

ELECTRONIC COUNTERS

100-MHz Universal Counter

HP 5334B

- Two matched 100-MHz input channels; optional C Channel to 1.3 GHz
- 9 digits per second resolution from 1 Hz to 1.3 GHz
- 2 ns time interval resolution, 200 ps with averaging

- Automatic rise/fall time, pulse width, and ac/dc voltage measurements
- Complete HP-IB programmability standard



HP 5334B

HP 5334B Universal Counter

Expanded Capabilities for Bench or System

- Rise/fall time, pulse-width measurements at the push of a button
- ac/dc voltage measurements of the input signal
- Offset, normalize, and average measurements for greater usability of results
- Auto triggering and auto attenuation for user convenience
- 100-MHz frequency and period measurements with resolution of 9 digits per second of gate time
- Time interval and time-interval delay to 2 ns resolution, 200 ps with averaging
- Full HP-IB programmability standard with optional rear inputs for system applications. Make up to 140 readings per second.
- 1.3 GHz C Channel and high-stability oven time base options
- External arming/gating for synchronizing measurements to external events

HP 5334B Specifications

Input Characteristics (Channels A and B)

Range

dc-coupled: 0 to 100 MHz

ac-coupled: 1 M Ω , 30 Hz to 100 MHz; 50 Ω , 1 to 100 MHz

Sensitivity:

15 mV rms sine wave to 20 MHz, 35 mV rms sine wave to 100 MHz
100 mV peak-to-peak at a minimum pulse width of 5 ns

Dynamic Range (X1): 45 mV to 5 V peak-to-peak, to 20 MHz. 100 mV to 2.5 V peak-to-peak, to 100 MHz

Trigger Level Range

Manual (auto trigger off): Continuously adjustable over ± 5.1 V (\times attn), displayed in 20 mV steps (\times attn)

Preset: 0V nominal in Sensitivity Mode

Auto trigger

dc-coupled: 100 Hz to 100 MHz

ac-coupled: 1 M Ω , 100 Hz to 100 MHz; 50 Ω , 1 to 100 MHz

Trigger Slope: Independent selection of + or - slope

Impedance: 1 M Ω or 50 Ω , nominal, switch-selectable.

Attenuator

Manual: $\times 1$ or $\times 10$ nominal, switch-selectable

Auto: Attenuator automatically switched when in auto trigger.

Low-Pass Filter: 100 kHz nominal, Channel A, switchable

External Arm

Sensitivity: 500 mV peak-to-peak at min. pulse width of 50 ns

Signal operating range: -5 Vdc to +5 Vdc

Slope: Independent selection of START and STOP ARM slopes: +, -, or OFF

Frequency A and Frequency B

Range: 0.001 Hz to 100 MHz

Resolution: See Graph 1

Accuracy: \pm resolution \pm time base error (Graph 2)

Period A

Range: 10 ns to 10³ s (single gate), 10 s (100 gate average)

Resolution, Accuracy: Δ freq [per]/freq (Graphs 1 and 2)

Time Interval A to B

Range: -1 ns to 10³ (single shot), 10 s (100 gate average)

LSD: 1 ns (100 ps using 100 gate average)

Resolution: \pm LSD noise trigger error (Graph 3) \pm 1 ns rms

Accuracy: \pm resolution time base error (Graph 2) \pm trig level timing error (Graph 4) \pm trig level setting error (Graph 5) \pm 2 ns

Time Interval Delay

Selectable delay can be inserted between START and STOP of time interval A to B. Inputs during delay are ignored. Delay range is 1 ms to 99.999 s.

Ratio A/B

Range: 0.001 Hz to 100 MHz both channels

LSD: $4 \times \text{RATIO}/[\text{FREQ A} \times \text{GATE TIME}]$

Resolution and Accuracy: \pm LSD \pm [B trig error (Graph 3)/GATE TIME]

Totalize A

Range: 0 to 10¹² -1

Resolution and Accuracy: 1 count of input signal

Pulse Width A

Range: 5 ns to 10 ms

LSD, Resolution, Accuracy: Same as time interval A to B except ± 2 ns in Accuracy deleted

Rise/Fall Time A

Range: 30 ns to 10 ms

Minimum Amplitude: 500 mV peak-to-peak

Dynamic Range: 500 mV to 40 V peak-to-peak

LSD, Resolution, Accuracy: Same as time interval A to B

ac/dc Voltage:

Measurements: Max. and min. peaks or dc level of Channel A or Channel B input are displayed.

Frequency Range: dc, 100 Hz to 20 MHz

Dynamic Range: 0 to 40 V peak-to-peak; ± 51 Vdc

Resolution: $\times 1$: 20 mV $\times 10$: 200 mV

Timebase

Frequency: 10 MHz

Aging Rate: $< 3 \times 10^{-7}$ per month

Temperature: 5×10^{-6} , 0 to 50 $^{\circ}$ C

Math

Display = (measurement/normalize) + offset

Entry Range: $\pm 1 \times 10^{-10}$ to $\pm 9.99999999999 \times 10^9$

Single Cycle: 1 measurement per push of RESET

Average

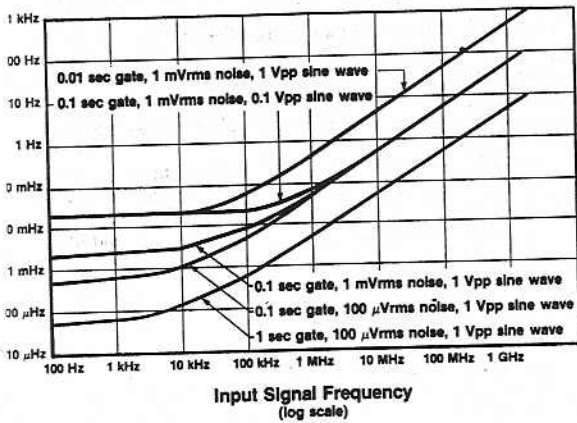
100 Gate Average: 100 measurements accumulated and average value displayed. Adds 1 digit of resolution to measurements and reduces resolution error by 10.

