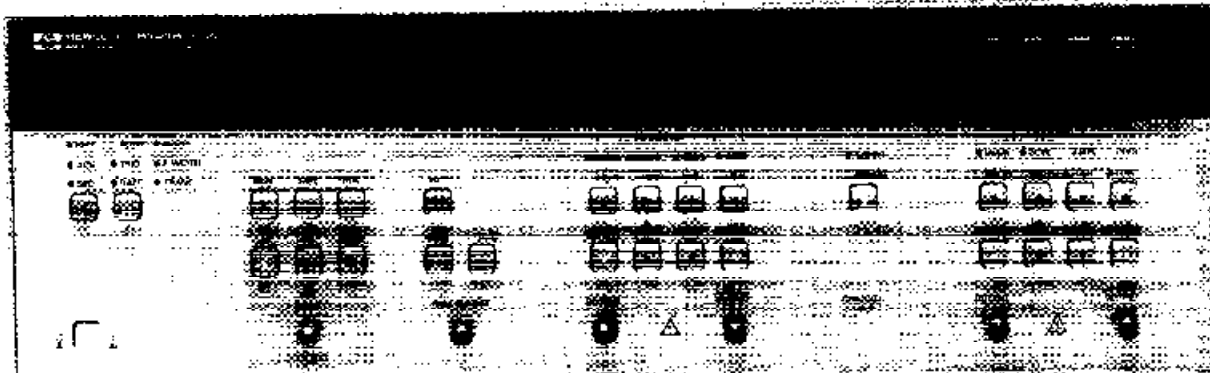


# PULSE GENERATORS

## 500 MHz High-speed Pulse Generator

### Model 8131A

- 1/2 (optional) channels / 500 MHz repetition rate
- <200 ps fixed transitions
- minimum resolutions: 10 ps; 10 mV
- suitable for BiCMOS, ECL, and GaAs technology
- 1 GHz Transducer Mode
- fully HP-IB programmable



HP 8131A

#### 200 ps Transition Times

The HP 8131A delivers excellent performance to help you solve high-speed measurement problems. Transition times of less than 200 ps from the 10% to 90% amplitude (20% to 80% of amplitude; typical 150 ps) enable repeatable and reliable timing measurements on high speed digital circuits. Since compromises in edge speed directly affect your measurement accuracy, the clean and sharp edges offered by the HP 8131A minimize errors due to threshold uncertainties. Matching the requirements of the most advanced ECL and GaAs devices, you now can characterize components and circuits with repetition rates up to 500 MHz (in Transducer Mode up to 1 GHz). The HP 8131A is the first product that offers 200 ps edge speed in a fully programmable product which makes it extremely useful not only in R&D environments but also in high speed production test applications.

#### 10 ps Timing Resolution

The high timing resolution allows precisely measure timing parameters like setup and hold times. Especially in the two channel version, the ability to precisely position sharp pulses anywhere within a period with independent delay and width makes the HP 8131A a very useful tool in evaluating fast digital circuits. With a timing resolution that is about one order of magnitude higher than the typical gate delay of ECL devices, it is easy to detect trends when varying a critical pulse parameter without losing a required timing relation. Spikes can be simulated with 500 ps small pulses, and in combination with the 10 ps width resolution, timing and energy related failures can be examined.

#### 5V Amplitude and 10 mV Resolution

The 5V amplitude makes it possible to stimulate high speed circuits such as ECL, GaAs, or BiCMOS devices. In addition, you now can test the excess-voltage immunity of your high speed components and evaluate crosstalk caused by 5 V, 200 ps transitions. The 10 mV resolution helps to slowly approach the threshold levels of digital circuits. The minimum amplitude of 100 mV is enough to check for minimum signal swing up to a 500 MHz (1 GHz in Transducer Mode) repetition rate. In combination with the full programmability, you now can do detailed analysis of critical level conditions in an automated test routine.

#### 500 MHz Repetition Rate

The 500 MHz repetition rate of the HP 8131A establishes a new class of high speed programmable pulse generator, which allows testing at the maximum toggle rate of your ECL, CMOS and complex GaAs devices. Now it is possible to perform functional and parametric tests of fast digital circuits under program control. In R&D, this means more reliable tests under repeatable conditions and easy documentation of test results. In production, the programmability opens new possibilities to functionally test high speed digital components with significantly higher throughput under well defined conditions. For the first time, the HP 8131A can test digital components at rated speed, thus increasing your confidence in the performance of your device and ensuring high quality of your product.

