

1 Specifications

Physical

Dimensions:	302x245x84mm (2U mounting kit available).
Weight:	5.2kg.
Mains voltage:	90..125VAC/180..250VAC switchable.
Power consumption:	60W.
Operating temperature:	0 to 40°C, max 85% relative humidity.

Host PC Requirement

Interface type:	USB.
Operating System:	Windows 98, ME, 2000 or XP.
Processor:	Pentium 200 or faster.
Memory:	64Mbytes minimum.

Signal Generator

Drives both domains simultaneously (also optionally sound device)

Channels:	Two, with independent functions and parameters, or tied.
Functions:	Sine, square, ramp, sine-burst, white noise, pink noise, MLS, pulse, twin-tone; arbitrary & multi-tone (scripted or wavetable, 2–1024 tones).
Amplitude range, accuracy:	Determined by output domain; see Output sections below.
Frequency range:	1Hz to maximum determined by output domain and sample rate.
Frequency accuracy:	Sine: $\pm fs/2^{24}$, approximately ± 0.005 Hz at $fs=96$ kHz; other functions: $\pm 0.0001\%$ (± 1 ppm).
Frequency resolution:	Sine: $fs/2^{23}$, or approximately 0.01Hz at $fs=96$ kHz; square, ramp, burst, twin-tone: 1Hz; arbitrary and multi-tone: $fs/256k$ (0.37Hz at $fs=96$ kHz, 0.73Hz at $fs=192$ kHz).

Signal Analyzer

Continuous input level, frequency and phase

Channels:	Two.
Amplitude range, accuracy:	Determined by selected input domain; see Input sections below.
Frequency range:	<5Hz to maximum of input domain; see Input sections below.
Frequency accuracy:	$\pm fs/2^{24}$, or approximately ± 0.005 Hz at $fs=96$ kHz.
Phase accuracy:	Determined by selected input domain.
Phase resolution:	0.1°

Continuous-Time Analyzer*Continuously-reading multi-function detector*

Channels:	Two, single selectable measurement function.
Functions:	Amplitude, balance, band pass, band reject, cross-talk, gain, IMD CCIF, IMD SMPTE/DIN, noise, THD+N, user-scripted.
Amplitude range, accuracy:	Determined by selected input domain; see Input sections below.
Frequency range:	<5Hz to maximum of input domain; see Input sections below.
High-pass filters:	None (DC-coupled), DC-block, 10Hz, 22Hz, 100Hz, 400Hz.
Low-pass filters:	AES17, 22kHz, 30kHz, 40kHz, 80kHz, user-settable, none (fs/2).
Weighting filters:	A-weighting, C-weighting, CCIR 468–1k, CCIR468–2k.
BP/BR filters:	1/3, 1/6, 1/12, 1/24 octave.
Measurement rates:	4/s, 8/s, 16/s, 32/s, auto.
Responses:	RMS, peak, peak-sample, CCIR–468 Q–peak.

FFT Analyzer*Sample-buffer-based multi-function detector*

Channels:	Two, maximum of 40 simultaneous measurement functions.
Functions:	Amplitude, balance, band pass, band reject, cross-talk, gain, IMD CCIF, THD, THD+N, 2nd harmonic distortion, 3rd harmonic distortion, 4th harmonic distortion, user-scripted, user-calculation.
Number of FFT points (n):	1k...256k in binary multiples.
FFT precision:	48+16 bit floating point.
FFT window functions:	Rectangular (none), triangular, gaussian, Blackman, Blackman-Harris 4, Hann, Hamming, Prism flat-top, Prism–5 (minimum spread), Prism–6, Prism–7 (maximum dynamic range), user-defined.
Amplitude range, accuracy:	Determined by selected input domain; see Input sections below.
Frequency range:	<1Hz (determined by frequency resolution) to fs/2
Frequency resolution:	fs/n (0.18Hz at fs=48kHz, n=256k).
High-pass filters:	None (DC-coupled), DC-block, 10Hz, 22Hz, 100Hz, 400Hz, user-defined.
Low-pass filters:	22kHz, 30kHz, 40kHz, 80kHz, user-defined, none (fs/2). Brick-wall option at any frequency.
Weighting filters:	A-weighting, C-weighting, CCIR 468–1k, CCIR468–2k, user-defined.
BP/BR filters:	1/3, 1/6, 1/12, 1/24 octave, window-width notch.
Graphical Traces:	(both channels simultaneously) Scope, FFT, Sweep, CTD residual, FFT of CTD residual, multi-tone responses vs frequency.
Multi-tone analysis:	Allows simultaneous measurement of frequency response, noise, distortion, cross-talk etc. from single buffer acquisition.
Impulse Response analysis:	Allows measurement of transducers, rooms and other EUTs by windowed impulse response analysis from noise or chirp stimulus.
Trigger:	Scope-like trigger with variable threshold and polarity, with normal, continuous, single-shot or manual operation.

