

STANFORD RESEARCH SYSTEMS

DS360

The Stanford Research Systems DS360 is an ultra-low distortion function generator that combines the low-distortion performance of an analog source with the high precision and flexibility of direct digital synthesis (DDS). Utilizing a 20-bit D/A converter and dedicated analog circuitry, the DS360 achieves exceptionally pure output waveforms with total harmonic distortion (THD) of better than -100 dB up to 20 kHz, making it an essential instrument for high-performance audio frequency testing, calibration, and research.

SPECIFICATIONS

General

Interfaces	GPIB (IEEE-488.2), RS-232
Display	Custom backlit LCD

Physical

Power Supply	100/120/220/240 VAC, 50/60 Hz, 40 W
Operating Temperature	0 °C to 50 °C °C
Dimensions (W×H×D)	432 × 89 × 413 mm (17" × 3.5" × 16.25") mm
Weight	7.7 kg kg

Frequency Characteristics

Frequency Range (Sine)	10 mHz to 200 kHz
Frequency Range (Square)	10 mHz to 200 kHz
Frequency Resolution	6 digits or 10 mHz (whichever is greater)
Frequency Accuracy	±25 ppm (0.0025%)

Amplitude Characteristics

Amplitude Range (Balanced)	20.0 μVpp to 80.0 Vpp
Amplitude Range (Unbalanced)	10.0 μVpp to 40.0 Vpp
Amplitude Resolution	3 digits
Amplitude Accuracy (1 kHz)	±0.1 dB (±1.2%)
Amplitude Flatness	±0.1 dB (10 mHz to 20 kHz, unbalanced)
Amplitude Units	Vrms, Vpp, dBV, dBm, dBrel

Distortion and Spectral Purity

THD (<5 kHz, 1 Vrms unbal / 2 Vrms bal)	-110 dB (typ.), -106 dB (max.)
THD (5 to 20 kHz, 1 Vrms unbal / 2 Vrms bal)	-104 dB (typ.), -98 dB (max.)
THD (20 to 40 kHz, 1 Vrms unbal / 2 Vrms bal)	-100 dB (typ.), -96 dB (max.)
THD (40 to 100 kHz, 1 Vrms unbal / 2 Vrms bal)	-90 dB (typ.), -85 dB (max.)
THD (100 to 200 kHz, 1 Vrms unbal / 2 Vrms bal)	-76 dB (typ.), -68 dB (max.)
THD (<5.0 kHz, 10 Vrms unbal / 20 Vrms bal)	-109 dB (typ.), -105 dB (max.)
THD (5 to 20 kHz, 10 Vrms unbal / 20 Vrms bal)	-103 dB (typ.), -98 dB (max.)
THD (20 to 40 kHz, 10 Vrms unbal / 20 Vrms bal)	-98 dB (typ.), -93 dB (max.)
THD (40 to 100 kHz, 10 Vrms unbal / 20 Vrms bal)	-88 dB (typ.), -83 dB (max.)
THD (100 to 200 kHz, 10 Vrms unbal / 20 Vrms bal)	-76 dB (typ.), -68 dB (max.)

Waveform Types and Attributes

Waveforms	Sine, Square, Two-Tone, White Noise, Pink Noise, Bandlimited Noise
Two-Tone Signals	Two sines, or sine and square (SMPTE, DIM, CCIF formats)
Square Wave Rise/Fall Time	1.3 μ s (10% to 90%)

Output Configuration

Output Configuration	Balanced and unbalanced
Output Connectors	XLR, BNC, dual banana jacks
Output Source Impedance	50 Ω , 150 Ω , 600 Ω
Output Isolation (Float Voltage)	Up to ± 40 V relative to chassis ground

Modulation and Sweep

Sweep Type	Linear and Logarithmic
Sweep Frequency Range	10 mHz to 200 kHz
Sweep Direction	Up and Down
Sweep Time Range	1 ms to 2600 s
Sweep Marker Output	TTL level
Burst Mode	Tone bursts of sine and square waves
Burst Count Range	1 to 65534 cycles
Trigger Sources	Internal rate generator, external trigger, external gate

Timing and Synchronization

External Reference Input	10 MHz
Sync Output	Front-panel TTL level

Physical and Environmental

AC Line Input	100 V, 120 V, 220 V, 240 V AC (selectable)
AC Line Frequency	50 Hz or 60 Hz
Power Consumption	40 W

Noise & Distortion

SMPTE IMD	< -100 dB (0.001%)
CCIF IMD	< -110 dB (0.0003%)
Broadband Noise	< 15 nV/√Hz (f > 1 kHz)
Spurious Components	< -100 dBc (DC to 20 kHz), < -90 dBc (20 kHz to 200 kHz)
Phase Noise	< -110 dBc/Hz (at 1 kHz offset)

DC Offset

DC Offset Range (Balanced)	0 to ±20.0 V (offset + peak AC < 20 V)
DC Offset Range (Unbalanced)	0 to ±10.0 V (offset + peak AC < 10 V)
DC Offset Resolution	3 digits
DC Offset Accuracy (Unbalanced)	1.5% of setting + 0.1 mV (Vp ≤ 0.2 V); 1.5% of setting + 1.0 mV (Vp ≤ 2.0 V); 1.5% of setting + 10 mV (Vp ≤ 14.14 V)
DC Offset Accuracy (Balanced)	1.5% of setting + 0.2 mV (Vp ≤ 0.4 V); 1.5% of setting + 2.0 mV (Vp ≤ 4.0 V); 1.5% of setting + 20 mV (Vp ≤ 28.28 V)

Noise Waveform Specifications

White Noise Bandwidth	DC to 200 kHz
Pink Noise Bandwidth	DC to 200 kHz
Bandlimited Noise Center Frequency Range	10 Hz to 200 kHz
Bandlimited Noise Bandwidth Range	100 Hz to 199.9 kHz

Phase Control

Phase Range (Relative to Sync)	-180° to +180°
Phase Resolution	0.001°

General & Environmental

Temperature Coefficient	< (0.01% + 0.005 dB) per °C
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Inputs & Outputs

Trigger Input Level	TTL
External Reference Input Level	TTL
External Reference Lock Range	±10 ppm

System & Interface

Setup Storage	9 setups (non-volatile)
RS-232 Baud Rates	300, 600, 1200, 2400, 4800, 9600 baud

Performance

Pink Noise Spectral Roll-off	3 dB/octave
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TECHNOLOGY

Direct Digital Synthesis (DDS) with 20-bit D/A Conversion

APPLICATIONS

Audio frequency research and development, high-fidelity equipment manufacturing, and automated audio testing

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