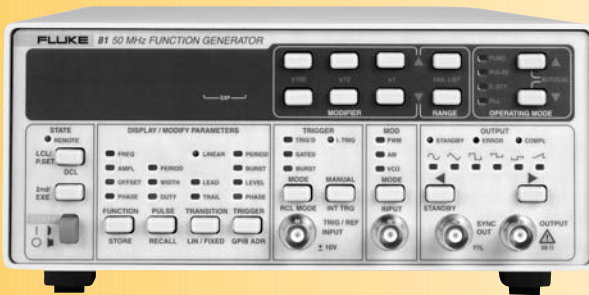


# 80/81 Function Pulse Generators

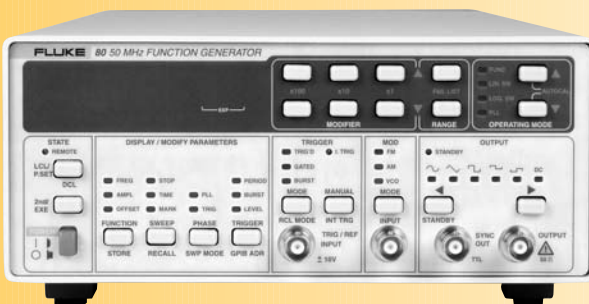
Function  
Generators

FLUKE®

## 50 MHz function/pulse generators



81 Function Generator



80 Function Generator

- Powerful performance
- Trigger, gate, and burst modes
- AM, FM, VCO, and phaselock/offset control modes
- Automated calibration
- Ideal replacement for HP 8116A (emulation mode model 81 only)

## Tech Tip

Model 81 employs a built-in counter/timer circuit. It is utilized when the instrument is placed in PLL operating mode for automatically detecting the external reference frequency. It can measure external frequencies from 10 Hz to over 60 MHz and external periods from .1 s to 16 ns. Frequency and period readings are given with fixed resolution of four digits. Decimal point and exponent are displayed automatically.

Ideal for both benchtop and ATE applications, the 80/81 family of 50 MHz waveform generators provides an unmatched combination of powerful operating features and great value.

The model 80 combines a function generator, linear and logarithmic sweep generator, and phase lock generator capabilities with dc output.

The model 81 provides a function generator, pulse generator with leading and trailing edge timing control and a phase lock generator.

## Standard Waveforms

Standard waveforms	Sine, triangle, square, positive and negative pulses (Model 81 only) and dc (Model 80 only)
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## Frequency

Range	10 mHz to 50 MHz
Resolution	4 digits
Accuracy (continuous mode)	10 mHz to 999.9 mHz: $\pm 3\%$ 1 Hz to 50 MHz: $\pm 0.1\%$ Jitter: $\leq 0.1\% \pm 50$ ps

## Sync Output

Level (Into 50 $\Omega$ )	0 to 1 V
Rise/fall time	< 3 ns

### Waveform Quality

Sine wave	
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, Ramp	
Linearity	$\leq 5$ MHz (10 % to 90 % of Amplitude): > 99 %
Square wave	
Rise/fall time	(10 % to 90 % of Amplitude): < 6 ns
Aberrations	< 5 %

### Main Output

Modes	Normal (on) or disabled (off)
Impedance	50 $\Omega \pm 1\%$
Output protection	Protected against continuous short to chassis ground
Output level	20.0 mV to 32.0 V <sub>p-p</sub> into open circuit, 10.0 mV to 16.0 V <sub>p-p</sub> into 50 $\Omega$
Resolution	3 digits
Accuracy	$\pm 4\%$ of reading

### DC Offset

DC offset	Offset and amplitude are independently adjustable within two windows: -800 mV to +800 mV -8 V to +8 V
Range	$\pm 800$ mV Window: $\pm 795$ mV $\pm 8$ V Window: $\pm 7.95$ V
Resolution	3 digits
Accuracy (at 1 kHz)	$\pm 800$ mV Window: $\pm (1\%$ of setting + 1 % of amplitude + 0.2 mV) $\pm 8$ V Window: $\pm (1\%$ of setting + 1 % of amplitude + 2 mV)

### Modulation

AM and SCM	External 0 to 10 V produces 0 to 200 % Range: 0 to 200 %, reduced to 70 % at 1 MHz Bandwidth: dc to 1 MHz
VCO	Range: 4.7 V change produces approx 1000:1 frequency change Bandwidth: dc to 50 kHz
FM (Model 80 only)	Range: 0 to 0.5 V change produces 1 % deviation Bandwidth: dc to 50 kHz

### Pulse and 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 99.99 s Resolution: 4 digits Accuracy and Jitter: As for frequency
Pulse width	Range: 10 ns to 999 ms Setting Accuracy: 10 ns to 99.9 ns: $\pm (5\% + 2\text{ ns})$ 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 5 V $\pm 20\%$ 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 $\mu\text{s}$ to 99.99 s Resolution: 4 digits
Ramp width	Range: 5 $\mu\text{s}$ to 999 ms Setting Accuracy (5 $\mu\text{s}$ to 999 ms): 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: $\pm (4\% + 2\text{ ns})$

### Operating Modes

Operating modes	Continuous, triggered, phaselock, start phase, and sweep (Model 80 only)
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### 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 999 s per decade Linear: 10 ms to 999 s
Sweep Out	0 to 5 V 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 k $\Omega$ $\pm$ 5 % Sensitivity: 500 mVp-p Max Input Voltage: $\pm$ 20 V Min Pulse Width: 20 ns Max Frequency: 50 MHz Slope: Positive or negative going leading edges Trigger Level: Variable -10 V to +10 V
Start phase of triggered waveform	To 500 kHz: Adjustable from -90 $^{\circ}$ 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 k $\Omega$ $\pm$ 5 %
Min pulse width	10 ns
Locking range	10 Hz to 60 MHz
Phase offset (10 Hz to 19.99 MHz)	Continuously adjustable from -180 $^{\circ}$ to +180 $^{\circ}$
Resolution	1 $^{\circ}$
Accuracy (10 Hz to 100 kHz)	3 $^{\circ}$ + 3 % of reading

### General

Remote Operation: GPIB interface is standard on Models 80 and 81. HP8116A emulation mode (Model 81 only)

### Environment

Operating Temperature: 0  $^{\circ}$ C to 50  $^{\circ}$ C, ambient  
For Specified Accuracy: Within  $\pm$  5  $^{\circ}$ C and 24 hours of last internal calibration  
Storage Temperature: -40  $^{\circ}$ C to +70  $^{\circ}$ C  
Humidity: 80 % R.H.  
Power: 115/230 V ac, optional  
100 V, 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)

### Ordering Information

#### Models

**Model 80** 50 MHz Function Generator

**Model 81** 50 MHz Function/Pulse Generator