Analogue Outputs

Channels:	Two, with independent muting.
Modes:	Balanced, common-mode test, unbalanced
Sample rate (fs):	48kHz, 96kHz or 192kHz.
Amplitude range:	fs=48kHz, 96kHz: <-120dBu..+28dBu, 19.46VRMS (bal) or +22dBu, 9.73VRMS (unbal); fs=192kHz: <-120dBu..+27.5dBu, 18.36VRMS (bal) or +21.5dBu, 9.21VRMS (unbal).
Amplitude accuracy:	(1kHz): $\pm 0.06\text{dB}$ ($\pm 0.7\%$).
Frequency range:	DC..0.474fs (91kHz at fs=192kHz, 45.5kHz at fs=96kHz, 22.75kHz at fs=48kHz).
Residual THD+N:	(fs=96kHz, 1kHz, 22Hz..22kHz bandwidth, unweighted, RMS): <-102dB (0.00079%)+1.5uV, typical -104dB (0.00063%)+1.3uV.
Residual noise:	(fs=96kHz, 22Hz..22kHz bandwidth, unweighted, RMS): <-115dBu (<1.4uV).
Flatness (1kHz ref):	fs=48kHz: +0.05/-0.1dB: DC..20kHz; +0.1/-3dB: DC..22.75kHz; fs=96kHz: $\pm 0.05\text{dB}$: DC..20kHz; +0.05/-0.1dB: DC..40kHz; +0.1/-3dB: DC..45.5kHz; fs=192kHz: $\pm 0.05\text{dB}$: DC..20kHz; +0.05/-0.1dB: DC..40kHz; +0.1/-3dB: DC..91kHz.
Phase matching:	10Hz..5kHz: $\pm 0.5^\circ$, 5kHz..20kHz: $\pm 1.0^\circ$, 20kHz..50kHz: $\pm 2.0^\circ$.
DC offset:	<1% of output range.
Interchannel cross-talk:	1kHz: <130dB; 15kHz: <120dB, typically (22Hz-22kHz): <140dB.
Output connectors:	XLR or coaxial BNC (RCA adapters provided), maximum current 150mA, minimum load 150R.
Output impedance:	Balanced (normal or CM test): 50R, 150/200R (jumper), 600R or asymmetric 25R/600R; unbalanced: 25R or 600R.
Grounding:	Switchable floating or chassis.

Analogue Inputs

Channels:	Two, independent.
Sample rate (fs):	48kHz, 96kHz or 192kHz.
Maximum amplitude:	+46dBu (159V RMS).
Amplitude accuracy:	(1kHz): $\pm 0.06\text{dB}$ ($\pm 0.7\%$).
Frequency range:	<1Hz..0.49fs (94kHz at fs=192kHz, 47kHz at fs=96kHz, 23.5kHz at fs=48kHz); DC coupling by jumper.
Residual THD+N:	(fs=96kHz, 1kHz, 22Hz..22kHz filters, unweighted, RMS): <-105dB (0.00056%)+1.5uV, typical -108dB (0.00040%)+1.3uV.
Residual noise:	(fs=96kHz, 22Hz..22kHz filters, unweighted, RMS): <-115dBu (<1.4uV).
Flatness (1kHz ref):	fs=48kHz: $\pm 0.05\text{dB}$: 5Hz..22.3kHz; +0.05/-0.1dB: 4Hz..22.5kHz; +0.1/-3dB: 1.5Hz..23.5kHz; fs=96kHz: $\pm 0.05\text{dB}$: 5Hz..44.7kHz; +0.05/-0.1dB: 4Hz..45kHz; +0.1/-3dB: 1.5Hz..47kHz; fs=192kHz: $\pm 0.05\text{dB}$: 5Hz..89.5kHz; +0.05/-0.1dB: 4Hz..90kHz; +0.1/-3dB: 1.5Hz..94kHz.
Phase accuracy:	10Hz..5kHz: $\pm 0.5^\circ$, 5kHz..20kHz: $\pm 1.0^\circ$, 20kHz..50kHz: $\pm 2.0^\circ$.
DC offset:	DC blocked: <0.0001% of range, DC coupled: <2% of range.
Interchannel cross-talk:	1kHz: <130dB; 15kHz: <120dB, typically (22Hz-22kHz): <140dB .
Input sources:	XLR or coaxial BNC (balanced and unbalanced RCA adapters provided), demodulated digital input jitter, or direct from generator.
Input impedance:	100kR, 600R or 150/200R (jumper), maximum 1W.
Small-signal CMRR:	(20Hz..20kHz): >80dB.

