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80/81 Function Pulse Generators Specifications

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Except as noted, specifications apply to Models 80 and 81
 Specifications apply after a 20 minute warmup

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Standard Waveforms

Standard Waveforms	Sine, triangle, square, positive and negative pulses, and (Model 80 only) dc
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Frequency

Range	10 mHz to 50 MHz
Resolution	4 digits
Accuracy (Continuous Mode)	10 mHz to 999.9 mHz: ± 3% 1 Hz to 50 MHz: ± 0.1% Jitter: d0.1% ± 50 ps

Waveform Quality

Harmonic Distortion (Sine)	100 mHz to 1 MHz: < 1% THD 1 MHz to 5 MHz: Max harmonic < -40 dB 5 MHz to 50 MHz: Max harmonic < -21 dB
Flatness	10 mHz to 999.9 kHz: $\pm 1\%$ 1 MHz to 9.999 MHz: $\pm 2\%$ 10 MHz to 50 MHz: -15%
Triangle and Ramp Linearity	d5 MHz (10% to 90% of Amplitude): > 99%
Square Rise/Fall Time	(10% to 90% of Amplitude): < 6 ns
Square Aberrations	< 5%

Pulse & Ramp (Model 81 Only)

Pulse Modes	Symmetrical pulse, positive pulse, negative pulse, and the complement to all pulse waveforms
Pulse Period	Range: 20 ns to 99.99s Resolution: 4 digits Accuracy and Jitter: As for frequency
Pulse Width	Range: 10 ns to 999 ms Setting Accuracy: 10 ns to 99.9ns: $\pm (5\% + 2 \text{ ns})$ 100 ns to 999 ms: $3\% \pm (4\% + 2 \text{ ns})$ Resolution: 3 digits Duty Cycle Range: 1% to 80%. Up to 99% using the complement mode PWM Range: 0 to 5V $\pm 20\%$ produces > 10% pulse width change from pulse width setting PWM Bandwidth: dc to 70 kHz Ramp Modes: Positive or negative going ramp
Ramp Period	Range: 7 μs to 99.99s Resolution: 4 digits
Ramp Width	Range: 5 μs to 999 ms Setting Accuracy (5 μs to 999ms): 3% Resolution: 3 digits Duty Cycle Range: 1% to 80%
Transition Times	Range: 8 ns to 99.9 ms in six overlapping ranges. Leading and trailing edges are independently programmable Max Ratio between Ranges: 100 to 1 Accuracy: 8 ns to 99 ns: $\pm (5\% + 2 \text{ ns})$ 100 ns to 99.9 ms: $\pm (4\% + 2 \text{ ns})$

Modulation

AM and SCM	External 0 to 10V produces 0 to 200% Range: 0 to 200%, reduced to 70% at 1 MHz Bandwidth: dc to 1 MHz
VCO	Range: 4.7V change produces approx 1000:1 frequency change Bandwidth: dc to 50 kHz

FM (Model 80 only)

Range: 0 to 0.5V change produces 1% deviation
Bandwidth: dc to 50 kHz

Amplitude

Range

Into 50 Ω : 10 mV to 16 Vp-p
Into Open Circuit: 20 mV to 32 Vp-p
Resolution: 3 digits
Accuracy (at 1 kHz): $\pm 4\%$ reading

DC Offset

DC Offset

Offset and amplitude are independently adjustable within two windows:
-800 mV to +800 mV
-8V to +8V

Range

± 800 mV Window: ± 795 mV
 ± 8 V Window: ± 7.95 V

Resolution

3 digits

Accuracy
(At 1 kHz)

± 800 mV Window: $\pm (1\%$ of setting + 1% of amplitude + 0.2 mV)
 ± 8 V Window: $\pm (1\%$ of setting + 1% of amplitude + 2 mV)

Main Output

Modes

Normal (on) or disabled (off)

Impedance

50 $\Omega \pm 1\%$

Output Protection

Protected against continuous short to chassis ground

Sync Output

Level (Into 50 Ω)

0 to 1V

Rise/Fall Time

< 3 ns

Operating Modes

Operating Modes

Continuous, triggered, phaselock, start phase, and (Model 80 only) sweep

Sweep Operation (80 Only)

Modes

Sweep may be continuous or triggered by any trigger mode

Sweep Spacing

Linear and logarithmic

Sweep Directions	Up, down, up-down, and down-up
Sweep Range	Log: 10 decades max Linear: 3 decades max
Sweep Rate	Log: 10 ms to 999s per decade Linear: 10 ms to 999s
Sweep Out	0 to 5V ramp proportional to frequency at rear panel BNC Marker Output: Output signals when marker frequency is reached

Triggered Operation

Modes	Single shot, gated, and burst
Sources	Manual (front panel key), internal trigger rate generator, and external signal input
Triggered	For each trigger, one output cycle is generated
Gated	Continuous waveform cycles are generated for the duration of the active portion of the trigger signal. Last cycle is always completed
Burst	Preset number of waveform cycles are generated by a trigger: 1 to 4,000
Manual Trigger	Key provides trigger signal
Internal Trigger Rate Generator	1 MHz to 50 kHz
External Input	Via Trig Input BNC Impedance: $10\text{ k}\Omega \pm 5\%$ Sensitivity: 500 mVp-p Max Input Voltage: $\pm 20\text{V}$ Min Pulse Width: 20 ns Max Frequency: 50 MHz Slope: Positive or negative going leading edges Trigger Level: Variable -10V to +10V
Start Phase of Triggered Waveform	To 500 kHz: Adjustable from -90° to $+90^\circ$. From 500.1 kHz to 50 MHz: Adjustable range proportionally reduced as frequency increases Accuracy (to 500 kHz): $\pm 3^\circ$

Phaselock Operation

Phaselock Operation	Output waveform locks to frequency and phase of external signal. Phase may be offset.
Impedance	$10\text{ k}\Omega \pm 5\%$
Min Pulse Width	10ns
Locking Range	10 Hz to 60 MHz
Phase Offset (10 Hz to 19.99 MHz)	Continuously adjustable from -180° to $+180^\circ$
Resolution	1°

Accuracy (10 Hz to 100 kHz)	3° + 3% of reading
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General

Remote Operation	GPIB interface is standard on Models 80 and 81. HP8116A emulation mode (Model 81 only)
Environment	Operating Temperature: 0° to 50°C, ambient For Specified Accuracy: Within $\pm 5^\circ\text{C}$ and 24 hours of last internal calibration Storage Temperature: -40° to +70°C Humidity: 80% R.H.
Power	115/230 Vac, optional 100V, 50 or 60 Hz, 60 W max
Stored Set-ups	Complete sets of front-panel set-ups stored: 30
Dimensions	8.9 cm (3.5 in) high x 21.1 cm (8.3 in) wide x 39.1 cm (15.4 in) deep
Rack Mount Dimensions	Single: 8.9 cm (3.5 in.) H x 48.3 cm (19 in.) W Dual: 13.3 cm (5.25 in) H x 48.3 cm (19 in) W
Weight	6 kg (12 lb)

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