



New AP2700 v3.30 control software

- USB connectivity to PC
- Native Windows Vista support
- Improved user profile management

2700 Series

Dual Domain Audio Analyzer



High-Performance Testing with the Audio Precision 2700 Series

The 2700 Series is the flagship model of Audio Precision's award-winning PC-controlled audio analyzers, long the recognized worldwide standard for the design and test of audio equipment. The full-featured SYS-2722 provides the unmatched distortion and noise performance required to test the latest advances in converter technology, combined with 192k digital input and output capabilities.

The 2722's true dual domain architecture enables uncompromised measurement of both analog and digital signals: the hardware generator and analyzer specifications surpass those of any digital configuration, while digital analysis techniques offer a wide array of precise, high-speed measurement techniques for either domain. Cross-domain work can be accomplished using the best of both worlds.

The 2700 Series

- The unparalleled precision of a dedicated hardware instrument.
- Fast instrument operation and powerful analysis under sophisticated control software.
- Programmatic control for high-speed automation.
- Serial digital interface testing.
- Flexible configuration options.
- * A family of auxiliary instruments for specialized testing.
- * AES3, IEC60958 (SPDIF) and PSIA input and output sample rates at 192 kHz.

The 2700 Series. Proven, reliable, high-performance technology from Audio Precision, the industry's preeminent audio test and measurement company.

Unparalleled Precision

Low Distortion

Analog system 1 kHz THD+N, 20 kHz BW ≤ -112 dB
(Typical worst case harmonic < -130 dB)

Digital generator distortion/spurious products ≤ -160 dB

High Bandwidth

Analog signal generation to **204 kHz**

Analog measurements to **500 kHz**

Analysis by FFTs and Multitone to **120 kHz**

Low Noise

Analog analyzer 22 Hz–22 kHz BW ≤ -118 dBu

Analog analyzer A-weighted ≤ -124 dBu

Flat Response

Analog system 20 Hz–20 kHz

Typically ± 0.003 dB

Low Crosstalk

Analog inputs 20 Hz–20 kHz ≤ -140 dB

Analog output 20 Hz–20 kHz ≤ -120 dB

Low Jitter

700 Hz–100 kHz BW ≤ 600 ps

50 Hz–100 kHz BW ≤ 1.0 ns

FFT Acquisitions

Up to **4 M Samples** (87 s @ 48 kHz F_s)

Accredited calibration to ISO 17025 standard



Every 2700 Series is calibrated before it leaves the factory, so you know your measurements are accurate and your instrument meets the most stringent Quality System Requirements in the industry.

Audio Precision is accredited by A2LA, the American Association for Laboratory Accreditation, to perform calibrations at our Calibration Lab in Beaverton, Oregon.



2700 Series dual domain model SYS-2722 192k

PC Control and Programmability

AP2700 is the control software for the 2700 Series instruments. Running on the controlling PC, AP2700 is a powerful and sophisticated real-time interface, with hardware and software system modules and functions controlled using settings on virtual panels, and measurement results displayed in virtual meter and graph readings. Both settings and readings can be swept and plotted on X-Y graphs, modified by various algorithms, compared against limits or analyzed by DSP methods.

AP2700 is flexible and configurable, addressing a wide range of uses from benchtop R&D or maintenance engineering to automated production testing.

Test setups, measurement data, automation scripts, graphs and other test components are saved on the PC. These files can be emailed or exchanged between co-workers at any location to duplicate test setups, review test results or publish reports. Graphs and numerical data can be pasted into spreadsheets, word processors or graphics editors, and can be exported in a number of different formats.

AP2700 supports Microsoft Windows® Vista and Windows XP.

- GPIB versions of each 2700 Series model are available, providing an IEEE-488 interface for compatibility with third-party automated testing instruments.

- The entire testing process can be automated for repeatability and speed by programmatically controlling the 2700 Series instrument using AP Basic, the Audio Precision programming language included with the 2700 Series. Every setting, reading and setup parameter in the 2700 Series control software is available in the AP Basic command set. AP Basic supports complex, branched testing programs as well as simple step-by-step macros.

- You can create, edit and run AP Basic macros without ever leaving the control software. The Macro Editor provides complete editing, debugging and syntax help.



Create and edit macros and verify your code using the Step and Trace mode in the Macro Editor.

