STANFORD RESEARCH SYSTEMS

DS345

The Stanford Research Systems DS345 is a 30 MHz synthesized function and arbitrary waveform generator based on an innovative Direct Digital Synthesis (DDS) architecture. It generates standard waveforms with excellent 1 µHz frequency resolution, wideband noise, and arbitrary waveforms updated at a fast 40 MSa/s rate. The instrument features comprehensive modulation options including AM, FM, Phase Modulation (PM), Burst, and phase-continuous frequency sweeps.

SPECIFICATIONS

Physical

Power Supply	50 W, 100/120/220/240 VAC, 50/60 Hz
Operating Temperature	0 to 50 °C
Dimensions (W×H×D)	216 × 89 × 330 mm
Weight	4.5 kg

Waveforms

Standard Waveforms	Sine, Square, Triangle, Ramp
Arbitrary Waveforms	Yes
Noise Mode	White Noise

Frequency Characteristics

Sine Range	1 µHz to 30.2 MHz
Square Range	1 µHz to 30.2 MHz
Triangle Range	1 µHz to 100 kHz
Ramp Range	1 µHz to 100 kHz
Noise Bandwidth	10 MHz
Frequency Resolution	1 µHz

Amplitude and Output

Amplitude Range (50 Ohms)	10 mVpp to 10 Vpp
Amplitude Resolution	3 digits
Output Impedance	50 Ω
Output Floating Range	Up to ±40 V relative to earth ground
Display Formats	Vpp, Vrms, dBm

Arbitrary Waveform Capabilities

Sample Rate	40 MSa/s
Waveform Memory Length	16,300 points
Vertical Resolution	12 bits

Modulation

Internal Source Frequency	1 mHz to 10 kHz
AM Depth	±100 % (1 % resolution)
FSK/BPSK Rate (Internal)	0.001 Hz to 50 kHz
External AM Input Range	±5 V for 100% modulation
External AM Bandwidth	15 kHz

Sweep

Sweep Type	Linear or Logarithmic
Sweep Direction	Up or Down
Sweep Continuity	Phase-continuous
Sweep Time	0.001 s to 1000 s

Burst

Burst Maximum Frequency (Sine/Square)	1 MHz
Burst Maximum Frequency (Triangle/Ramp)	100 kHz

Inputs and Outputs

Main Output Connector	Front-panel BNC (floating)

Timebase

Frequency Accuracy	±5 ppm (20 °C to 30 °C)

Phase

Phase Control Range	±7199.999°
Phase Control Resolution	0.001°

Square Wave Characteristics

Square Wave Rise/Fall Time	< 15 ns (10 % to 90 %)
Square Wave Asymmetry	< 1 % of period + 4 ns
Square Wave Overshoot	< 5 % of peak-to-peak amplitude

Triangle/Ramp Wave Characteristics

Triangle/Ramp Linearity	> 99 % (up to 100 kHz)

Arbitrary Wave Characteristics

Arbitrary Waveform Rise/Fall Time	< 35 ns

Amplitude & Offset

DC Offset Range (50 Ω)	±5 V
DC Offset Range (High Z)	±10 V
DC Offset Accuracy	1.5 % of setting + 20 mV

Spectral Purity (Sine)

Harmonic Distortion (DC to 1 MHz)	< -55 dBc
Harmonic Distortion (1 MHz to 10 MHz)	< -45 dBc
Harmonic Distortion (10 MHz to 30 MHz)	< -35 dBc

Signal Quality

Phase Noise	< -110 dBc/Hz (10 kHz offset, 5 MHz carrier)
Spurious (DC to 1 MHz)	< -65 dBc
Spurious (1 MHz to 15 MHz)	< -55 dBc
Spurious (15 MHz to 30 MHz)	< -45 dBc

Burst Mode

Burst Count	1 to 30,000 cycles

Inputs & Outputs

External Reference Input Frequency	10 MHz

TECHNOLOGY

Direct Digital Synthesis (DDS)

APPLICATIONS

Test & Measurement