

DOCUMENTATION SUR LE GÉNÉRATEUR HEWLETT-PACKARD HP 3312A

FICHE N° 3893

PRÉSERVER
SAUVEGARDER
VALORISER

Période de fabrication : 1975-1999
Fabricant : Hewlett-Packard Company
Domaines : Physique
Sous-domaines : Electronique, Electricité
Organisme : Université de Rennes
Ville : Rennes
Modèle : HP 3312A
Matériaux : Papier

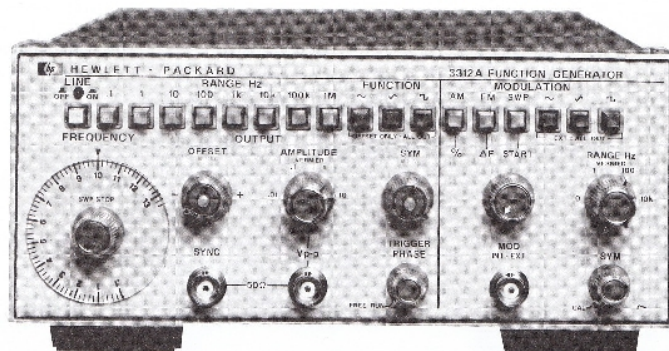
Description

Cette documentation en anglais sur le générateur de fonctions HP 3312A est extraite du catalogue Hewlett-Packard de 1978 (page 338). Elle décrit les caractéristiques et spécifications de l'instrument et ses performances en fréquences et en modulation.

Utilisation

Cet appareil était destiné aux étudiants lors des travaux pratiques d'électronique de licence et de maîtrise. Il permettait de générer des signaux électriques simples ou modulés dans une large gamme de fréquence et d'étudier la réponse de circuits électroniques tels que des filtres et des amplificateurs.

- AM, FM, sweep, trigger, gate and burst



Description

Hewlett-Packard's 3312A 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 50Ω 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 50Ω can be obtained.

The main generator includes dc offset up to 10 volts p-p into 50Ω.

Hewlett-Packard's 3312A is an effective low cost solution for generating a multitude of functions.

3312A Specifications

Output waveforms: sine, square, triangle, $\pm$ ramp, pulse, AM, FM, sweep, trigger and gate.

Frequency characteristics

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

Dial accuracy: $\pm 5\%$ of full scale.

Square wave rise or fall time (10% to 90%): < 18 nsec.

Aberrations: $< 10\%$.

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

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

Sine wave distortion: $< 0.5\%$ THD from 10 Hz to 50 kHz, > 30 dB below fundamental from 50 kHz to 13 MHz.

Output characteristics

Impedance: 50Ω $\pm 10\%$.

Level: 20 V p-p into open circuit, 10 V p-p into 50Ω.

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

DC offset: ± 10 volts, continuously adjustable, independent of variable attenuator setting. Instantaneous ac voltage $\pm V_{dc}$ offset must be between ± 10 V (not terminated) or ± 5 V (terminated with 50Ω) in the 1:1 attenuator position.

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 pulse variable symmetry.

Frequency range: 0.01 Hz to 10 kHz.

Output level: > 1.0 V p-p into 10 kΩ.

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 100 Hz, 90:10 ramp, and 0 Hz (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 kΩ.

Gate characteristics: start/stop phase range: -90° 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: the frequency versus voltage curve will be linear within 0.5% over a 100:1 frequency range.

Input impedance: 2.8 kΩ $\pm 5\%$.

General

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

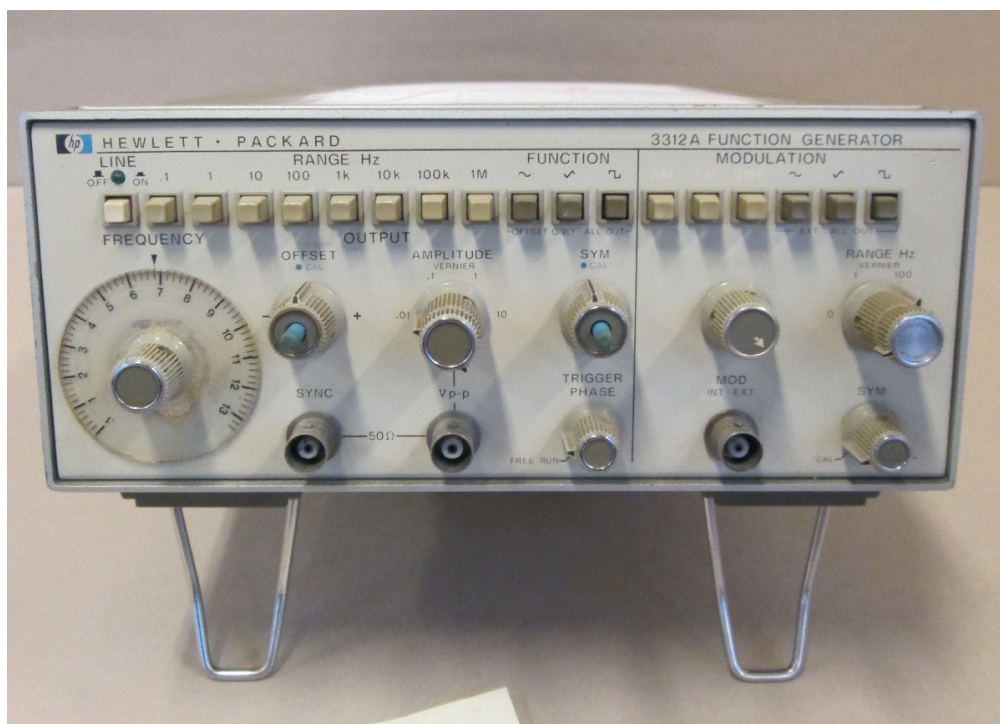
Storage temperature: -40°C to $+75^\circ\text{C}$.