- AP Basic works with the control software using ActiveX Automation. The entire command structure is accessible to Microsoft Visual Basic®, enabling you to integrate your 2700 Series instrument with a wide variety of applications and equipment.

- Learn Mode is a “macro recorder” that provides a fast and convenient way to generate automated test macros, even if you have little programming experience.

- A Dialog Editor provides an easy way to design a custom user interface “front-end” for your automation macros. Drag-and-drop in the Dialog Editor, and the underlying code is written into the Macro Editor script.



Use the Object Browser to easily integrate commands and correct syntax while working in the Macro Editor.



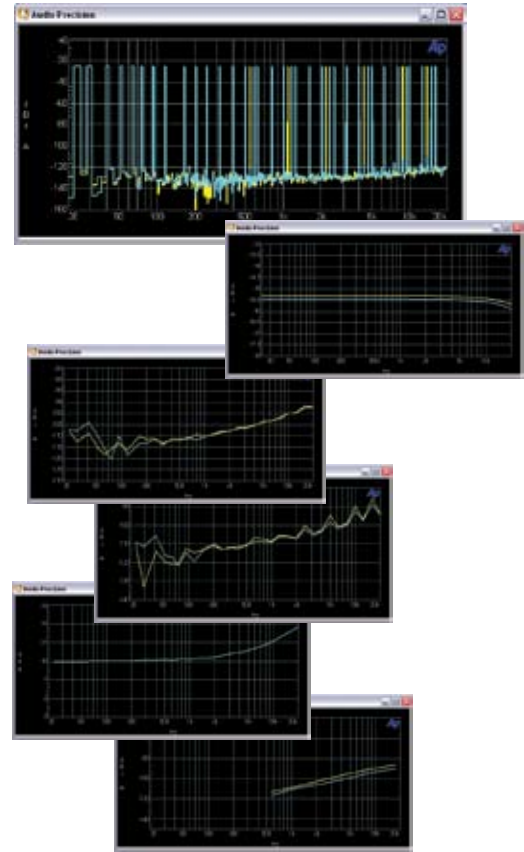
Design professional user interface panels within your macro using the Dialog Editor.

Unparalleled Speed

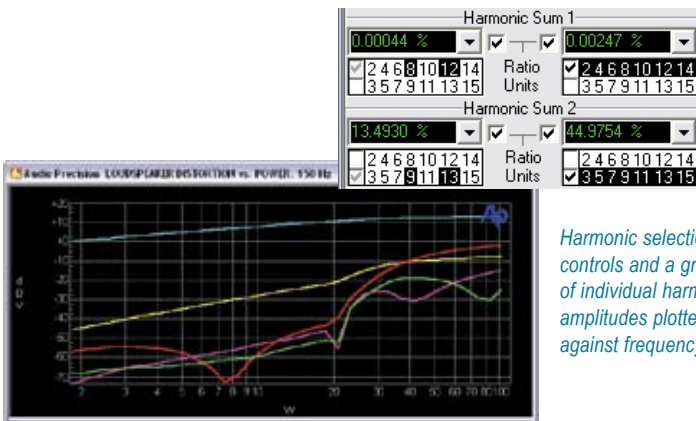
The 2700 Series offers an array of powerful, time-saving analysis tools to speed your testing procedures.

Multitone Multitone testing techniques can provide response, distortion, noise, crosstalk and phase measurements — all from a single sub-second acquisition. You can address a wide variety of high-speed testing applications by choosing a standard stimulus waveform, or by making your own using the multitone creation utility. In addition to great speed, multitone analysis brings other advantages: a stimulus signal, for example, that is a rich mix of frequencies, levels and phase relationships that more closely resembles program material than conventional single stimulus tones; and the unique ability to measure noise or very low distortion products in the presence of signal.

Fast detection The DSP-implemented Fast RMS Detector speeds sine wave sweeps by making measurements in as little as one cycle of the sine wave. This can provide an improvement in testing speed of an order of magnitude compared to normal RMS detector techniques.



The graph at the top shows a spectrum display of a multitone stimulus. The next graphs are examples of five dual-channel parameters plotted against frequency, all produced from a single multitone stimulus lasting less than one second.



Harmonic selection controls and a graph of individual harmonic amplitudes plotted against frequency.