Digital Outputs (data)

Channels:	Two in normal (one-wire) mode, independent muting; one in Split96 (two-wire) mode.
Sample rate (fs):	32kHz, 44.1kHz, 48kHz, 88.2kHz*, 96kHz*, 176.4kHz*, 192kHz* [*Generated normal or Split96].
Sample rate accuracy:	±1ppm.
Sample rate deviation:	Settable ±1500ppm in 1ppm steps.
Wordlength:	8..24 bits.
Dither:	White TPDF dither or plain truncation.
DC offset:	User-defined, added to signal, 48-bit resolution.
Frequency range:	DC..0.499fs.
Residual THD+N:	(1kHz, 24 bits, FS, 22Hz..22kHz bandwidth, unweighted, RMS): <-140dB (<0.00001%).
Flatness (1kHz ref):	DC..0.49fs: ±0.001dB.
Phase matching:	Absolute.
Channel Check mode:	Generates data integrity sequence (PRBS) in 24, 20 or 16 bit wordlength which can be checked at digital input, or by Prism Sound DSA-1 hand-held analyzer.
Channel Status:	Professional or Consumer modes; all fields functionally or numerically settable for each channel (tied or split), with automatic options.
User bits:	Can generates EUT transparency check sequence.
Valid bits:	Settable for each channel.
Ref Sync inputs:	AES11 (XLR); Wordclock, AES3-id, S/PDIF, video PAL/NTSC/30fr (BNC); or internal; external inputs have switchable 110R (XLR) and 75R (BNC) terminations.
Ref Sync rates:	Ref Sync measured to within ±1ppm, any standard audio frame rate can be locked to any standard Ref Sync input rate.
Ref Sync Outputs:	AES11 (XLR), Wordclock (BNC); both fed pre-carrier-degradation.

Digital Outputs (carrier)

Carrier formats:	AES3 (XLR); AES3–id (BNC), S/PDIF with RCA adapter supplied; TOSLINK (optical). Can be looped-through from digital inputs.
Output impedance:	110R (XLR), 75R (BNC/RCA).
Carrier amplitude:	XLR and BNC outputs separately variable. XLR: 120mV to 10.24V (p–p, loaded) in 40mV steps, accuracy $\pm 5\% + 20\text{mV}$; BNC: 30mV to 2.56V (p–p, loaded) in 10mV steps, accuracy $\pm 5\% + 5\text{mV}$. TOSLINK not variable.
Carrier rise/fall time:	XLR and BNC outputs separately variable in steps 5ns, 10ns up to 100ns in 10ns steps, accuracy $\pm 20\%$. TOSLINK not variable.
Carrier phase vs. Ref Sync:	(applied to all formats): variable from -128UI to $+128\text{UI}$ in 0.5UI steps (-100% to $+100\%$ in 0.39% steps).
Residual jitter:	$< 1\text{ns p-p}$ ($> 700\text{Hz}$).
Added jitter functions:	(applies to all formats): sine (freq variable 10Hz..40kHz), LF sine (freq variable 10Hz..10kHz), wide-band noise (BW 1Hz..64fs), audio-band noise (BW 10Hz..40kHz).
Added jitter amplitude:	Sine, audio and wide-band noise, 0..0.5UIp–p (0..81.4ns p–p at fs=48kHz); LF sine 0..20UIp–p (0..325ns p–p at fs=48kHz). Variable in 0.1ns or 0.01UI steps. Accuracy $\pm 10\% + 1.5\text{ns}$.
Differential interference:	(XLR and BNC tied with 4:1 voltage ratio, wide-band noise): XLR: 0..2.56Vp–p in 10mV steps, accuracy $\pm 5\% + 5\text{mV}$; BNC 0..640mVp–p in 2.5mV steps, accuracy $\pm 5\% + 1.25\text{mV}$.
Common-mode interference:	(sine, XLR output only, freq variable 100Hz..40kHz): amplitude variable 0..20Vp–p in 10mV steps, accuracy $\pm 5\% + 5\text{mV}$.

