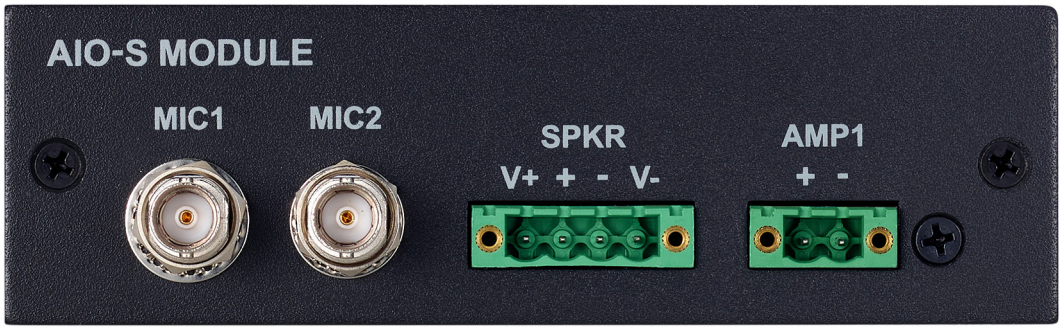
Speaker Test Module

option for

AIO Test System

The Speaker Test Module (AIO-S) is designed for making advanced acoustic and impedance measurements of a device under test (DUT)—typically a speaker or driver. Ideal for use with measurement microphones, ear simulators, artificial heads, speakers, actuators, and mouth simulators. AIO-S is a configuration option for the AIO Test System and requires the AIO chassis to operate.



HARDWARE FEATURES:

- **Two mic/line inputs**
- **CCP/IEPE/ICP microphone power**
- **TEDS reader for microphone data**
- **Two 10 W class-D amplifier outputs**
- **Internal 0.1 Ω impedance sense resistor**
- **Additional inputs for voltage and current monitoring**

KEY APPLICATIONS:

- **Speaker measurements with impedance**
- **Drivers**

MIC/LINE INPUTS:

Two low-noise inputs accommodate a very wide range of input voltages, from dynamic microphones to line-level inputs. Features include adjustable gain, constant current power, and TEDS readers.

IMPEDANCE MEASUREMENT:

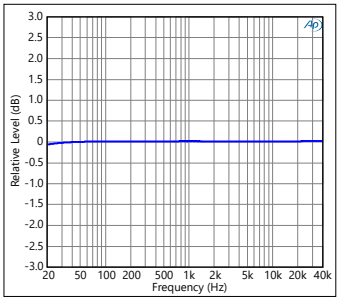
Two additional inputs are used to measure load impedance via the remote voltage sense terminals and an internal 0.1 Ω sense resistor. These inputs appear as additional audio input channels.

AMPLIFIER/SPEAKER OUTPUTS:

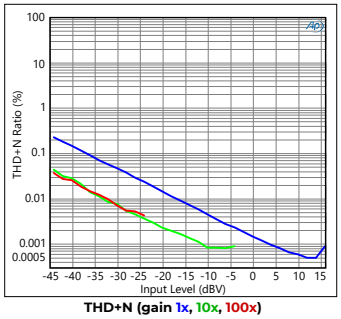
Two high-quality 10 Watt class-D floating amplifier outputs, one with impedance measurement.

PERFORMANCE GRAPHS:

Mic/Line Inputs

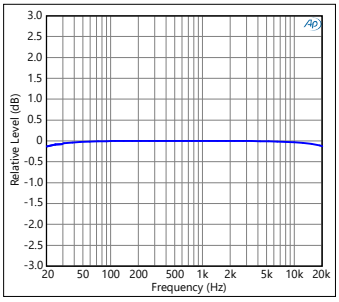


Frequency Response

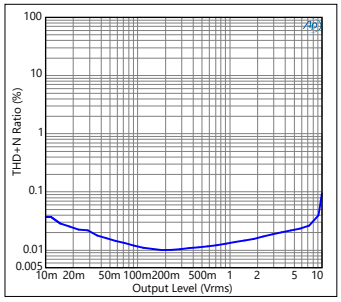


THD+N (gain 1x, 10x, 100x)

Amplifier/Speaker Outputs



Frequency Response (8 Ω load)



THD+N (8 Ω load)

The Echo AIO ™ is a modular audio test platform ideally suited for high-volume production-line testing and QA/QC verification. The AIO combines the functionality of multiple standalone devices into a single, integrated unit, making test stations both more reliable and less expensive.

SPEAKER MODULE COMMON CONFIGURATIONS:

(Other configurations may be available—check with your dealer.)