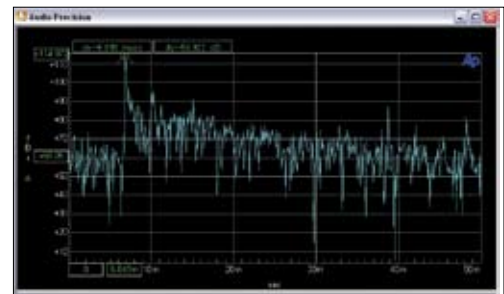
Proprietary Harmonic Distortion Analyzer An FFT-implemented dual-channel Harmonic Distortion Analyzer can simultaneously measure the individual amplitudes of a fundamental frequency and up to four harmonic products, selectable from the 2nd to the 15th harmonic. Sweeps using this analysis tool can rapidly characterize frequency or amplitude dependent distortion mechanisms.



Fast data settling A sophisticated data settling algorithm enables you to optimize the inherent trade-off between testing speed and measurement accuracy in sweep tests. Individual settling parameters are stored for every measurement available in the instrument.

MLS analysis Quasi-anechoic measurements of transducers and acoustic spaces can be performed using MLS (Maximum Length Sequence) signals and analysis to produce impulse, frequency and phase response graphs in less than one second.

Hardware and software filters Make noise measurements to virtually any international standard using our extensive collection of weighting and band-limiting filters. Use optional Audio Precision hardware filters (for the Analog Analyzer) or Audio Precision software filters (for the DSP Audio Analyzer); or make your own user-downloadable software filters using the Filter Creation Utility.



Loudspeaker impulse response graph, showing a 6.6 ms delay before the impulse peak.

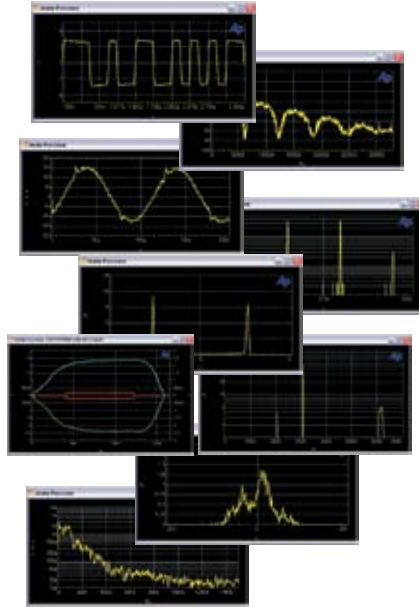
Digital Interface Capabilities

The 2700 Series offers both AES3 and IEC60958 serial digital interfaces, with fully configurable serial data and clock ports available via the auxiliary PSIA-2722 Programmable Serial Interface Adapter.

All digital input and output capabilities are functional over the full range of sample rates from 8 kHz to beyond 200 kHz.

The Digital Input/Output panel provides complete control and display of serial interface parameters including connector and format selection, sample rate, resolution, pulse amplitude, active data bits, error flags and received jitter amplitude. A Status Bits panel enables you to set and read interface metadata in both professional and consumer formats. Metadata is displayed in both hex and English interpretations.

Test the performance of AES3 or 60958 receivers with sub-standard signals by introducing impairments to the output serial interface signal. Impairments include variable sample rate, pulse amplitude and rise and fall times, the addition of noise, common-mode signals, controllable jitter and a long cable simulation.



Fully characterize a serial digital bit stream including waveforms, eye patterns, spectrums and histograms, as shown by these nine graphs.



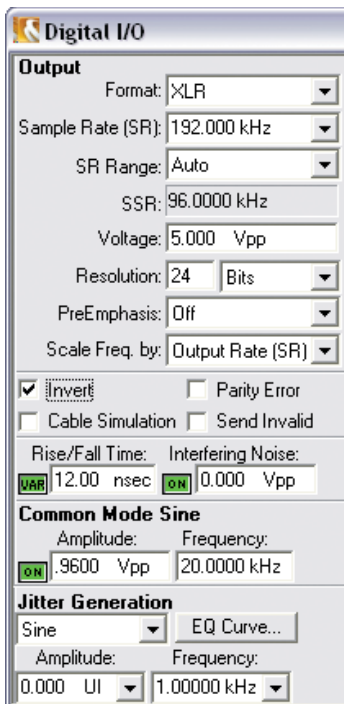
Digital Input/Output panel

Digital Inputs and Outputs

Choose balanced XLR for the AES3 format, unbalanced BNC for the 60958 format, or a Toslink® connector for optical output or input to 192k. The second connectors can be used to switch between cables or in dual-connector mode. Rear-panel jacks provide reference, clock and trigger inputs and outputs.