Digital Inputs (data)

Channels:	Two in normal (one-wire) mode, independent muting; one in Split96 (two-wire) mode.
Sample rate (fs):	28.8–105.6kHz, 176.4kHz, 192kHz (normal mode), 57.6–200kHz (Split96 mode).
fs measurement accuracy:	$\pm 1\text{ppm}$.
Wordlength:	Can be masked as 8..24–bits.
Data bit activity:	All 24 bits of each channel indicated as high, low or moving.
Amplitude range:	$< -140\text{dBFS}$ to 0dBFS sine-peak-referred.
Amplitude accuracy:	$\pm 0.001\text{dB} + 1\text{LSB}$.
Frequency range:	DC..0.5fs.
Residual THD+N:	(1kHz, 24 bits, 0dBFS, 22Hz..22kHz filters, unweighted, RMS): CTD: $< -138\text{dB}$ ($< 0.000013\%$); FFTD: $< -140\text{dB}$ ($< 0.00001\%$).
Flatness (1kHz ref):	DC..0.49fs: $\pm 0.001\text{dB}$.
Phase accuracy:	DC..0.49fs: $\pm 0.01^\circ$
Channel Check mode:	Verifies data integrity sequence (PRBS) at 24, 20 or 16 bit wordlength, as generated by digital output, or by Prism Sound DSA–1 hand-held analyzer.
Channel Status:	Professional or Consumer modes; all fields functionally or numerically displayed for each channel, with warning highlight modes.
User bits:	EUT transparency check sequence may be verified.
Valid bits:	Displayed for each channel.

Digital Inputs (carrier)

Carrier formats:	AES3 (XLR); AES3-id (BNC), S/PDIF with RCA adapter supplied; TOSLINK (optical).
Input impedance:	110R (XLR), 75R (BNC/RCA); or HiZ
Amplitude measurement:	XLR: differential, common-mode or audio-band; BNC: common-mode or audio-band, TOSLINK: not measured. Range: 40mV to 20.48Vp-p; accuracy: (XLR) $\pm 5\% + 40\text{mV}$, (BNC) $\pm 5\% + 20\text{mV}$; resolution: 5mV.
Jitter measurement, time-domain (JTA):	(fs jitter mode): freq range: 700Hz..fs/2, max amplitude 0.5UIp-p; (data jitter mode): freq range 700Hz..64fs, max amplitude 0.5UIp-p. Response: p-p; accuracy: $\pm 5\% + 2\text{ns}$; resolution: <300ps.
Jitter measurement, via demodulator:	(fs jitter mode): freq range: 700Hz..fs/2, max amplitude 64UIp-p; (data jitter mode): freq range 700Hz..48kHzs, max amplitude 0.5UIp-p. Response: RMS, peak, Q-peak; accuracy: $\pm 5\% + 2\text{ns}$.
Residual jitter:	<1ns p-p (>700Hz).
Eye-narrowing:	Measures maximum reduction of eye-time, at zero-crossing or at 200mVp-p thresholds; accuracy: $\pm 5\% + 2\text{ns}$; resolution: <300ps.
Carrier Display:	Displays any part of carrier waveform; (time axis): accuracy: $\pm 5\% + 2\text{ns}$, resolution: <300ps; (amplitude axis): max range: $\pm 20.48\text{V}$, accuracy: $\pm 5\% + 40\text{mV}$, resolution: 5mV.
Carrier phase vs. Ref Sync:	Range: $\pm 64\text{UI}$ ($\pm 50\%$); resolution 0.25UI (0.2%); accuracy: $\pm 0.25\text{UI}$ ($\pm 0.2\%$).
Carrier condition indicators:	Unlock, biphas violation, block-length error, eye-narrowing>50%, asynchronous wrt generator Ref Sync.

Monitor Outputs

BNC assignable functions:	(Generator pair): Signal Generator A and B channels, digital output jitter modulation signals and common-mode interference. (Analyzer pair): Signal Analyzer input A and B channels, CTA output A and B channels, digital input carrier and various sync pulses.
BNC outputs:	Output impedance: 75R; unterminated amplitude (audio signals): nominally 4Vp-p max, 2Vp-p min when auto-ranged; (digital input carrier): half of nominal carrier amplitude.
Audio monitor:	Loudspeaker and stereo headphone output with volume control, selectable to follow Generator or Analyzer BNC function (audio only).