ELECTRONIC COUNTERS

100 MHz Universal Counters

HP 5334A and 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
- MATE interface optional

HP 5334B

DESIGNED FOR MATE SYSTEMS

HP 5334B Universal Counter

Expanded Universal Counter Capability for Bench or System

- Rise/fall time, pulse width measurements at the push of a button.
- Measure the ac/dc voltage of the input signal.
- Offset, normalize, and average measurements for greater usability of results.
- Auto triggering and auto attenuation for user convenience.

As well as

- 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, MATE Interface, and High Stability Oven Time Base options.
- External arming/gating for synchronizing measurements to external events.

Condensed Specifications

Input Characteristics (channels A and B)

Range

dc coupled: 0 to 100 MHz.

ac coupled: 1 MΩ, 30 Hz to 100 MHz; 50Ω, 1 MHz 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 (× ATTN), displayed in 20 mV steps (× ATTN).

Preset: ØV NOMINAL in Sensitivity Mode.

Auto trigger

dc coupled: 100 Hz to 100 MHz.

ac coupled: 1 MΩ, 100 Hz to 100 MHz; 50 Ω, 1 MHz to 100 MHz.

Trigger slope: independent selection of + or − slope.

Impedance: 1 MΩ or 50 Ω, NOMINAL, switch selectable.

Attenuator

Manual: × 1 or × 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 V dc to +5 V dc.

Slope: independent selection of START and STOP ARM slopes: +, −, or OFF.

Frequency A and Frequency B

Range: .001 Hz to 100 MHz.

Resolution: See graph 1.

Accuracy: ± Resolution ± Time Base Error (Graph 2).

Period A

Range: 10 ns to 10^3 s (single gate), 10 s (100 GATE AVERAGE)

Resolution, accuracy: ΔFREQ [PER]/FREQ (Graph 1 and 2)

Time interval A to B

Range: −1 ns to 10^3 (single shot), 10 s (100 GATE AVERAGE).

LSD: 1 ns (100 ps using 100 GATE AVERAGE).

Resolution: ± LSD ± noise trigger error (graph 3) ± 1 ns rms.

Accuracy: ± Resolution ± time base error (graph 2) ± trig level timing error (Graph 4) ± trig level setting error (graph 5) ± 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: .001 Hz to 100 MHz both channels.

LSD: 4 × RATIO/ [FREQ A × GATE TIME].

Resolution and accuracy: ± LSD ± [B Trig Error (Graph 3)/GATE TIME].

Totalize

Range: 0 to 10^{12} −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

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: ϕ-40 V peak-to-peak; ±51 Vdc.

Resolution: × 1: 20 mV × 10: 200 mV

Time base

Frequency: 10 MHz.

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

Math

Display = (Measurement/Normalize) + Offset.

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

Single cycle: one measurement per push of RESET.

100 gate average: 100 measurements accumulated and average value displayed. Adds one digit of resolution to measurements and reduces resolution error by 10.

Hewlett-Packard Interface Bus

Programmable controls: all front-panel controls and functions, except power on/stby switch.

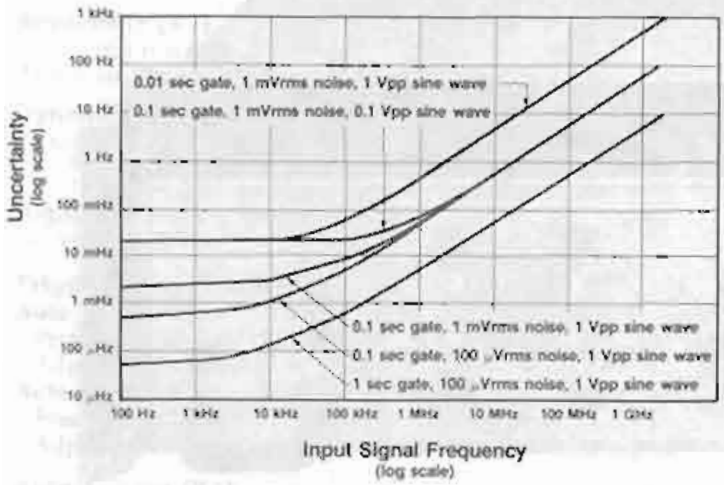
Trigger level: set Channel A or B in 20 mV steps (× ATTN).

Data output

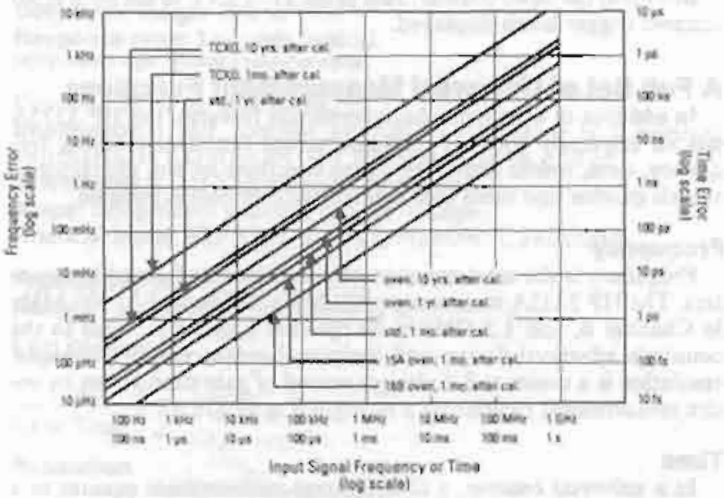
Normal operation: ten readings/second, formatted.