Rear panel connections



Selectively inject various impairments into the digital signal to test device performance.

Use the Digital Interface Analyzer tool to measure and display the interface signal or jitter waveform and spectrum, histograms for a number of interface measurements or to generate an eye pattern. Add jitter of various types and amplitudes to the generated bitstream and measure the effect on the receiver and the resulting audio signal.



Complete Status Bit metadata setting and display for either consumer or professional format.

- An Eye Pattern is a triggered oscilloscope view of the minimum pulse stream amplitude vs. time, computed over thousands of data cells. The eye opening provides a quick check of signal amplitude, signal-to-noise ratio, rise and fall times and jitter.
- Histograms display the probability distribution of pulse stream parameters like timing (jitter), amplitude, sample rate and bit width. The interface signal and the jitter waveform can be viewed either in the time domain (oscilloscope view) or the frequency domain (FFT spectrum).



SYS-2722



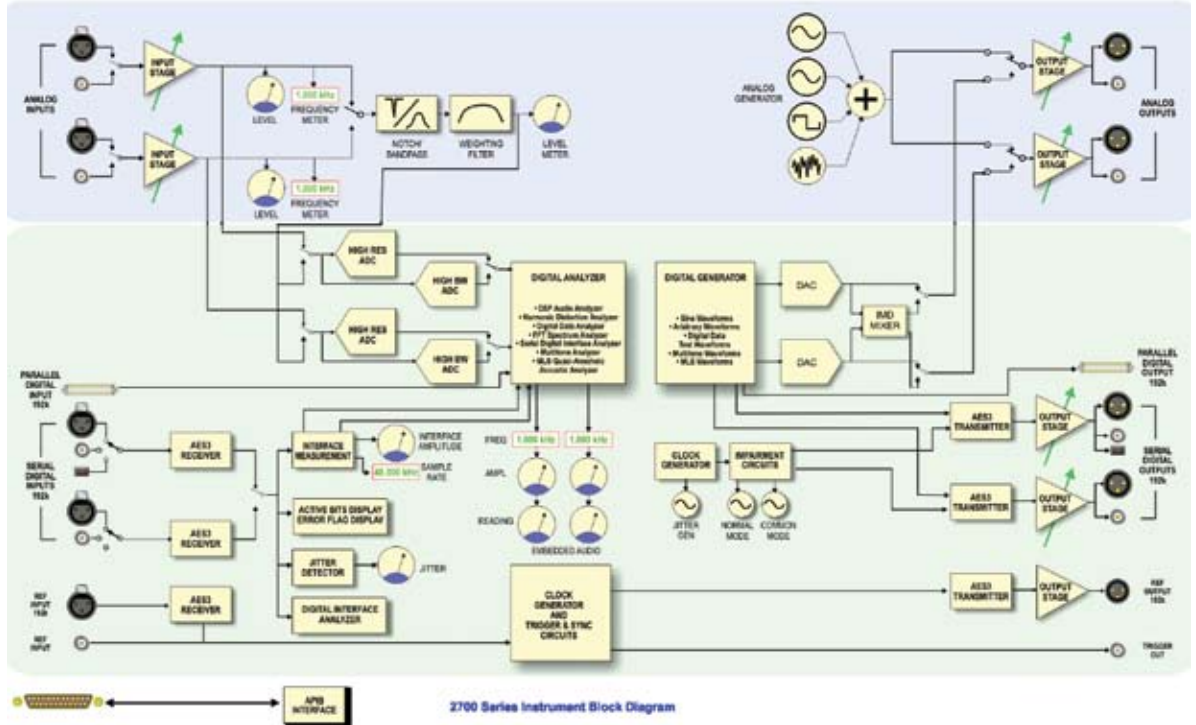
SYS-2720



SYS-2712



SYS-2702



The 2700 Series is available in four models to test analog signals, digital signals or both (dual domain).

