

ANALOG SIGNAL OUTPUTS

Low Distortion Sine Wave

Frequency Range	10 Hz to 120 kHz
Frequency Accuracy	±0.5 %
Amplitude Range	(20 Hz to 30 kHz) Balanced $-0.25\text{ mV to }26.25\text{ Vrms}$ [-70 dBu to +30.6 dBu] Unbalanced $-0.25\text{ mV to }13.12\text{ Vrms}$ [-70 dBu to +24.6 dBu]
Amplitude Accuracy	±0.2 dB [±2.3 %] at 1 kHz
Amplitude Resolution	0.01 dB
Flatness (1 kHz ref)	±0.05 dB
Residual THD+N	25 Hz–20 kHz ≤(0.0025% + 3 μV), 80 kHz BW [-92 dB]

Square Wave

Frequency Range	20 Hz–30 kHz
Amplitude Range	Balanced 0.71 mVpp to 34.73 Vpp Unbalanced 0.71 mVpp to 17.36 Vpp
Amplitude Accuracy	±0.3 dB [±3.5 %] at 400 Hz
Rise/fall time	Typically 2.5–3.0 μs

SMPTTE (or DIN) Test Signals with option "ATS-IMD"

LF Tone	50, 60, 70, or 250; all ±1.0 %
HF Tone Range	7 kHz or 8 kHz (±1 %)
Mix Ratio	4:1 (LF:HF)
Residual IMD	0.0015 % [-96.5 dB], 60 Hz + 7 kHz or 250 Hz + 8 kHz

OUTPUT CHARACTERISTICS

Source Configuration	Selectable balanced or unbalanced
Source Impedances	Balanced 50 Ω (±2 Ω), 150 Ω (±2 Ω), or 600 Ω (±6 Ω) Unbalanced 50 Ω (±2 Ω)
Output Current Limit	75 mA peak
Max Output Power	Balanced +29.9 dBm into 600 Ω (Rs = 50 Ω) Unbalanced +23.8 dBm into 600 Ω (Rs = 50 Ω)
Output Related Crosstalk	(10 Hz–20 kHz) ≤-110 dB or 10 μV, whichever is greater

ANALOG ANALYZER

ANALOG INPUT CHARACTERISTICS

Input Ranges	80 mV to 250 V in 10 dB steps
Maximum Rated Input	350 Vpk, 140 Vrms (dc to 20 kHz); overload protected
Input Impedance	Balanced (each side) Nominally 100 kΩ // 150–200 pF Unbalanced Nominally 100 kΩ // 150–200 pF
Terminations	Selectable 600 Ω ±1 %
CMRR 80 mV–2.5 V range	≥70 dB, 50 Hz–20 kHz
Input Related Crosstalk	10 Hz–20 kHz ≤-120 dB or 1 μV, whichever is greater

Wideband Amplitude/Noise Function

Measurement Range	$-1\text{ }\mu\text{Vrms to }140\text{ Vrms}$ [-118 dBu to +45 dBu]
Accuracy (1 kHz)	±0.2 dB [±2.37 %] unweighted
Flatness (1 kHz ref)	±0.05 dB (20 Hz–20 kHz)
Bandwidth Limiting Filters	LF -3 dB <math><10\text{ Hz}</math>; 400 Hz ±5 % (3-pole) HF -3 dB 22 kHz; 30 kHz; 80 kHz (3-pole), or 300 kHz
Weighting Filters	ANSI-IEC "A"; CCIR-QPK; CCIR-ARM; CCIR-RMS
Optional Filters	Up to 2 (Aux 1 and Aux 2)
Detection	RMS ($t=60\text{ ms}$); AVG; QPK (CCIR Rec 468)
Residual Noise	22 Hz–22 kHz BW A-weighted ≤1.5 μV [-114 dBu] Unweighted ≤1.0 μV [-118 dBu] CCIR-QPK ≤5.0 μV [-104 dBu]

Frequency Meter Related (both channels)

Measurement Range	10 Hz–200 kHz
Accuracy	±0.01 % [±100 PPM]
Resolution	5 digits

Phase Measurement Related

Measurement Ranges	±180, +90/-270, or -90/+270 deg
Accuracy 20 Hz–20 kHz	±2.0 deg
Resolution	0.1 deg

Level Meter Related (both channels)

Measurement Range	10 mV to 140 V for specified accuracy and flatness, useable to <math><100\text{ }\mu\text{V}</math> [-38 dBu to +45 dBu]
Accuracy (1 kHz)	±0.1 dB + 100 μV
Flatness (1 kHz ref)	(Vin >10 mV) ±0.05 dB (20 Hz–20 kHz)

