# 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 40ºC, max 85% relative humidity. |

## Host PC Requirement

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|---|---|
| **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)*

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|---|---|
| **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: ±fs/2^24, approximately ±0.005 Hz at fs=96kHz; other functions: ±0.0001% (±1ppm). |
| **Frequency resolution:** | Sine: fs/2^23, or approximately 0.01Hz at fs=96kHz; square, ramp, burst, twin-tone: 1Hz; arbitrary and multi-tone: fs/256k (0.37Hz at fs=96kHz, 0.73Hz at fs=192kHz). |

## 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:** | ±fs/2^24, or approximately ±0.005Hz at fs=96kHz. |
| **Phase accuracy:** | Determined by selected input domain. |
| **Phase resolution:** | 0.1º |

 

| **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 threshhold and polarity, with normal, continuous, single-shot or manual operation. |

 

## Analogue Outputs

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|---|---|
| **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): ±0.06dB (±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: ±0.05dB: DC..20kHz; +0.05/–0.1dB: DC..40kHz; +0.1/–3dB: DC..45.5kHz; fs=192kHz: ±0.05dB: DC..20kHz; +0.05/–0.1dB: DC..40kHz; +0.1/–3dB: DC..91kHz. |
| **Phase matching:** | 10Hz..5kHz: ±0.5º, 5kHz..20kHz: ±1.0º, 20kHz..50kHz: ±2.0º. |
| **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): ±0.06dB (±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: ±0.05dB: 5Hz..22.3kHz; +0.05/–0.1dB: 4Hz..22.5kHz; +0.1/–3dB: 1.5Hz..23.5kHz; fs=96kHz: ±0.05dB: 5Hz..44.7kHz; +0.05/–0.1dB: 4Hz..45kHz; +0.1/–3dB: 1.5Hz..47kHz;fs=192kHz: ±0.05dB: 5Hz..89.5kHz; +0.05/–0.1dB: 4Hz..90kHz; +0.1/–3dB: 1.5Hz..94kHz. |
| **Phase accuracy:** | 10Hz..5kHz: ±0.5º, 5kHz..20kHz: ±1.0º, 20kHz..50kHz: ±2.0º. |
| **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 ±5%+20mV; BNC: 30mV to 2.56V (p–p, loaded) in 10mV steps, accuracy ±5%+5mV. TOSLINK not variable. |
| **Carrier rise/fall time:** | XLR and BNC outputs separately variable in steps 5ns, 10ns up to 100ns in 10ns steps, accuracy ±20%. TOSLINK not variable. |
| **Carrier phase vs. Ref Sync:** | (applied to all formats): variable from –128UI to +128UI in 0.5UI steps (–100% to +100% in 0.39% steps). |
| **Residual jitter:** | <1ns p–p (>700Hz). |
| **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 ±10%+1.5ns. |
| **Differential interference:** | (XLR and BNC tied with 4:1 voltage ratio, wide-band noise): XLR: 0..2.56Vp–p in 10mV steps, accuracy ±5%+5mV; BNC 0..640mVp–p in 2.5mV steps, accuracy ±5%+1.25mV. |
| **Common-mode interference:** | (sine, XLR output only, freq variable 100Hz..40kHz): amplitude variable 0..20Vp–p in 10mV steps, accuracy ±5%+5mV. |

## 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:** | ±1ppm. |
| **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:** | <–140dBFS to 0dBFS sine-peak-referred. |
| **Amplitude accuracy:** | ±0.001dB+1LSB. |
| **Frequency range:** | DC..0.5fs. |
| **Residual THD+N:** | (1kHz, 24 bits, 0dBFS, 22Hz..22kHz filters, unweighted, RMS): CTD: <–138dB (<0.000013%); FFTD: <–140dB (<0.00001%). |
| **Flatness (1kHz ref):** | DC..0.49fs: ±0.001dB. |
| **Phase accuracy:** | DC..0.49fs: ±0.01º |
| **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) ±5%+40mV, (BNC) ±5%+20mV; 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.<br>Response: p–p; accuracy: ±5%+2ns; 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.<br>Response: RMS, peak, Q–peak; accuracy: ±5%+2ns. |
| **Residual jitter:** | <1ns p–p (>700Hz). |
| **Eye-narrowing:** | Measures maximum reduction of eye-time, at zero-crossing or at 200mVp–p thresholds; accuracy: ±5%+2ns; resolution: <300ps. |
| **Carrier Display:** | Displays any part of carrier waveform; (time axis): accuracy: ±5%+2ns, resolution: <300ps; (amplitude axis): max range: ±20.48V, accuracy: ±5%+40mV, resolution: 5mV. |
| **Carrier phase vs. Ref Sync:** | Range: ±64UI (±50%); resolution 0.25UI (0.2%); accuracy:±0.25UI (±0.2%). |
| **Carrier condition indicators:** | Unlock, biphase violation, block-length error, eye-narrowing>50%, asynchronous wrt generator Ref Sync. |

## Monitor Outputs

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|---|---|
| **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). |

 