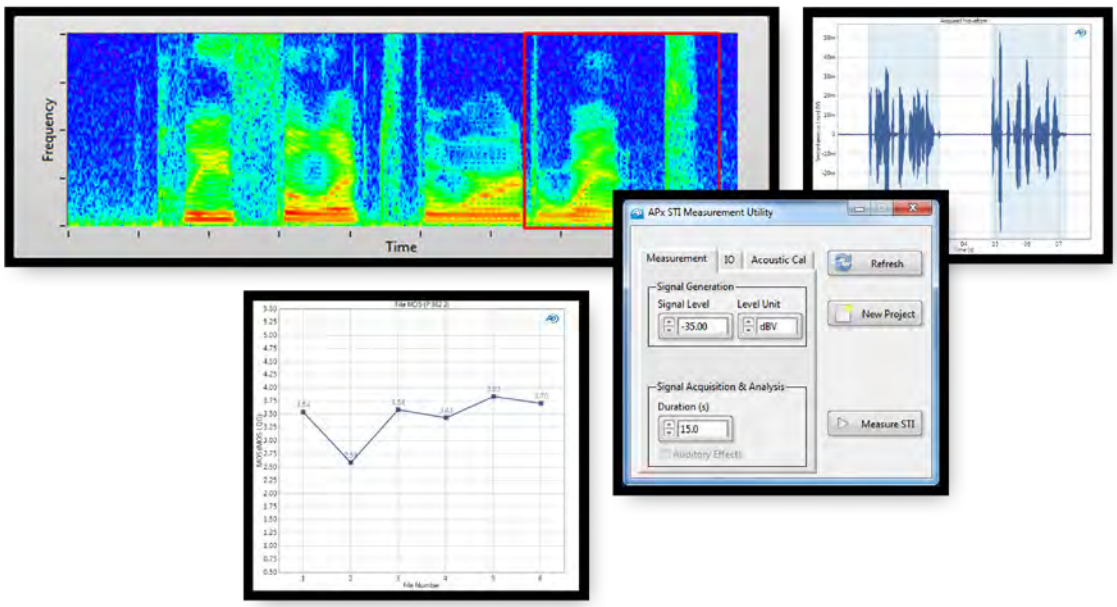
The APx1701B transducer test interface is an APx accessory device that integrates instrument-grade amplifiers and microphone power supplies for designers and production test engineers seeking clear insight into the behavior of their loudspeaker, headphone and microphone designs. The system drives loudspeakers and headphones with dedicated power amplifiers, enables impedance measurements, and provides power to measurement microphones and mics under test. Its functions are integrated with the APx500 audio measurement software and a connected APx analyzer.

	SPK-RD	SPK-PT
Impedance/Thiele-Small	■	■
Full Thiele-Small Parameters	✓	–
Impedance Real	✓	–
Impedance Imaginary	✓	–
Impedance Magnitude	✓	–
Impedance Phase	✓	–
Loudspeaker Production Test	■	■
Optimized Thiele-Small Parameters	✓	✓
Rub & Buzz Detection	✓	✓
Impedance Magnitude	✓	✓
Impedance Phase	✓	✓
Frequency Response	✓	✓
Relative Level	✓	✓
Phase	✓	✓
Distortion Product Ratio	✓	✓
Distortion Product Level	✓	✓
Acoustic Response	■	■
Rub & Buzz Detection	✓	✓
Impulse Response	✓	✓
Energy Time Curve	✓	✓
Frequency Response	✓	✓
Relative Level	✓	✓
Phase	✓	✓
Distortion Product Ratio	✓	✓
Distortion Product Level	✓	✓
Modulated Noise Air Leak Detection	■	■

SMART DEVICE TEST

Using the exponentially-swept sine (or chirp) test signal, APx500 software v4.6 and later can measure devices that require open loop test configurations, including smart speakers, media streaming devices, and smart phones. With the Transfer Function measurement added in APx500 v5.0, engineers can measure system magnitude and phase across frequency, using any broadband signal as a stimulus. Transfer Function provides a number of derived results, including impulse response.

