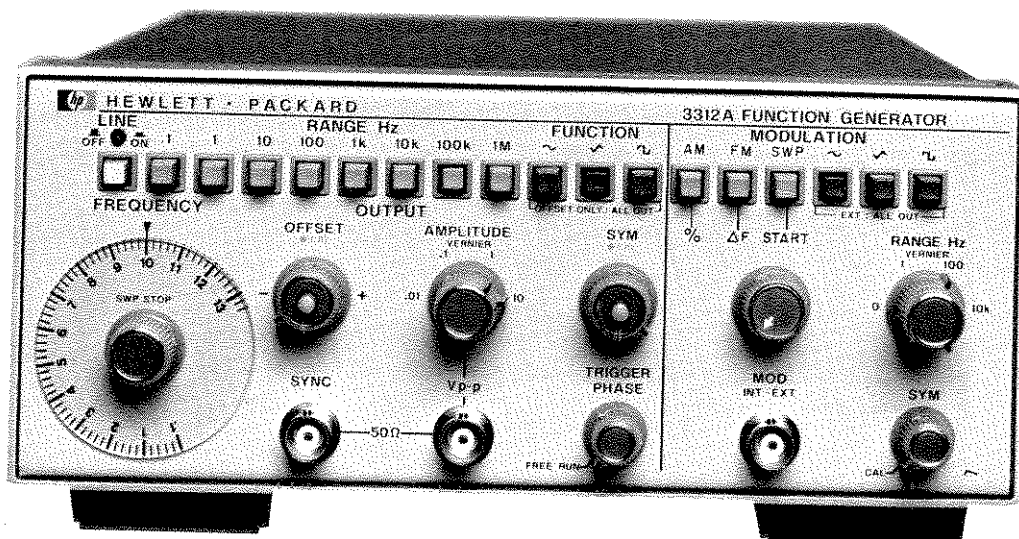


FREQUENCY, FUNCTION & WAVEFORM SYNTHESIZERS

Function Generator

Model 3312A

- Two function generators in one instrument
- AM-FM, sweep, trigger, gate and burst



HP 3312A

Description

Hewlett-Packard's 3312 A Function Generator combines two separate, independent function generators with a modulator section in one compact instrument.

The main generator can—via pushbutton control—be triggered by the modulation generator to provide sweep functions, AM, FM or tone burst.

Ten V p-p into 50 Ω provides adequate power for most applications. The output attenuator has a range of more than 10,000:1 so clean low-level signals from 10 V to 1 mV p-p into 50 Ω can be obtained. The main generator includes dc offset up to 10 volts p-p into 50 Ω .

The HP 3312A is an effective low cost solution for generating a multitude of functions.

Specifications

Output waveforms: sine, square, triangle, \pm ramp, pulse, AM, FM, sweep, triggered and gated.

Frequency Characteristics

Range: 0.1 Hz to 13 MHz in 8 decades ranges.

Dial accuracy: $\pm 5\%$ of full scale. Unspecified in Uncal Mode.

Square wave rise or fall time (10% to 90%): < 20 ns.

Aberrations: $< 10\%$.

Triangle linearity error: $< 1\%$ at 100 Hz.

Variable symmetry: 80:20:80 to 1 MHz.

Sine wave distortion: $< 0.5\%$ (-46 dB) THD from 10 Hz to 50 kHz. (10 kHz range maximum). > 30 dB below fundamental from 50 kHz to 13 MHz, at full-rated output.

Output Characteristics

Impedance: 50 $\Omega \pm 10\%$.

Level: 20 V p-p into open circuit, > 10 V p-p into 50 Ω at 1 kHz.

Level flatness (sine wave): $< \pm 3\%$ from 10 Hz to 100 kHz at full rated output (1 kHz reference). $< \pm 10\%$ from 100 kHz to 10 MHz.

Attenuator: 1:1, 10:1, 100:1, 1000:1 and $> 10:1$ continuous control.

Attenuator error: $< 5\%$.

Sync output: impedance: 50 $\Omega \pm 10\%$, > 1 V p-p square wave into open circuit. Duty cycle varies with symmetry control.

DC offset: variable up to ± 10 volts. Instantaneous ac voltage + Vdc offset cannot exceed ± 10 V (open circuit) or ± 5 V (terminated 50 ohm).

Modulation Characteristics

Types: internal AM, FM, sweep, trigger, gate or burst; external AM, FM, sweep, trigger, gate or burst.

Waveforms: sine, square, triangle, ramp or variable symmetry pulse.

Frequency range: 0.01 Hz to 10 kHz.

Output level: > 1.0 V p-p into 10 k Ω .

Amplitude Modulation

Depth: 0 to 100%.

Modulation frequency: 0.01 Hz to 10 kHz (internal). DC to > 1 MHz (external).

Carrier 3 dB bandwidth: < 100 Hz to > 5 MHz.

Carrier envelope distortion: $< 2\%$ at 70% sine wave modulation with $f_c = 1$ MHz, $f_m = 1$ kHz.

External sensitivity: < 10 V p-p for 100% modulation.

Frequency Modulation

Deviation: 0 to $\pm 5\%$ (internal).

Modulation frequency: internal: 0.01 Hz to 10 kHz; external: DC to > 50 kHz.

Distortion: < -35 dB at $f_c = 10$ MHz, $f_m = 1$ kHz, 10% modulation.

Sweep Characteristics

Sweep width: $> 100:1$ on any range.

Sweep rate: 0.01 Hz to 10 kHz, 90:10 ramp, and 0 Hz Range (provides manual setting of "Sweep Start" without modulation generator oscillating).

Sweep mode: repetitive linear sweep between start and stop frequency settings. Retrace time can be increased with symmetry control.

Ramp output: 0 to > -4 p-p into 5 k Ω .

Gate Characteristics

Start/stop phase range: $+90^\circ$ to -80° .

Frequency range: 0.1 Hz to 1 MHz (useful to 10 MHz).

Gating signal frequency range (external): dc to 1 MHz, TTL compatible.

External Frequency Control

Range: 1000:1 on any range.

Input requirement: with dial set at 10, 0 to -2 V $\pm 20\%$ will linearly decrease frequency $> 1000:1$. An ac voltage will FM the frequency about a dial setting within the limits $(0.1 < f < 10) \times$ range setting.

Linearity: 0.5% of Fmax for Fmax ≤ 1 MHz 5.0% of Fmax for Fmax > 1 MHz. Deviation is from a best fit straight line. VCO frequency span $\leq 100:1$.

Input impedance: 2.8 k $\Omega \pm 5\%$.

General

Operating temperature: 0°C to $+55^\circ\text{C}$; specifications apply from 0°C to 40°C .

Storage temperature: -40°C to $+75^\circ\text{C}$.

Power: 100 V, 120 V, 220 V, 240 V $\pm 5\%$, -10% , switchable; 48 Hz to 440 Hz; ≤ 25 VA.

Size: 102 mm H x 213 mm W x 377 mm D (4" x 8.4" x 14.8").

Weight: net, 3.8 kg (8.4 lb). Shipping, 5.9 kg (13 lb).

HP 3312A Function Generator

\$1,450