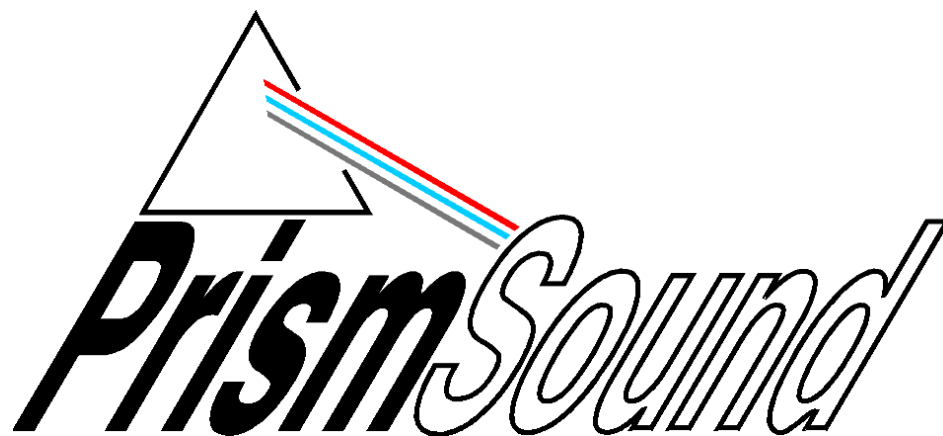




dScope Series III M1

Specifications

1 dScope M1 Unit Specifications

Physical

Dimensions:	230x180x36mm (1U mounting kit available).
Weight:	1.35kg.
Power supply voltage:	12VDC, 1.25A.
Power consumption:	<15W.
Operating temperature:	0 to 40°C, max 85% relative humidity.

Host PC Requirement

Interface type:	USB 2, compatible with USB 3.0
Operating System:	Windows XP, Vista, 7, 8/8.1, 10 - Architecture 32 or 64 bit..
Processor:	4 cores, 2GHz or better. (M1 unit may require higher spec than dSIII)
Memory:	4GB minimum (less on XP 32-bit).

Signal Generator

Channels:	<i>Drives both domains simultaneously (also optionally sound device)</i> 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:	±0.0002% (±2ppm).
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 $fs=192kHz$, 1.46Hz at $fs=384kHz$).

Signal Analyzer

Channels:	<i>Continuous input level, frequency and phase</i> 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:	±0.0002% (±2ppm).
Phase accuracy:	Determined by selected input domain.
Phase resolution:	0.1°

Continuous-Time Analyzer

Channels:	<i>Continuously-reading multi-function detector</i> Two, single selectable measurement function.
Functions:	Amplitude, balance, band pass, band reject, cross-talk, gain, IMD CCIF, IMD SMPTE/DIN, noise, THD+N.
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

Channels:	<i>Sample-buffer-based multi-function detector</i> Two, maximum of 40 simultaneous measurement functions.
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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...1M (1024k) 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 (0.045Hz at fs=48kHz, n=1024k).
High-pass filters:	None (DC-coupled), DC-block, 10Hz, 22Hz, 100Hz, 400Hz, user-defined. Brick-wall option at any frequency.
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, 192kHz or 384kHz.
Amplitude range:	Any fs <-120dBu..+26dBu, 15.46VRMS (bal) or +20dBu, 7.75VRMS (unbal).
Amplitude accuracy:	(1kHz): $\pm 0.06\text{dB}$ ($\pm 0.7\%$).
Frequency range:	DC.. >200kHz at fs=768kHz, >150kHz at fs=384kHz. DC..0.474fs (fs 48k, 96k, 192k) 91kHz at fs=192kHz, 45.5kHz at fs=96kHz, 22.75kHz at fs=48kHz.
Residual THD+N:	fs=48kHz to 384kHz, 1kHz, 22Hz..22kHz bandwidth, unweighted, RMS: <-106dB (0.00050%)+0.7uV*, typical -108dB +0.6uV*
Residual noise:	fs=96kHz, 22Hz..22kHz bandwidth, unweighted, RMS: <-116dBu (<1.25uV).
Flatness (1kHz ref):	fs=96kHz: $\pm 0.05\text{dB}$: DC..35kHz; +0.05/-0.1dB: DC..40kHz; +0.1/-2dB: DC..45.5kHz; fs=192kHz: $\pm 0.05\text{dB}$: DC..67kHz; +0.05/-0.1dB: DC..70kHz; +0.1/-2dB: 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 (BNC/RCA adapters available at extra cost), maximum peak current 34mA (24mA rms), minimum load 1000R (2000R for M1HP).
Output impedance:	Balanced (normal or CM test): 50R Fixed (M1D/HP: also 150/200R 600R); Unbalanced: 25R Fixed (M1D/HP: also 600R).
Grounding:	Common to Analyzer; Semi floating with 750R tie to Chassis