Model	Inner Module	Outer Module	Mic/Line Inputs	Line Outputs	Headphone Outputs	Amp Outputs	Impedance	Digital	5VDC & Battery Simulator	GPIO	PTH
AIO-S1	AIO-S		2			2	1				
AIO-S2	AIO-S	AIO-S	4			4	2				
AIO-SA	AIO-S	AIO-A	6			3	1				
AIO-SC	AIO-S	AIO-C	2			2	1		Yes	8/8	Yes
AIO-SL	AIO-S	AIO-L	6	2		2	1				
AIO-ST	AIO-S	AIO-T	2			2	1	TDM 10/10			

SPECIFICATIONS:

Microphone / Line Inputs	
Input impedance:	1 MΩ
Input coupling:	AC
Input gain:	1x, 10x, and 100x
Voltage, full scale (1x gain):	8.75 Vpk (+15.8 dBV)
Voltage, maximum:	±15 Vpk
Frequency response:	±0.01 dB (10 Hz – 22 kHz) (48k SR) ±0.01 dB (10 Hz – 44 kHz) (96k SR) ±1 dB (10 Hz – 86 kHz) (192k SR)
Input bandwidth (-3 dB @ 192k SR):	94 kHz
Dynamic range (20 kHz BW):	112 dB
THD+N (1x gain, 20 kHz BW):	< -105 dB (20 Hz – 20 kHz)
Noise, residual:	17 µV
IMD (SMPTE 4:1 @ full scale):	-95 dB
Crosstalk:	< -122 dB (20 Hz – 20 kHz)
Phase error:	< ±0.1° @ 20 kHz
Constant current supply:	CCP/IEPE/ICP, 4 mA
TEDS reader:	IEEE 1451.4 Class 1

Amplifier / Speaker Outputs	
Output impedance:	190 mΩ (amp), 290 mΩ (spkr)
Output coupling:	AC
Load, minimum:	4 Ω
Voltage, full scale:	9.475 Vrms (8 Ω load)
DC offset, residual:	< ±6 mV
Power output (20 Hz – 20 kHz, all channels driven):	10 W @ <0.2% THD+N (8 Ω load) 6 W @ <0.3% THD+N (4 Ω load)
Frequency response:	±0.2 dB (10 Hz – 20 kHz) (8 Ω load)
Output bandwidth (-3 dB @ 192k SR):	44 kHz
Dynamic range (20 kHz BW):	100 dB
Noise, residual:	100 µV
IMD (SMPTE 4:1):	< -53 dB (≥ 0.5 mW)
Crosstalk:	< -70 dB (20 Hz – 20 kHz)
Phase error:	< ±1.2° @ 20 kHz
Impedance measurement accuracy:	≤ 0.5% (20 Hz – 20 kHz)

General	
Power:	90 – 264 VAC, 50/60 Hz, 60 W
Dimensions:	17.5" (44.4 cm) x 8.75" (22.2 cm) x 1.75" (4.4 cm)
Weight:	42.5 lbs (19.3 kg)

AIO Test System

(See system datasheet for more details)

Shown: AIO-SA rear view with one **S** speaker and one **A** acoustic test module.

FEATURES:

- **High accuracy**
- **Cost effective**
- **Silent—no fan!**
- **Standard USB 2.0 audio class interface**
- **Wide test & measurement software compatibility**
- **Runs on Windows (10 or later) or macOS**
- **ASIO, WASAPI, & Core Audio protocols**

CONTROL PANEL SOFTWARE:

Provides comprehensive level monitoring and control over hardware settings, including transducer power, TEDS data, gain, TDM format, and calibration. Command-line and API access to settings is also available.

TEST & MEASUREMENT SOFTWARE:

Choose from a wide variety of third-party test and measurement software, including APx500 Flex, ARTA, LabVIEW, and MATLAB. The AIO system works just like a standard sound card for Windows, Mac, or Linux.

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MODULE OPTIONS:

(See individual datasheets for details and configurations)

A **Acoustic:** Four mic/line inputs with CCP, TEDS; two 10 W class-D amplifier outputs.

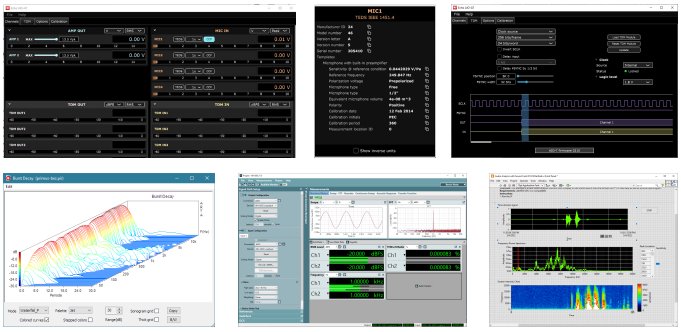
C **Combo:** GPIO; 5 VDC fixed supply; 5 VDC battery simulator; Pressure, temperature, and humidity sensor.

H **Headphone:** Four mic/line inputs with CCP, TEDS; two headphone/earbud outputs with impedance measurement.

L **Line Level:** Four mic/line inputs with CCP, TEDS; two balanced line-level outputs.

S **Speaker:** Two mic/line inputs with CCP, TEDS; two 10 W class-D amplifier outputs; built-in speaker impedance measurement.

T **TDM:** Digital TDM, up to 10 channels, 24 or 32 bit samples.



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