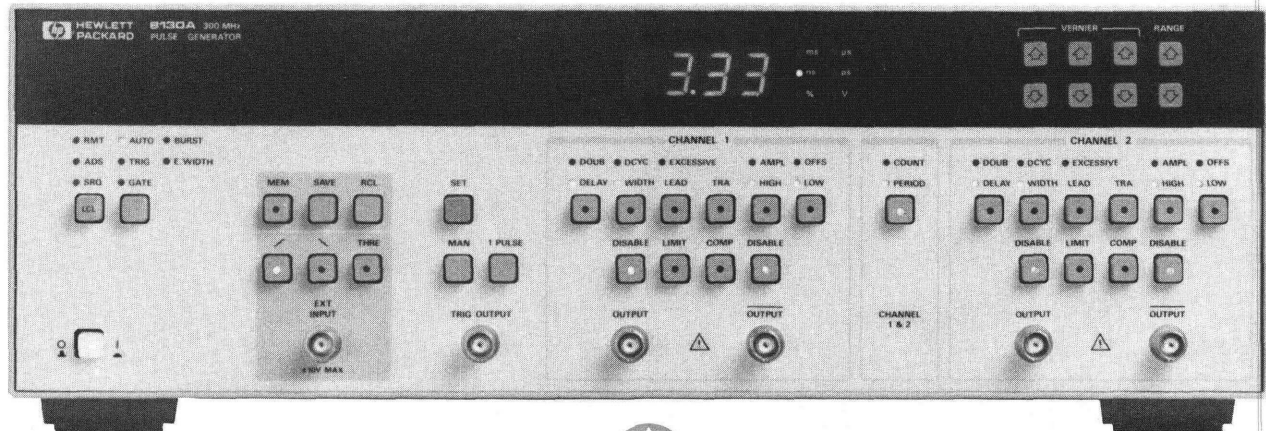


PULSE GENERATORS

300 MHz Pulse Generator, Variable Transitions

HP 8130A

- 1 ns variable transitions
- 300 MHz repetition rate
- 5V p-p amplitude
- Minimum resolution: 10 ps; 10 mV
- 1 channel (2 optional)
- fully HP-IB programmable



HP 8130A with Option 020, second channel



300 MHz Pulse Generator

The 300 MHz repetition rate of the HP 8130A Pulse Generator establishes a new class of high-speed programmable pulse generator with variable transition times. In many cases, the HP 8130A will perform parametric and function tests up to 300 MHz, because delay and width have a degree of adjustment at this speed. This increases your confidence in the device, because measurements can be performed at a higher speed and even at-speed measurements are feasible.

Variable Transition Times

Clean edges down to 1 ns mean repeatable, reliable measurements on fast digital ICs like BiCMOS, ECL and ECLips*. Variable transition times mean you can optimize switching speed and thus reduce the effects of ringing and reflection when driving reactive or unmatched loads. In addition, the variable transitions open a wide range of analog and digital applications, such as measuring operational amplifiers slew rate, or comparator threshold uncertainty, because trapezoidal and triangular waveforms can be generated.

5V p-p and 10m Information V Resolution

With 5 V p-p pulse amplitude into 50 ohms, you can cover the level requirements of all high-speed semiconductor technologies like BiCMOS, ECL, and ECLips. Minimum signal sensitivity down to 100 mV can be tested using a direct connection to the HP 8130A. Attenuators can be inserted for smaller signal amplitudes; e.g., with a 20 dB attenuator, the minimum amplitude is 10 mV with 1 mV resolution.

10 ps Timing Resolution

A timing resolution of an order of magnitude higher than typical gate-delays eliminates time-window uncertainties, making more accurate and reliable measurements possible.

Data Simulation

Two signals—data and clock—are needed in order to characterize flip-flops. The HP 8130A with Option 020, second channel, is a convenient way of generating two different but synchronized signals. Double-pulse can be selected in one channel to simulate a clock, the other channel then appears to produce a series of binary ones and

zeros in NRZ (non-return-to-zero) format. Data rates up to 280 Mbit/s can be simulated.

Rapid ATE Integration

The HP 8130A is the first fully programmable product to offer full pulse performance flexibility up to 300 MHz. Even the input trigger level can be programmed to automate your measurements. This makes it an extremely useful instrument not only for R&D and production engineering environments, but also in incoming component inspection, and for high-speed functional test applications in production test. A new standardized programming language (HP-SL) enables you to program, upload, and down-load new parameters or complete settings for future requirements; i.e., you can rapidly acquire set-ups you have previously set manually.

Fast and Convenient Manual Operation

The proven design of Hewlett-Packard's pulse generators has been adapted to the requirements of the HP 8130A. This reduces your training, and lets you concentrate on your measurement task. I

Specifications

Specifications describe the warranted performance. Non-warranted values are described as "typical". All specifications apply after a 30 minute warm-up phase with 50 ohms load resistance at all outputs, and are valid at 0°C to 55°C ambient temperature.

Timing Parameters

Common Specifications

Measurement conditions: normal mode, measured at 50% of amplitude and fastest transitions.

Resolution: 3 digits, best case: 10 ps

Repeatability: factor 4 better than accuracy.

RMS-jitter: 0.025% of programmed value + 15 ps (0.05 % of programmed value + 15ps for range 10 ns to 100 ns)

Period

Range: 3.33 ns to 99.9 ms

Accuracy: ±5% of programmed value ±100 ps

Width

Range: 1.5 ns to 99.9 ms

Accuracy: ±5% of programmed value ±250 ps

*registered trade mark of Motorola Inc.