Hewlett-Packard Interface Bus (HP-IB)

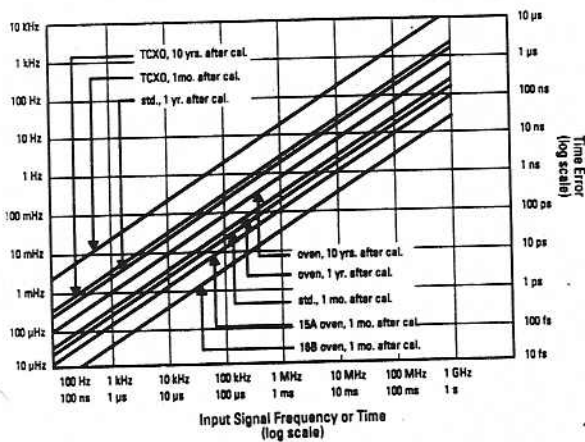
Programmable Controls: All front-panel controls and functions except power-on/stby switch.

Trigger Level: Set Channel A or B in 20 mV steps (\times attn)

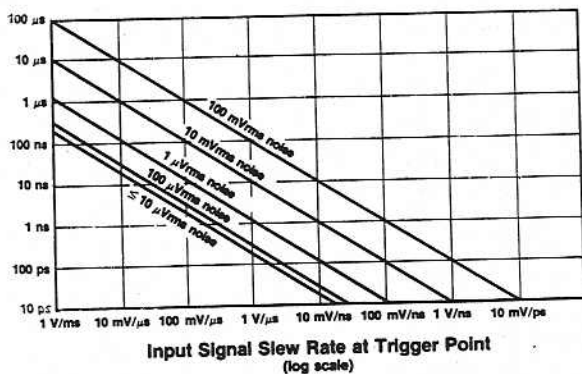
Output
 Normal operation: 10 readings/s, formatted.
 High-speed mode: Up to 140 readings/s (55 readings/s with Op-700), unformatted
 B interface functions: SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, DC1, C0, E2 (see page 101)



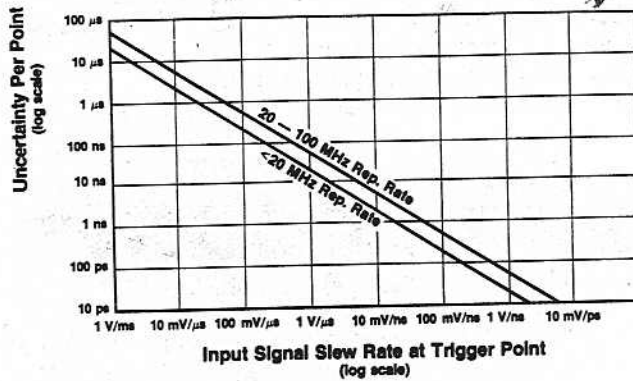
Graph 1. Frequency Resolution Error: Noise on the input and internal uncertainties affect frequency and period measurements.



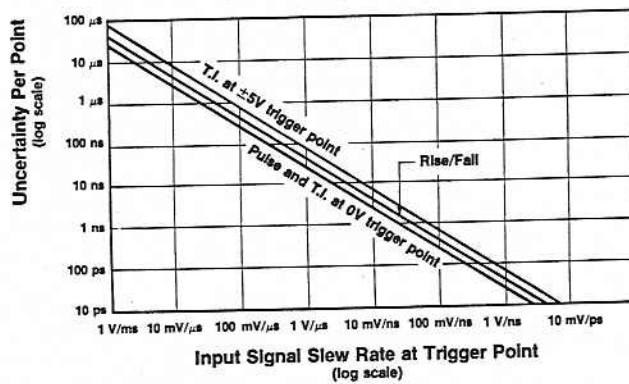
Graph 2. Time Base Error: Crystal environment and aging affects all measurements.



Graph 3. Input Noise Trigger Error: Noise on the input signal affects both the start and stop points of all time-interval measurements.



Graph 4. Trigger Level Timing Error: Affects the start and stop points of all time-interval measurements. Total error is the larger of the 2 trigger-point errors.



Graph 5. Trigger Level Setting Error: Affects both the start and stop points of all time-interval measurements.

HP 5334A

See Mature Products (page 206) for information regarding the HP 5334A Universal Counter.

Options

Opt 010: High-Stability Time Base (Oven)

Frequency: 10 MHz

Aging rate: 5×10^{-10} /day after 24-hour warmup

Opt 030: 1300 MHz C Channel

Range: 90 to 1300 MHz

Sensitivity: 15 mV rms (-23.5 dBm) sine wave, 90 to 1000 MHz;

75 mV rms (-9.5 dBm) sine wave, 1000 to 1300 MHz

Resolution and accuracy: Same as Frequency A and B

Ordering Information

HP 5334B Universal Counter

Opt 010 Oven Oscillator

Opt 030 Channel C

Opt 060 Rear Terminals

Channel A, B and ARM in parallel with front inputs.

Option 030 at rear panel only.

Opt W30 Extended Repair Service (see page 636)

Opt W32 Calibration Service (see page 636)

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

Price

\$2,305

+ \$880

+ \$595

+ \$150



For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 665.