High speed mode: up to 140 readings/second (55 readings/second with Option 700), unformatted.

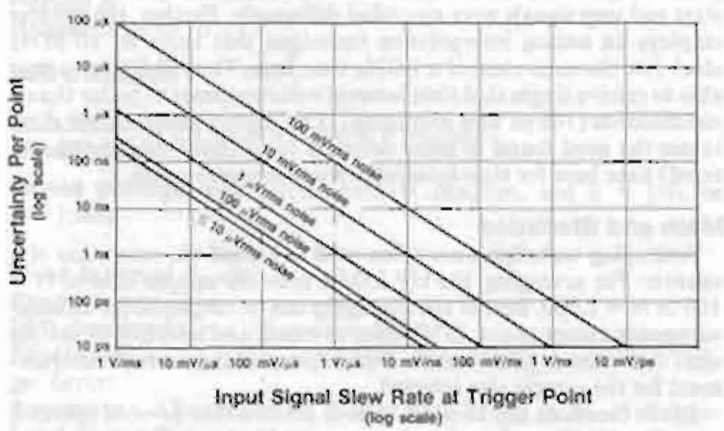
HP-IB interface functions: SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, PP0, DC1, C0, E2 (see page 578).



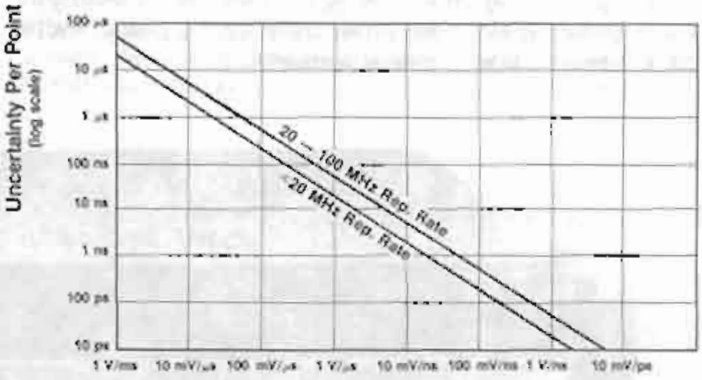
Graph 1, Frequency Resolution Error: Noise on the input signal and internal uncertainties affect frequency and period measurements.



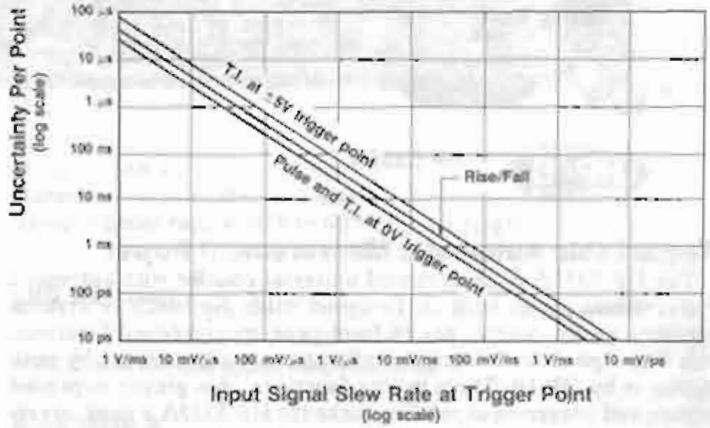
Graph 2, Time Base Error: crystal environment and aging affects all measurements.



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 two trigger point errors.



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

HP 5334A

Contact your local HP sales office for information regarding the HP 5334A Universal Counter.

Options

Option 010 High Stability Time Base (Oven)

Frequency: 10 MHz.

Aging Rate: 5×10^{-10}/day after 24-hour warm up.

Option 030 1300 MHz C Channel

Range: 90 MHz to 1300 MHz.

Sensitivity: 15 mV rms (−23.5 dBm) sine wave, ,90 MHz to 1000 MHz. 75 mV rms (−9.5 dBm) sine wave, 1000 MHz to 1300 MHz.

Resolution and accuracy: same as Frequency A and B.

Option 700 internal CIIL interface (MATE)

Measurement functions provided:

Frequency A, B, and C; Period A, Time Interval A to B, Ratio A/B, Totalize A, Rise/Fall Time A, Pulse Width A, Read Levels A and B (ac/dc voltage and trigger).

Programmable controls:

Channel A and B: Trigger Level, Auto Trigger, Coupling, Trigger, Slope, Impedance, Attenuator, Common.

External Arm: External Arm Select, Slope.

General: Gate Time

Measurement data output rate: 2.5 readings/second.

Ordering Information

HP 5334A Universal Counter

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 700 Internal MATE programming

Opt W30 Extended repair service. See page 723.

Opt W32 Calibration service. See page 723.

☎ For same-day shipment, call HP DIRECT at 800-538-8787.