Delay

(measured between trigger out and main out)

Fixed delay (trigger to main out): 18 ns

Variable range: from 0 ns to 99.9 ms

Accuracy: $\pm 5\%$ of programmed value ± 250 ps

Transition Times (measured at 10% to 90% of amplitude)

Range: 1 ns to 100 μ s

Accuracy: $\pm 10\%$ of programmed values ± 300 ps

Linearity:

transitions 1.00 ns to 1.99 ns: $< \pm 20\%$ of amplitude

transitions 2.00 ns to 49.9 ns: $< \pm 10\%$ of amplitude

transitions > 50 ns: $< \pm 3\%$ of amplitude

Under-Programmability

Period, width and transitions are under-programmable to ensure that the specified minimum values can always be obtained.

Output Levels

Output levels double when driving into open circuits. Instrument disables outputs if levels exceed ± 6.5 V, or amplitude exceeds 6.5 V p-p.

High level: -4.90 V to +5.00 V

Low level: -5.00 V to +4.90 V

Resolution: 3 digits, best case: 10 mV

Level accuracy: $\pm 1\%$ of programmed value $\pm 3\%$ of amplitude ± 40 mV

Repeatability: factor 4 better than accuracy

Settling time: 20 ns (at fastest transition time)

Operating Characteristics

Operating Characteristics describe typical, non-warranted performance.

Duty cycle

(Width and duty cycle are mutually exclusive)

Range: 1% to 90%

Resolution: 1%

Subject to width and period specifications

Input and output

BNC connectors on the front panel. Rear panel connectors are optional.

Main outputs (differential outputs)

Amplitude: 100 mV p-p to 5 V p-p into 50

Offset: -4.95 V to 4.95 V into 50

Source impedance: 50 ± 1

Maximum external voltage: ± 5 V

Short circuit current: 200 mA

External input

Trigger, Gate, Burst, and External width mode

Trigger slopes can be selected positive or negative.

Input impedance: 50 ± 2.5

Threshold: -5 V to +5 V

Resolution: 100 mV

Maximum input voltage: ± 10 V

Input transition: < 50 ns

Input frequency: dc to 300 MHz

Minimum pulsewidth: 1.5 ns

Input sensitivity: > 300 mV p-p

Trigger output

Levels: high at 2.4 V, low at 0.3 V into 50

Trigger pulse width:

Period (PER)	Pulse width (WID)
3.33 ns to 99.9 ns	50% of PER
100 ns to 999 ns	95% of PER
1.00 μ s to 9.99 μ s	99.5% of PER
10.0 μ s to 99.9 ms	99.95% of PER

Transition times: < 1 ns

Source impedance: 50 ± 2.5

Delay from external input or trigger output:

In Trigger and External Width mode: 16 ns

In Gate and Burst mode: 18.5 ns

Max/Min external voltage: $+7/-2$ V

Operating Modes

Manual: simulates an external input signal.

1 Pulse: in Trigger, Gate and Burst mode, one pulse to double pulse is generated.

Auto: continuous pulse stream

Trigger: each active input transition generates a single output pulse or double pulse.

Gate: external signal enables period generator. First output pulse synchronous with active edge. Last pulse always completed. Width and period of first pulse may deviate 10% from subsequent pulses.

External burst: each active input transition generates a preprogrammed number of pulses (1 to 9999), minimum burst period is 5 ns. Width and period of first pulse may deviate 10% from subsequent pulses.

External width: pulse recovery (external edges toggle output). Output levels and transition times are selectable.

Limit: maximum high and low levels into 50 can be limited to protect the device under test. Pushing the limit key declares present levels as limits which then cannot be exceeded as long as the mode is active.

Complement: normal/complement is selectable per output

Disable: relays connect/disconnect outputs.

Set: sets parameters to fixed ratio relative to period (delay = 0 ns, width = 50% of period, transitions = 10% of period, limited to min 1 ns; period, high level and low level = current values).

HP-IB capabilities

All modes and parameters are programmable, downloadable and uploadable. ASCII and binary formats are supported.

Non-volatile Memory

Current settings are saved on power-down. Additionally, 19 complete set-ups can be stored.

General

Storage temperature: -40°C to $+65^{\circ}\text{C}$

Operating temperature: 0°C to 55°C

Power: 100/120/220/240 Vrms, $\pm 10\%$, 250 VA max, 50-60 Hz

Weight: 20 kg (44.4 lb)

Size: 145H x 426W x 525mmD

(5.7" x 16.75" x 20.65")

Recalibration period: 1 year recommended

Ordering Information

HP 8130A 300 MHz Pulse Generator

Opt 001 Rear Panel Connectors

Opt 020 Second Channel

Opt 908 Rack Mount Flange Kit (P/N 5062-3977)

Opt 916 Additional Operating/Programming

Manual (P/N 08130-90011)

Opt W30 Extended Repair Service. See page 725.

Opt W32 Calibration Service. See page 725.

Opt H01 Preparation for rack slides

(rack slide kit required)

Accessories

HP 1494-0059 Rack Slide Kit

HP 8493A#020 20dB Attenuator

HP 1250-1200 BNC- SMA Adaptor

☎ Fast ship product—see page 734.

Price

\$12,100

\$0

\$6,300

\$33.50 ☎

\$32

contact HP

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\$100 ☎

\$120 ☎

\$40 ☎