

PULSE GENERATORS & DATA GENERATORS

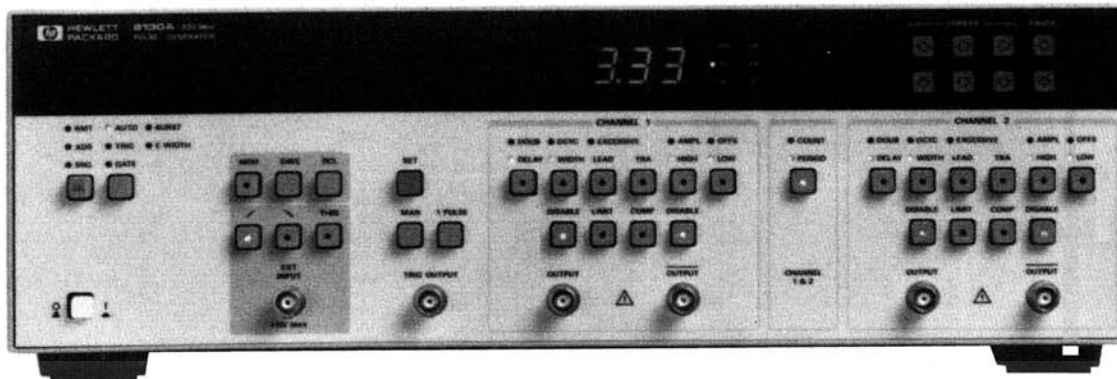
300 MHz Pulse Generator, Variable Transitions

HP 8130A

503

- One ns variable transitions
- 300 MHz repetition rate
- 5V peak-to-peak amplitude

- Minimum resolution: 10 ps; 10 mV
- One channel (two 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 generators 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 such as 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.

5 V Peak-to-Peak Amplitude and 10 mV Resolution

With 5 V peak-to-peak pulse amplitude into 50 ohms, you can cover the level requirements of all high-speed semiconductor technologies, such as 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; for example, 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, allowing for more accurate and reliable measurements.

Data and Clock 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 zeroes 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 research and development 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 download new parameters or complete settings for future requirements; for example, you can rapidly acquire setups that 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. Your training is reduced, and you're able to concentrate on your measurement task.

Specifications

Specifications describe the warranted performance. Non-warranted values are described as "typical." All specifications apply after a 30 minute warmup 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

Period

Range: 3.33 ns to 99.9 ms

Width

Range: 1.5 ns to 99.9 ms (max < Period)

*Registered trademark of Motorola Inc.

PULSE GENERATORS & DATA GENERATORS

300 MHz Pulse Generator, Variable Transitions (cont'd)

HP 8130A

Delay

(Measured between trigger out and main out)

Fixed delay 18 ns

Variable range: From 0 ns to 99.9 ms (max < Period)

Double pulse (Period \geq 7.20 ns)

Range: 3.33 ns to 99.9 ms (max < Period). Double pulse and delay are mutually exclusive

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

Range: 1 ns to 100 μ s leading and trailing edges common in range 1 ns to 2 ns, max leading/trailing ratio 1:20 (1:5 from 2 to 5 ns).

Linearity:

Transitions 1.00 ns to 1.99 ns: $\leq \pm 20\%$ of amplitude

Transitions 2.00 ns to 49.9 ns: $\leq \pm 10\%$ of amplitude

Transitions > 50 ns: $\leq \pm 3\%$ 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 peak-to-peak

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

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 peak-to-peak to 5 V peak-to-peak into 50 Ω

Offset: -4.95 V to 4.95 V into 50 Ω

Source impedance: 50 $\Omega \pm 1 \Omega$

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 $\Omega \pm 2.5 \Omega$

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 pulse width: 1.5 ns

Input sensitivity: ≥ 300 mV peak-to-peak

Trigger output

Levels: High at 2.4 V, low at 0.3 V into 50 Ω

Trigger pulse width:

Period (PER)	Pulse width
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 $\Omega \pm 2.5 \Omega$

Delay from external input to 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 is synchronous with active edge. Last pulse is always completed. Width and period of first pulse may deviate 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 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 Ω 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.

Nonvolatile Memory

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

General

Storage temperature: -40° C to +65° C

Operating temperature: 0° C to 55° C

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

Weight: 20 kg (44.4 lb)

Size: 145 mm H \times 426 mm W \times 525 mm D (5.7 in \times 16.75 in \times 20.65 in)

Recalibration period: 1 year recommended

Ordering Information

	Price
HP 8130A 300 MHz Pulse Generator	\$12,700
Opt 001 Rear-Panel Connectors	\$0
Opt 020 Second Channel (not retrofittable)	\$6,800
Opt 908 Rackmount Flange Kit (P/N 5062-3977)	\$36
Opt 910 Additional Manual Set	\$230
Opt 915 Additional Service Manual	\$200
Opt 916 Additional Operating/Programming Manual (P/N 08130-90011)	\$32
Opt W30 Extended Repair Service. See page 681.	\$360
Opt H01 Preparation for rack slides (rack slide kit required)	\$0

Pulse Generator Accessories



HP 15104A/15115A



HP 15116A

HP 15104A Pulse Adder/Splitter dc to 2 GHz \$120

HP 15116A Pulse Inverter 3 MHz to 2 GHz \$230

HP 15115A Pulse Splitter/Inverter 3 MHz to 2 GHz \$230

☎ For off-the-shelf shipment, call 800-452-4844.