Analogue Inputs

Channels:	Two with independent gain ranging.
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Sample rate (fs):	48kHz, 96kHz, 192kHz, 384kHz or optional 768kHz (incl. on M1HP).
Maximum amplitude:	+42dBu (100V RMS).
Amplitude accuracy:	(1kHz): $\pm 0.06\text{dB}$ ($\pm 0.7\%$).
Frequency range:	<1Hz.. >200kHz at fs=768kHz, >150kHz at fs=384kHz. <1Hz..0.49fs (94kHz at fs=192kHz, 47kHz at fs=96kHz, 23.5kHz at fs=48kHz); DC coupling by software control.
Residual THD+N:	(fs=48kHz to 384kHz, 1kHz, 22Hz..22kHz filters, unweighted, RMS): <-106dB (0.00050%)+0.7uV; typical -108dB (0.00040%)+0.6uV
Residual noise:	(fs=48kHz to 384kHz, 22Hz..22kHz filters, unweighted, RMS): <-120dBu (<0.8uV).
Flatness (1kHz ref):	fs=96kHz: $\pm 0.05\text{dB}$:DC..35kHz; +0.05/-0.1dB: DC..40kHz; +0.1/-2dB: DC..45.5kHz; fs=192kHz: $\pm 0.05\text{dB}$: DC..67kHz; +0.05/-0.1dB: DC..70kHz; +0.1/-2dB: DC..91kHz.
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 Fixed (for M1D/HP also 600R or 150/200R software selection, maximum 0.25W).
Small-signal CMRR:	(20Hz..20kHz): >80dB.
Microphone Power:	4mA CCP differential, or 48V Phantom power (common mode DC).

Digital Outputs (data)

Channels:	Two in normal (one-wire) mode, independent muting; one in Split96 (two-wire) mode.
Sample rate (fs):	Any standard rate 8kHz to 192kHz.
Sample rate accuracy:	$\pm 2\text{ppm}$.
Sample rate deviation:	Settable $\pm 1500\text{ppm}$ in 1ppm steps.
Wordlength:	8..24 bits.
Dither:	White TPDF or RPDF 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: $\pm 0.001\text{dB}$.
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 generate EUT transparency check sequence.
Valid bits:	Settable for each channel.
Ref Sync inputs:	Wordclock (via BNC on rear) or DI.
Ref Sync rates:	Ref Sync measured to within $\pm 2\text{ppm}$.
Ref Sync Outputs:	Wordclock (BNC on rear) or DO.

Digital Outputs (carrier)

Carrier formats:	AES3 (XLR); AES3-id (BNC) & S/PDIF with optional BNC or RCA adapters; TOSLINK (optical). Can be looped-through from digital inputs.
Output impedance:	110R (XLR), 75R (Unbalanced/Coaxial BNC/RCA).

Carrier amplitude:	XLR and BNC outputs variable: XLR 0..5V (p-p loaded) in 240mV steps, accuracy $\pm 5\% + 10\text{mV}$; BNC/RCA: 0..3.3V (p-p loaded) in 160mV steps, accuracy $\pm 5\% + 5\text{mV}$. TOSLINK not variable.
Carrier rise/fall time:	Fixed 5nS.
Carrier phase vs. Ref Sync:	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:	(Not currently supported).
Added jitter amplitude:	(Not currently supported).
Differential interference:	(Not currently supported).
Common-mode interference:	(Not currently supported).

Digital Inputs (data)

Channels:	Two in normal (one-wire) mode, independent muting;
Sample rate (fs):	Any standard rate 8k to 216kHz except 96k~176.4k.
fs measurement accuracy:	$\pm 2\text{ppm}$.
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 optional BNC/RCA adapter; TOSLINK (optical).
Input impedance:	110R (XLR), 75R (If BNC/RCA adapter used/selected);
Amplitude measurement:	Differential only; Range: 0..10.32V p-p TOSLINK: not measured.
Jitter measurement, time-domain (JTA):	(Not currently supported).
Jitter measurement, via demodulator:	(Not supported).
Residual jitter:	$< 2\text{ns p-p}$ ($> 700\text{Hz}$).
Eye-narrowing:	(Not supported).
Carrier Display:	(Not supported).
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, biphasic violation, block-length error, eye-narrowing $> 50\%$, asynchronous wrt generator Ref Sync.

Monitor Outputs

Not provided.	Monitor functions may be supported using PC speaker/line out in a future update.
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