# Synthesized Function Generators

*DS335 — 3 MHz function generator*


## DS335 Function Generator

- **1 µHz to 3.1 MHz frequency range**
- **1 µHz frequency resolution**
- **Sine, square, ramp, triangle & noise**
- **Phase-continuous frequency sweeps**
- **FSK modulation**
- **10 Vpp into 50 Ω**
- **RS-232 and GPIB interfaces (opt.)**

The DS335 is a simple, low-cost, 3 MHz function generator designed for general benchtop or ATE applications. Based on a Direct Digital Synthesis (DDS) architecture, the DS335 includes features not normally found in function generators in this price range.

Basic functions include sine waves and square waves (up to 3.1 MHz), and ramps and triangles (up to 10 kHz). A 3.5 MHz Gaussian white-noise generator is also provided. All functions can be swept logarithmically or linearly in a phase-continuous fashion over the entire frequency range. A rear-panel SWEEP output marks the beginning of a sweep to allow synchronization of external devices. Both unidirectional and bidirectional sweeps can be selected.

Internal and external FSK modes allow the output frequency to be rapidly toggled between two preset values. Toggling is done either at a fixed, internal rate of up to 50 kHz, or externally via a rear-panel input.

Outputs have the low phase noise inherent to DDS. Wide-band amplifiers maintain good pulse response and provide low distortion. The result is an output capable of driving 10 Vpp into a 50 Ω load, or 20 Vpp into a high-impedance load.

Both GPIB and RS-232 interfaces are available to provide complete control via an external computer. All instrument functions can be set and read via the computer interfaces.

## Frequency Range

| | *Max. Freq.* | *Resolution* |
|---|---|---|
| Sine | 3.1 MHz | 1 µHz |
| Square | 3.1 MHz | 1 µHz |
| Ramp | 10 kHz | 1 µHz |
| Triangle | 10 kHz | 1 µHz |
| Noise | 3.5 MHz | (Gaussian weighting) |

## Output

| | |
|---|---|
| Source impedance | 50 Ω |
| Grounding | Output may float up to ±40 V (AC + DC) |

## Amplitude

| | |
|---|---|
| Range | 50 mVpp to 10 Vpp (50 Ω), 100 mVpp to 20 Vpp (Hi-Z) |
| Resolution | 3 digits (DC offset = 0 V) |
| Offset | ±5 VDC (50 Ω), ±10 VDC (Hi-Z) |
| Offset resolution | 3 digits |
| Accuracy | 0.1 dB (sine output) |

## Sine Wave

| | |
|---|---|
| Spurious response | < –65 dBc to 1 MHz<br>< –55 dBc to 3.1 MHz |
| Harmonic distortion | |
| DC to 100 kHz | < –60 dBc |
| 100 kHz to 1 MHz | < –50 dBc |
| 1 MHz to 3 MHz | < –40 dBc |
| Phase noise | < –60 dBc (30 kHz band centered on carrier) |

## Square Wave

| | |
|---|---|
| Rise/fall time | <15 ns ± 5 ns (10 % to 90 %) |
| Asymmetry | <3 ns + 1 % of period |
| Overshoot | <5 % (full-scale output) |

## Ramps and Triangles

| | |
|---|---|
| Rise/fall time | 100 ns |
| Linearity | ±0.1 % of full scale |
| Settling time | 200 ns (0.5 % of final value) |

## FSK Modulation

| | |
|---|---|
| Modes | Internal, External |
| Max rate | 50 kHz, internal |
| External FSK | TTL input, 1 MHz (max.) |

## Sweeps

| | |
|---|---|
| Type | Linear and logarithmic (phase continuous) |
| Span | Linear (full frequency range), log (6 decades) |
| Sweep rate | 0.01 Hz to 1 kHz |

## Timebase Accuracy

| | |
|---|---|
| Standard | ±5 ppm (20 °C to 30 °C) |
| Optional | TCXO, 2 ppm stability, 2 ppm aging (20 °C to 50 °C) |

## General

| | |
|---|---|
| Interfaces | Optional RS-232 and GPIB. All instrument functions are controllable over the interfaces. |
| Non-volatile memory | Up to nine sets of instrument settings may be stored and recalled. |
| Dimensions | 8.5" × 3.5" × 13" (WHD) |
| Weight | 8 lbs. |
| Power | 22 W, 100/120/220/240 VAC, 50/60 Hz |
| Warranty | One year parts and labor on defects in materials and workmanship |


*DS335 rear panel (with opt. 01)*

## Ordering Information

| | |
|---|---|
| DS335 | 3 MHz function generator |
| Option 01 | GPIB and RS-232 interfaces |
| Option 02 | 2 ppm TCXO timebase |
| O345RMD | Double rack mount kit |
| O345RMS | Single rack mount kit |