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HP 8114A Pulse Generator Specifications

Specifications describe the instrument's warranted performance. Non-warranted values are described as typical. All specifications apply after a 30 minute warm- up phase with 50 Ohm source impedance into a 50 Ohm load, and are valid from 0°C to 55°C ambient temperature. Non-warranted values are described as 'typical'. Parameters are are over- and under-programmable outside their specified ranges.

General

Environmental

Operating temperature:	0°C to +55°C
Storage temperature:	-40°C to +70°C
Humidity:	95% (0°C to 40°C)
EMC:	conforms to EN55011 Group 1 Class A
Battery:	Lithium (Panasonic CR2477-1HF)

Safety

IEC348, safety class 1

Power requirements

100-240 Vac, ±10%, 50-60 Hz;

100-120 Vac, ±10%, 400 Hz

Power consumption: 500 VA max.

Maximum Dimensions (H x W x D)

133 mm H x 426 mm W x 422 mm D (5.2 in x 16.8 in x 16.6 in)

Weight

Net

14 kg (30.8 lb)

Shipping

17 kg (37.4 lb)

Recalibration period

1 year recommended

Warranty

1 year standard

Acoustic Noise Pressure

Acoustic Noise Pressure
For ambient temperature up to 30°C, under normal operation and at the typical operator position:

LpA – 45.1 dBA

Measured in accordance with ISO 7779/EN 27779.

Geräuschemissionswerte
Bei einer Umgebungstemperatur bis 30°C

LpA – 45.1 dBA

am Arbeitsplatz, normaler Betrieb.

Angabe ist das Ergebnis einer Typprüfung nach ISO 7779/EN 27779.

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Declaration of Conformity

Manufacturer: Hewlett-Packard GmbH
Böblingen Instruments Division
Herrenberger Str. 130
D-71034 Böblingen Germany

We declare that the product

HP 8114A 100V/2A Programmable Pulse Generator conforms to the following standards:

Safety: IEC 1010-1 (1990) including Amendment 1 (1992)

EN 61010 (1993)

CSA C22.2 Nr.1010.1

EMC: EN 55011 (1991)/CISPR 11 Group 1, Class A

EN 50082-1 (1991)

IEC 801-2 ESD: 4kV cd, 8kV ad
IEC 801-3 Radiated Immunity: 3V/m
IEC 801-4 Fast Transients: 0.5kV, 1kV

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Supplementary Information

During the measurement against EN 55011, the I/O ports were terminated with their nominal impedance, the HP-IB connector was terminated with the cable HP 10833B. When the product is connected to other devices, the user must ensure that the connecting cables and the other devices are adequately shielded to prevent radiation.

Böblingen 6th September 1993

Hans Baisch
Product Regulations Consultant

Output

Amplitude

Range:

1.00 V to 50.0 V (doubles into open circuit) 2.00 V to 100 V (HIZ (High-Z) into 50Ω)

Warning 

- **When working with output voltages of 30 - 100V amplitude, the output voltage can be dangerous to life. Care should therefore be taken when connecting the HP 8114A to external instruments.**
-  **When working in HIZ (High-Z) Mode, if you remove the external load the output voltage can be higher than the programmed voltage. V_{pp} can be as much as 130 V, even when set as low as 2 V_{pp}.**

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Current:

40.0 mA to 2.00 A

Accuracy:

± 1% of amplitude ±100 mV

Resolution:

3 digits, best case 10 mV

Baseline: 0 V ±100 mV ±0.5% of amplitude

Variable Baseline (Option 001)

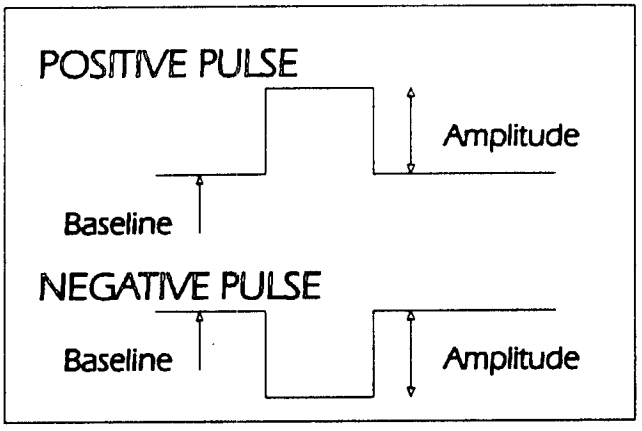
50Ω source impedance only, pulse within ±50V window