APx PERCEPTUAL AUDIO TEST



APx500 MEASUREMENT SOFTWARE supports several innovative and popular perceptual audio tests used for evaluating speech quality or intelligibility. From testing mobile phones to VoIP networks to hands free devices, software options PESQ, POLQA, STI and ABC-MRT support designers' needs for perceptional audio analysis.

PESQ

Low-Bandwidth Speech Quality

PESQ is an enhanced perceptual measurement for voice quality in telecommunications. It is licensed from OPTICOM GmbH and forms the basis of ITU-T Recommendation P.862. PESQ is specifically designed for testing voice quality on low bandwidth devices, like mobile phones and smartphones. MOS results from PESQ can achieve a very high correlation with results obtainable using human subjects.

POLQA

Wide Band Speech Quality

POLQA is licensed from OPTICOM as a successor to PESQ (above), and specifically targets changes in the communications landscape with support for HD Voice, 3G, 4G/LTE and VoIP technologies. Like PESQ, POLQA delivers results with a very high correlation to tests with human subjects. Unlike PESQ, POLQA handles variations including wide band audio, acoustic transducers, DSP and level.

STI

Speech Intelligibility (Noise-Based)

Using the APx STI measurement enables developers to verify the STI performance of their designs with AP's industry-leading instrumentation. Once the option is installed, the STIPA measurement can be easily incorporated into any measurement sequence. Additionally, the option includes a Speech Level measurement that conforms to Annex J of IEC 60268-16, for proper adjustment of the STIPA signal level.

ABC-MRT

Speech Intelligibility (Voice-Based)

The APX-SW-ABC-MRT option provides a convenient, automated method for measuring speech intelligibility that is proven to be highly correlated with subjective Modified Rhyme Test (MRT). As an objective estimate of speech intelligibility, it is fully integrated with APx B Series analyzers, including the test sequencer, limits and reporting, up to 16 acquisition channels and access to a wide variety of audio interfaces.

ACCESSORIES

SWITCHING AMPLIFIER MEASUREMENT FILTERS

Audio Precision switching amplifier measurement filters are designed to be inserted between the device under test and analyzer input, to reduce out-of-band switching signal components before measurement.

AUX-0100 Eight-channel passive low-pass filter, 20 Hz to 20 kHz passband.
AUX-0025 Two-channel passive filter, 20 Hz to 20 kHz passband.
AUX-0040 Two-channel passive filter, 20 Hz to 40 kHz passband.

AUDIO SWITCHERS

SWR-2755B Audio Precision offers three models of the SWR-2755B audio switchers, which expand the input and output capabilities of Audio Precision two-channel audio analyzers.

SOFTWARE LICENSING

Software Licensing and Maintenance

New instruments include a license for the current release of APx500 software, plus one year of software maintenance, licensing that instrument for the next major release (e.g. version 5.0) of APx500 software. This also includes any minor releases (e.g., version 5.x) that occur between major versions. For users wishing to license an existing analyzer for the most current release, software upgrades are available for purchase. Additionally, software maintenance subscriptions are available to license analyzers for multiple major releases. These subscriptions provide a distinct discount relative to purchasing individual software upgrades as major releases occur.

When purchasing a new analyzer, extended software license options are also available, with SW-EXT-3 and SW-EXT-5 licensing the instrument for the next three or next five major releases respectively.

Warranty Information

Audio Precision is proud to offer a limited three-year warranty on its new products. Upgrades, used equipment, and cables have a one-year warranty. Service is warranted for 90 days.

When purchasing a new analyzer, the EWP2 option extends the hardware warranty an additional two years, for a total warranty period of five years. Any instrument covered under a valid Audio Precision new product warranty—where the damage is not caused by owner misuse or abuse—is repaired free of charge. If the repair is made within a year of purchase, the unit will also receive an Accredited Calibration (Service B). If the unit is more than one year old, calibration is not included automatically, though it can be ordered at an extra charge.

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