Bandpass Amplitude Function

Tuning Range (f _c)	20 Hz to 120 kHz
Bandpass Response	Q=5 (2-pole)
Accuracy (at f _c)	±0.3 dB, 20 Hz–120 kHz

THD+N / SINAD Function

Fundamental Range	10 Hz to 100 kHz, THD+N mode
Measurement Range	.001 %–100 %
SINAD Range	400 Hz–1 kHz
Accuracy	±1 dB, 20 Hz–120 kHz harmonics
Measurement Bandwidth	LF -3 dB <math><10\text{ Hz}</math> HF -3 dB 22k, 30k, 80k, or 300 kHz
Residual THD+N	25 Hz–20 kHz ≤(0.0025% + 3.0 μV), 80 kHz BW [-92 dB]

Crosstalk Function

Frequency Range	10 Hz to 120 kHz
Measurement Range	-140 dB to 0 dB
Accuracy	±0.5 dB

SMPTTE (DIN) IMD Function with option "ATS-IMD"

Test Signal Compatibility	40–250 Hz and 3 kHz–20 kHz in 0:1 to 8:1 ratio
IMD Measured	Amplitude modulation products of the HF tone.
Measurement Range	<math><0.0025\text{ }\%</math>–20 %
Accuracy	±1 dB per SMPTTE RP-120-1983, DIN 45403
Residual IMD	≤0.0025% [-92 dB], 60 + 7 kHz or 250 + 8 kHz

Wow & Flutter Function

Test Signal Compatibility	2.80 kHz–3.35 kHz
Accuracy (4 Hz)	±5 % of reading + 0.002 %
Detection Modes	IEC/DIN; NAB; JIS
Residual W+F	≤0.005% Weighted; ≤0.01% Unweighted

DIGITAL SIGNAL GENERATOR

DIGITAL OUTPUT CHARACTERISTICS

Output Formats	AES/EBU (per AES3-1992); SPDIF-EIAJ; Optical
Sample Rates	28.8 kHz–99.9999 kHz
Sample Rate Accuracy	±0.002% [±20 PPM] lockable to external reference
Word Length	16 to 24 bits (even values)

Sine Wave

Frequency Range	10 Hz to 47 % of sample rate (22.56 kHz at 48 ks/s)
Frequency Resolution	Sample Rate ÷ 2 ²³ (typically 0.006 Hz at 48 ks/sec)
Flatness	±0.001 dB
Residual Distortion	±0.00001 % [-140 dB]

Square Wave

Frequency Range	10 Hz to 1/6 sample rate
Frequencies available	f _c ÷ 4096 to f _c ÷ 6, in even integer divisors

SMPTTE/DIN IMD Waveform with option "ATS-IMD"

Upper Tone Range	Choice of 7 kHz or 8 kHz
Lower Tone Range	Choice of 50 Hz, 60 Hz, 70 Hz, or 250 Hz
Amplitude Ratio	4:1 (LF:HF)
Residual Distortion	≤0.00001 % [-140 dB] at 4:1 ratio

Random Generator Waveform

Waveform	Compatible with Audio Precision BITTEST
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Dither (all waveforms)

Probability Distribution	Triangular or rectangular; independent for each channel
Spectral Distribution	Flat (white) or Shaped (+6 dB/oct, triangular only)
Amplitude	Automatically tracks word length or off

AES/EBU INTERFACE GENERATION

Interface Signal

Amplitude Range	Balanced (XLR) 0–5.11 Vpp, into 110 Ω in 5 mV steps Unbalanced (BNC) 0–1.62 Vpp, into 75 Ω in 1.6 mV steps
Channel Status Bits	English language decoded, Professional/Consumer
Validity Flag	Selectable, set or cleared

AES/EBU Impairments

Induced Jitter	Sine wave
Jitter Freq Range	10 Hz to 38.8 kHz
Jitter Amplitude	0–1.28 UI (pk), in steps of 0.005 UI or better 1.3–12.75 UI, in steps of 0.05 UI or better
Residual Jitter	(total generator/analyzer) peak calibrated ≤0.005 UI (700 Hz–30 kHz BW) Peak response ≤0.015 UI (700 Hz–30 kHz BW)
Spurious Jitter Products	Jitter & Ref Delay Off ≤0.0005 UI Jitter On ≤-30 dB below jitter signal

REFERENCE INPUT CHARACTERISTICS

Input Formats	AES/EBU (per AES3-1992)
Input Sample Rates	28.8 kHz–99.9999 kHz
Lock Range	±0.0025% [±25 PPM]

DIGITAL ANALYZER

DIGITAL INPUT CHARACTERISTICS

Input Formats	AES/EBU (per AES3-1992); SPDIF-EIAJ; Optical
Sample Rates	28.8 kHz–99.9999 kHz
Word Length	16 to 24 bits