Range:

-25.0 V to +25 V

Accuracy:

±1% ±100 mV ±0.5% of amplitude



Polarity Positive or negative pulses selectable

Source Impedance 50Ω or High Impedance (>10kΩ typ.) selectable

Load Compensation For loads ≠ 50Ω the actual load can be entered to correct output values

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Connector BNC

On/Off: Relay connects/disconnects output

Output Protection

Maximum external voltage 100 Vpp from external 50Ω source
(± 20 Vdc from external 0Ω source)

Limits Programmable level and duty-cycle limits restrict the available output range to protect the DUT.

Pulse Performance

Overshoot/Preshoot/Ringing:

<±5% of amplitude ± 50 mV

Settling time:

<100 ns typical

Transition Times:

Measured between 10% and 90% of amplitude,
50Ω into 50Ω: <7ns (ampl >5 V)
HIZ (High-Z) into 50Ω <12 ns (ampl >10 V)

Pulse Timing Measured at 50% of amplitude

Repeatability:

factor 4 better than accuracy

Period

Can be set as period or frequency

Range:

66.7 ns to 999 ms (**Frequency:** 1.00 Hz to 15.0 MHz)

Accuracy:

±5% ±100 ps

Resolution:

3 digits, best case 100 ps

RMS-Jitter:

0.03% + 25 ps (0.05% + 25 ps in the 66.7 ns to 100 ns range)

Width

Can be set as width, duty-cycle or trailing-edge delay.

Range

10 ns to 150 ms

Accuracy:

±5% ±500 ps

Resolution:

3 digits, best case 100 ps

RMS-Jitter:

0.03% + 25 ps (0.05% + 25 ps in the 50 ns to 100 ns range)

Duty-cycle

0.1% to 100%
(Subject to width and period specifications).

Standard HP 8114A (Baseline = 0 V)