#### 1 GHz Transducer Mode

If you need to functionally test your component at frequencies beyond 500 MHz, the 1 GHz transducer mode allows to shape an externally provided sinewave into a squarewave with transition times of 200 ps. Especially if you need a very fast, programmable clock source, the combination of the HP 8131A and a microwave signal generator is ideal. This way, you can test maximum toggle frequency with a true digital 1 GHz signal and still have parametric capabilities up to 500 MHz for in-depth characterization of your circuit.



## Specifications

Specifications describe the instrument's warranted performance (30 minutes warm-up, 50-Ohm load) at 0°C to 55°C ambient temperature.

### Timing Parameters (measured at 50% of amplitude)

Common Specification

Resolution: 3 digits (best case: 10 ps)

Period: 2 ns to 99.9 ms

Delay: 20 ns to 99.9 ms

measured between trigger out and main out.

Double Pulse: 2 ns to 99.9 ms

Double Pulse and Delay are mutually exclusive.

Width: 500 ps to 99.9 ms

Constant Duty Cycle:

Range: 1% to 70%, min. width 0.5 ns

Resolution: 1%

Transition Times: (50% leading and trailing edges)

10%-90% of amplitude: < 200 ps

20%-80% of amplitude: < 150 ps typically

Differential outputs

Output Levels: (into 50 Ω, output levels double when driving into open circuits, instrument disables outputs if voltage exceeds 6 V)

Amplitude: 100 mVpp to 5.0 Vpp

Offset: -4.95 V to +4.95 V

Resolution: 3 digits (best case: 10 mV)

Settling Time: 10 ns

### Supplementary Characteristics

(values describe typical, non-warranted performance)

#### Inputs and Outputs

##### External Input:

Trigger slopes can be selected pos/neg.

Input impedance: 50 Ohm

Threshold: -5 V to +5 V

Input Frequency: dc to 500 MHz

Min. pulse width: 1 ns

Input sensitivity: ≥ 300 mV (p-p)

##### Transducer Input:

Input Impedance: 50 Ohm

Input transition: < 50 ns.

Input Frequency: 10 MHz to 1 GHz

Input sensitivity: ≥ 600 mV (p-p)

##### Trigger Output:

Levels: high 0V, Low -0.6 V

Delay from external input to trigger output: < 10 ns

source impedance: 50 Ohm

### HP-IB Capabilities

All modes and parameters are fully HP-IB programmable.

## Operating Modes

**Auto:** Continuous pulse stream

**Trigger:** Each active input transition generates a single output pulse  
**Gate:** External signal enables period generation. First output pulse synchronous with leading edge. Last pulse always completed.

**E. Width:** Restoration of external signal with selectable output levels

**E. Burst:** Each active input transition generates a preprogrammed number of pulses (1 to 9999), max. burst frequency is 200 MHz.

**Transducer:** Restoration of external sinewave signal (up to 1 GHz) with fixed transition times and selectable output levels.

**Limit:** Max. high and low levels into 50 Ohm can be limited to protect the device under test. Pushing the limit key will set limits to actual levels which then can not be exceeded as long as the mode is active.

**Manual:** Simulates an external input signal

**Complement:** Both channels can be switched to normal/complement separately

**Disable:** Relays can enable/disable both channels separately

**Set:** Sets parameters to fixed ratio relative to period.

**Store:** Stores complete setting in displayed location

**Recall:** Recalls complete setting in displayed location.

## General

**Storage Temperature:** -40°C to +65°C

**Operating Temperature:** 0°C to 55°C

**Power:** 100-120/220-240 Vrms, ±10%, 400 VA max., 48-66 Hz

**Weight:** 20 kg (44.4 lb)

**Dimensions (H\*W\*D)** 145 mm \* 426 mm \* 525 mm,  
 [5.7 in \* 16.75 in \* 20.65 in]

**Recalibration Period:** 1 year recommended

## Ordering Information

**HP 8131A 500 MHz Pulse Generator**

**Price**

\$14,300

### Options

Opt. 001 Rear Panel Connectors

N/C

Opt. 020 Second channel

\$7,450

Opt. 908 Rack Mount Flange Kit (P/N 5061-9678)

\$36 ☞

Opt. 910 Set of Operating/Programming and Service Manual

\$138

Opt. 915 Service Manual (P/N 08131-90001)

\$106

Opt. 916 Additional Operating and Programming Manual (P/N 08131-90011)

\$32

Opt. W30 Two additional years of Return-to HP service

\$200

### Accessories

HP 8493A Option 010; 10 dB Attenuator

\$120 ☞

HP 8493A Option 020; 20dB Attenuator

\$120

P/N 8120-4948 Cable, Coax (SMA)

\$180 ☞

☞ Fast-ship product - see page 766