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

Size: 102 H $\times$ 213 W $\times$ 377 mm D ($4" \times 8\frac{3}{4}" \times 14\frac{1}{2}"$).

Weight: net, 3.8 kg (8 lbs, 6 oz); Shipping, 5.9 kg (13 lbs).

3312A Function Generator



OSCILLATORS & FUNCTION GENERATORS

General information

Oscillators, function generators

Signal sources have been described by various names—oscillators, test oscillators, audio signal generators, function generators, etc. Different names are applied, depending on design and intended use of the source. The name "test oscillator" has been used to describe an oscillator having a calibrated attenuator and output monitor. The term "signal generator" is reserved for an oscillator with modulation capability.

A function generator is a signal generator that delivers a choice of different waveforms with frequencies adjustable over a wide range. Function generators produce sine, triangle, square wave, saw-tooth waves, pulses, sweep, and modulation. Hewlett-Packard's function generators extend from a low frequency of 0.0005 Hz (HP 3310A) up to a high frequency of 50 MHz (HP 8165A).

Basic requirements

In selecting an oscillator or function generator, the user will be most interested in its frequency coverage. The question to be answered here is, "Will the instrument supply both the lowest and highest frequencies of interest for anticipated tests?" As shown in Table 1, Hewlett-Packard manufactures a broad range of oscillators and function generators covering the frequency spectrum from 0.0005 Hz to 50 MHz.

The user's next concern will be with available output power or voltage. Some tests require large amounts of power, while others merely require sufficient voltage output. For almost any application, there is a Hewlett-Packard oscillator capable of delivering desired voltage output into a high-impedance load or of supplying desired power into lower impedance loads.

Besides frequency range and power output, the user will be interested in instrument stability, its dial resolution, and the amount of harmonic distortion, hum and noise in the output signal, and functions available. See Table 1 for a comparison of Hewlett-Packard oscillators and function generators.

Frequency stability

Frequency stability of an oscillator determines the ability of the instrument to maintain a selected frequency over a period of time. Component aging, power-supply variations and temperature changes all affect stability. Carefully chosen components, such as precision resistors and variable capacitors in the frequency-determining networks, contribute to long-term stability.

Amplitude stability

Amplitude stability is important in certain

FUNCTIONS	FREQUENCY RANGE	POWER OUTPUT	INST.	PAGE
~		3 W	201C	334
~		550 mW	3310A/B	339
~		250 mW	3312A*	338
~		20 mW	3311A	337
~		200 mW	851B/852A 854M	342
~		150 mW	2090D	334
~		150 mW	4794A	336
~		40 mW	209A	335
~		20 mW	853A	**
~		10 mW	236A	337
~		10 mW	204C	335
~		1.4 mW	8165A	340

*Two Generators, AM, FM, Sweep, Trigger/Gate

**See data sheet

Table 1. Functions, frequency range and power output of Hewlett-Packard oscillators and function generators.

oscillator applications. Amplitude stability is inherent in the Hewlett-Packard RC oscillator circuit because of large negative feedback factor and amplitude stabilizing techniques. "Frequency response," or amplitude variation as frequency is changed, is of special interest when the oscillator is used for response measurements throughout a wide range of frequencies.

Distortion

Distortion in the oscillator's output signal is a measure of the purity of the oscillator's waveform.

Oscillator distortion can be undesirable for harmonic distortion testing of amplifiers, for example. If the amount of distortion contributed by the oscillator is more than 20 dB below the distortion contributed by the amplifier, an error in the harmonic distortion measurement will be less than 10 percent.

Hum and noise

Hum and noise can be introduced at a variety of points in oscillator circuits; but when the circuit operates at a relatively high level, the amount of hum and noise introduced into the device under test is usually negligible. Hum and noise introduced by a

power amplifier usually remain constant as output signal amplitude is diminished. Hence, even though hum and noise power may be quite small compared to rated output, these spurious signals sometimes become a significant portion of low-level output signals. To overcome such a limitation many Hewlett-Packard oscillators have their amplitude control on the output side of the power amplifier so that hum and noise are reduced proportionally with the signal when low-level signals are desired for test purposes.

Function generators

The function generator is a versatile multiwaveform signal source capable of very wide frequency coverage. Available functions range from modulation (3312A) to sweep and triggered/gated waveforms (3310A/E 3312A). The function generator is an indispensable general purpose signal source for product testing, instrument repair, and the electronics laboratory. Diverse fields of applications in which the function generator is being used include medical research, education, chemical communications, geophysics, industrial control, military, and aerospace.

Pour nous citer :

Base de la Mission nationale de sauvegarde et de valorisation du patrimoine scientifique et technique contemporain, PATSTEC, Documentation sur le générateur Hewlett-Packard HP 3312A (Hewlett-Packard Company), <https://www.patstec.fr/ressources/objets/detail?id=15911>, consulté le 2026-07-28