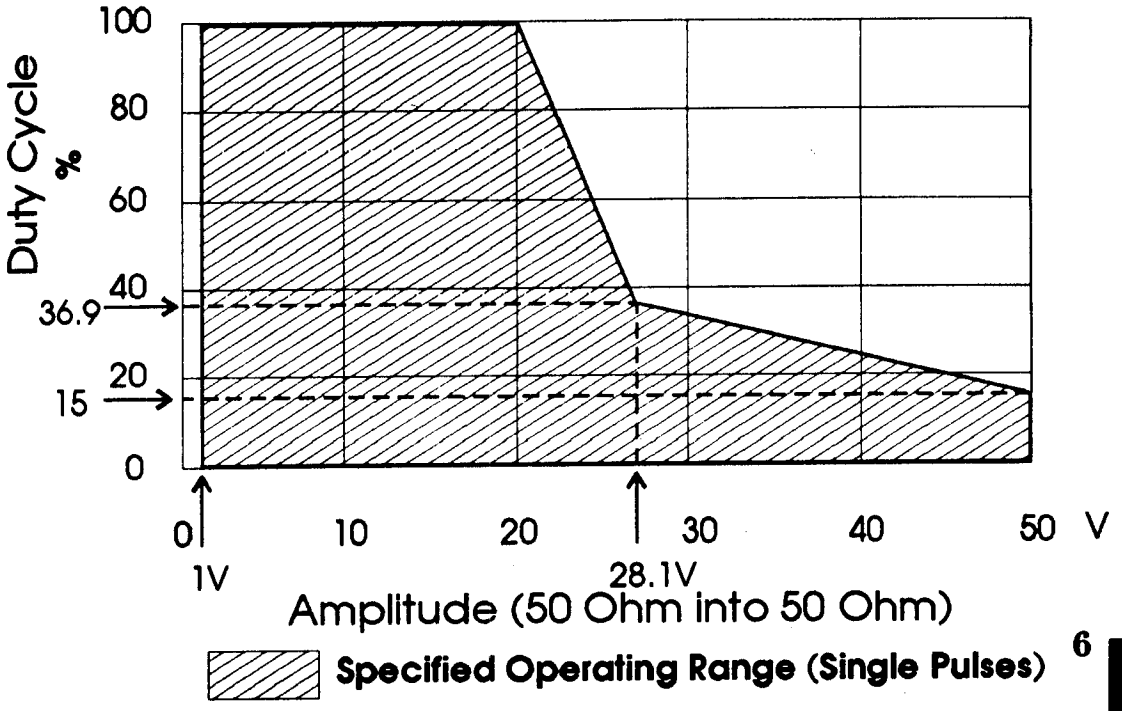

Figure 6-1. Duty-cycle / Amplitude Ranges

Figure 6-1 shows the maximum possible duty-cycle for a given pulse amplitude from 50Ω into 50Ω. Note that amplitude doubles from HIZ (High-Z) into 50Ω.

In double-pulse mode the actual duty-cycle of the signal is twice the value displayed on the HP 8114A screen because two pulses are generated per pulse period. Therefore, the duty-cycle available, and set, will be limited to half the value given by Figure 6-1.

Variable Baseline Option 001

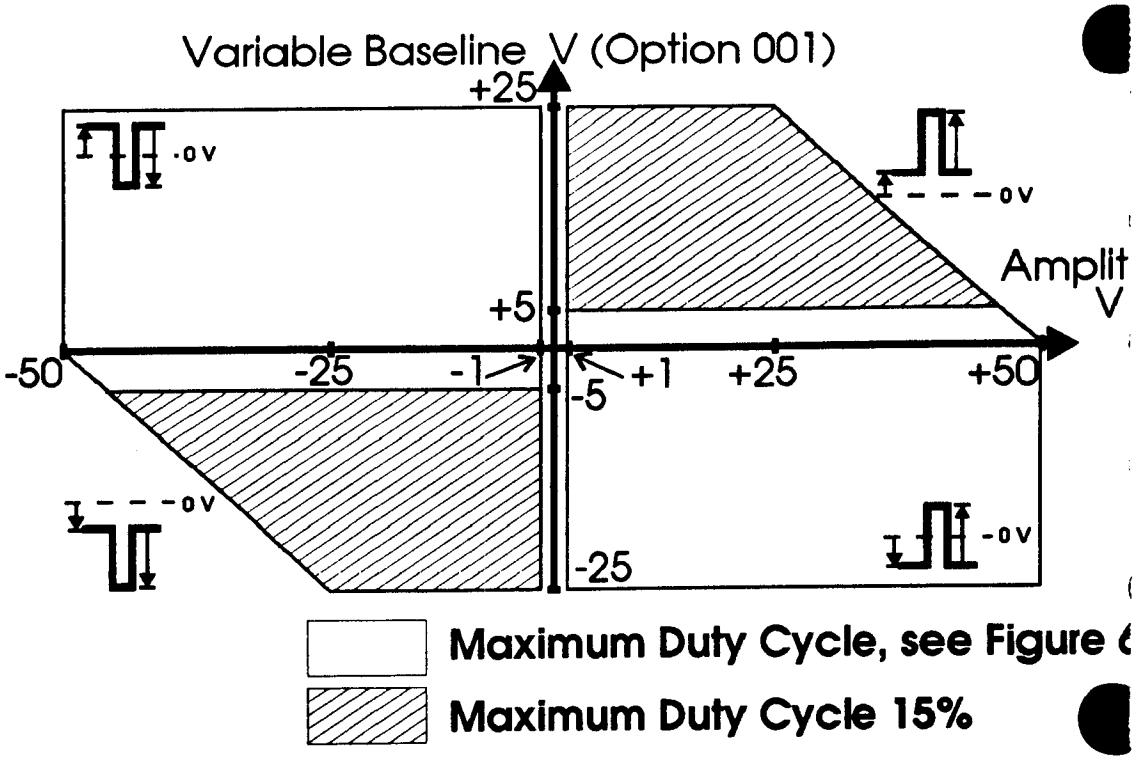

Figure 6-2. Baseline Duty-cycle / Amplitude Ranges

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Refer to Figure 6-2. Under the following conditions Figure 6-1 still applies for the maximum duty-cycle:

- Positive pulse with negative Baseline
- Negative pulse with positive Baseline
- -5 V $\leq$Baseline $\leq$+5 V, negative or positive pulses

Under the following conditions maximum duty-cycle is 15%:

- Baseline >+5 V and positive pulses
- Baseline <-5 V and negative pulses

Note also, that the pulse is limited to a ±50 V window (50Ω into 50Ω) so that for positive pulses with positive Baseline, or negative pulses with negative baseline, the maximum available amplitude becomes limited by the Baseline setting

Delay

Can be set as absolute delay, phase, or % of period.

Fixed delay 42 ns typical (measured between Trigger Output and Output)

Variable Range 0.00 ns to 999 ms
(Maximum value: period - 4 ns)

Accuracy ±5% ±1 ns

Resolution 3 digits, best case 10 ps

RMS-Jitter 0.03% + 25 ps (0.05% + 25 ps in the 50 ns to 100 ns range)

Double Pulse Delay

Double pulse delay replaces delay when double pulses are selected. The delay between double pulses can be set as absolute delay or % of period.

Minimum Period 133.4 ns

Range 20.0 ns to 999 ms (Maximum value: period - width - 4 ns)

Accuracy ±5% ±250 ps

Resolution 3 digits, best case 100 ps

Minimum Period 133.4 ns

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Trigger Output

Level Fixed TTL (2.5 V into 50Ω)

Output Impedance 50Ω typical

Trigger pulse width 50% of period, typical

Maximum external voltage

-2 V/+7 V

Transition times 5 ns typical

Delay from External Input to Trigger Output

24 ns typical

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External Input

An external signal at the external input can be used to trigger or gate the output signal.

Input impedance 10 kΩ

Threshold -10 V to +10 V with 100 mV resolution

Maximum external voltage

±50 V

Input transitions <100 ns

Input frequency dc to 15MHz

Minimum pulse width

10 ns typical

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Input sensitivity ≤300 mV_{pp} typical

Inhibit Input

An external TTL signal at the Inhibit Input can be used to inhibit the pulse signal, holding the output signal at its baseline level.

Inhibit on Edge An active edge inhibits the pulse signal until reset from the front panel, or HP-IB.

Inhibit on Level An active level inhibits the pulse signal

Input Impedance 100 kΩ

Threshold 1.5 V (TTL) typical

Input transitions <100 ns

Input frequency dc to 5 MHz

Minimum pulse width

100 ns typical

Input sensitivity ≤300 mV_{pp} typical

Inhibit response time

200 ns typical

Maximum external voltage

⚠ ±50 V

Trigger Modes

Continuous A continuous train of pulses or bursts of pulses is generated

Triggered A transition (rising, falling, or both) at the external input or MANual trigger key triggers a pulse or burst of pulses.

Gated Active level (high or low) at the external input or MANual Trigger key enables pulses or bursts of pulses. The last pulse or burst of pulses is always completed.

External Width Period and width of the output signal are taken from a signal at the External Input.

Pulse Modes

Burst Set a burst of 2 to 65536 pulses.
(A normal pulse is equivalent to a burst of 1 pulse)

Double Pulse Two pulses generated per pulse-period. First pulse starts at the start of pulse-period; double delay sets delay to the start of the second pulse. Double pulses are available in all Trigger Modes except External Width.

Human Interface

Display All pulse parameters at a glance on one display.

Help Key Displays context-sensitive information.

Memory The current setting, plus nine user settings are stored in non-volatile memory when the instrument is switched off.

Clear Memory:

Clears all stored user settings.

Memorycard Instrument settings (350 bytes each) are stored in MS-DOS formatted PCMCIA memorycards. Cards can also be used for convenient firmware updates.

Remote Control

Operates according to IEEE standard 488.2, 1987 and SCPI 1992.0

Function Code

SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0.

Programming times

(All checks and display off)

ASCII Command	Typical Execution Time
One parameter or mode	5 . . . 20 ms
Recall setting	<250 ms