SYS-2722 offers analog and digital inputs and outputs, DSP analysis of both digital and internally-converted analog signals, DSP-generated digital and analog signals, and low-distortion, hardware-implemented generation and analysis for analog signals. It is a true dual domain instrument.

SYS-2720 offers digital input and output and DSP generation and analysis of digital signals. It has no analog I/O capabilities.

SYS-2712 offers analog inputs and outputs, DSP analysis of internally-converted analog signals, DSP-generated analog signals, and low-distortion hardware-implemented signal generation and analysis. It has no digital I/O capabilities.

SYS-2702 offers analog input and output, with low-distortion hardware-implemented signal generation and analysis. It has no digital I/O capabilities.

The **GPIB** option adds an IEEE-488 interface to the instrument.

Three major internal analog options may be fitted to all instruments except the digital-only SYS-2720. Note that some BUR- and IMD-type capabilities are already provided in DSP generation and analysis for SYS-2722 and SYS-2712.

The **BUR** option adds analog-domain generation of burst sine waves with controllable burst duration, interval and amplitude between bursts. It also includes analog-generated square waves to 20 kHz, analog random and pseudorandom white and pink noise, and bandpass-filtered pink noise.

The **IMD** option tests analog-domain devices for intermodulation distortion to the SMPTE/DIN, CCIF and DIM/TIM standards.

The **W&F** option measures analog wow & flutter to the IEC/DIN, NAB, JIS, and scrape flutter standards, weighted or unweighted.

A 2700 Series **APIB** interface connects the instrument to your PC, and is included with all models, except the GPIB option. APIB is available in your choice of an USB, PCIE, PCI or PCMCIA PC card.

Each instrument except the digital-only SYS-2720 can accept up to seven analog filter option modules, selectable from a large assortment of lowpass, bandpass and psophometric weighting filters. Other external accessories include the **PSIA-2722** Programmable Serial Interface Adapter for connecting to devices that use non-standard serial interfaces, the **SWR-2755** family of high-performance signal switchers/multiplexers and the **DCX-127** DC/Ohms/low speed digital logic multifunction module.

2700 SERIES ORDERING INFORMATION

Models

SYS-2722	.....	Analog and Digital Input and Output, with DSP. Dual domain, 192k.
SYS-2720	.....	Digital Input and Output, with DSP, 192k.
SYS-2712	.....	Analog Input and Output, with DSP.
SYS-2702	.....	Analog Input and Output.

Options

BUR	.....	Analog burst sine waves, square waves to 20 kHz, random and pseudorandom white and pink noise signals.
IMD	.....	Analog Intermodulation Distortion to SMPTE/DIN, CCF and DIM/TIM standards.
W&F	.....	Wow & Flutter to IEC/DIN, NAB, JIS and scrape flutter standards, weighted or unweighted.
OPT-2711	.....	Onboard Dolby® Digital (AC-3) signal generation for SYS-2722 and SYS-2720.
EWP2-2700	.....	Two-Year Extended Warranty (adds two more years to the standard three-year warranty included with instrument).

Interface Options (selected at time of order)

USB-APIB	.....	USB interface adapter w/USB cable, AP2700 software and instructions
S2-PCIE	.....	PCIe Interface Card w/AP2700 software.
S2-PCI	.....	PCI Interface Card w/AP2700 software.
S2-PCMCIA	.....	PCMCIA Interface Card w/AP2700 software.
-G	.....	IEEE-488 (GPIB) Interface.

Filters

S-AES17	.....	Lowpass filter for AES17 DAC measurements.
OPT-2020	.....	Lowpass filter for DAC measurements.
FIL-xxx	.....	Family of analog psophometric noise weighting filters.
FLP-xxx	.....	Family of analog sharp lowpass filters.
FBP-xxx	.....	Family of analog 1/3 octave bandpass filters.

External Accessories

AUX-0025	.....	Switching Amplifier Measurement Filter.
PSIA-2722	.....	Programmable Serial Interface Adapter.
SWR-2755	.....	12x2 switcher family expandable to 192 channels.
DCX-127	Multifunction module including 4 1/2 digit DC voltmeter/ohmmeter with miscellaneous digital control ports.
RAK-S2	Rackmount kit.
HAN-S2	Carrying handle.

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5750 SW Arctic Drive
 Beaverton, Oregon 97005
 503-627-0832
 1-800-231-7350
 info@ap.com