EMBEDDED AUDIO MEASUREMENTS

Wideband Level/Amplitude

Range	0 dBFS to -140 dBFS
Frequency Range	<math><10\text{ Hz}</math>–22.0 kHz at 48 ks/sec
Accuracy	±0.01 dB, ≥-90 dBFS
Flatness	±0.01 dB, 15 Hz–22 kHz
High pass Filters	22 Hz, 400 Hz, 2-pole Butterworth
Low pass Filters	15 kHz, 20 kHz 6-pole elliptic low-pass
Weighting Filters	ANSI-IEC "A" weighting; CCIR QPK; CCIR RMS
Residual Noise	-140 dBFS unweighted; -142 dBFS A-weighted

Narrow Band Amplitude

Frequency Range	0.04% to 40% of sample rate (10 Hz–19.2 kHz at 48.0 ks/sec)
Filter Shape	10-pole, Q=19 (BW = 5.3% of f _c)

THD+N Measurements

Fundamental Range	0.02% to 45% of sample rate (10 Hz–22.0 kHz at 48.0 ks/sec)
Residual THD+N	≤-138 dBFS
High pass Filters	22 Hz, 400 Hz 2-pole Butterworth
Low pass Filters	15 kHz, 20 kHz 6-pole elliptic low-pass
Weighting Filters	ANSI-IEC "A" weighting; CCIR QPK; CCIR RMS

SMPTTE (DIN) IMD Function with option "ATS-IMD"

Test Signal Compatibility	40–250 Hz and 3 kHz–20 kHz in 1:1 to 4:1 ratio
IMD Measured	Amplitude modulation products of the HF tone.
Measurement Range	<math><0.0001\%</math>–10%
Accuracy	±1 dB per SMPTTE RP-120-1983, DIN 45403
Residual IMD (0 dBFS)	≤0.0001% [-120 dB], 60 + 7 kHz or 250 + 8 kHz

Frequency Measurements

Range	5 Hz to 47% of sample rate
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Phase Measurement Related

Measurement Ranges	±180, +90/-270, or -90/+270 deg
Accuracy	±2.0 deg (20 Hz–20 kHz)
Resolution	0.1 deg

BITTEST Measurement

Measurement	Compatible with random mode of Audio Precision BITTEST
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DIGITAL INTERFACE MEASUREMENTS

AES/EBU Impairments, Real Time Displays

Input Sample Rate	±0.002% [±20 PPM] internal ref, ±0.0001% [*1 PPM] external ref
Output to Input or Reference	Measures status propagation from the AES/EBU output to the input.
Input to Input Delay	Range is 0–192 (frames), resolution ±60 ns.
AES/EBU Input Voltage	Balanced 400 mV to 10.24 Vpp, ±(10% + 50 mV) Unbalanced 100 mV to 2.56 Vpp, ±(10% + 30 mV)
Jitter Amplitude (500 Hz)	(peak-peak sine wave calibrated) 0–10 UI.
Jitter Flatness	±1.5 dB, 100 Hz–22 kHz (50 Hz HP selection, RMS detection, 48 kHz sample rate)
Residual Jitter, peak calibrated	(analyzer only) (700 Hz–30 kHz BW) ≤0.01 UI RMS; ≤0.03 UI Peak
Spurious Jitter Products	≤0.002 UI (1.2 kHz) or 0 dB below jitter signal
Channel Status Bits	English language decoded (Professional/Consumer)
Validity Flag	Displayed for selected channel
Parity; Signal Confidence; Receiver Lock; Coding Error	Displayed for total signal (both channels combined)

AUXILIARY SIGNALS

Generator Analog Sync Output; Digital Sync Output; Analyzer Input Monitor; Analyzer Reading

AUDIO MONITOR

Power Output	Typically 1 watt
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GENERAL / ENVIRONMENTAL

Power Requirements	100/120/230/240 Vac (-10%/+6%), 50–60 Hz, 50 VA max
Temperature Range	0° C to +50° C Operating; -20° C to +60° C Storage
Humidity	90% RH to at least +40° C (non-condensing)
EMC	Complies with 89/336/EEC, CISPR 22 (class B), and FCC 15 subpart J (class B)
Dimensions	16.5 x 6.0 x 13.6 inches (41.9 x 15.2 x 34.5 cm)
Weight	Approximately 20 lbs [9.1 kg]
Safety	Complies with 73/23/EEC, 93/68/EEC, EN61010, and IEC 1010 (including Amendments 1 and 2)

Complete ATS-1 specifications are downloadable from the Products area of the Audio Precision Web site at audioprecision.com.