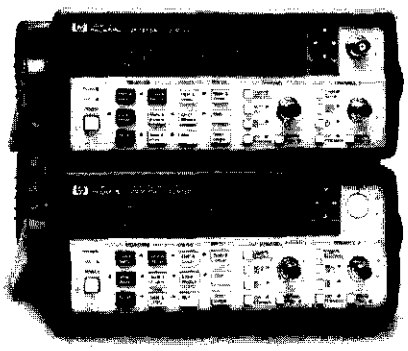
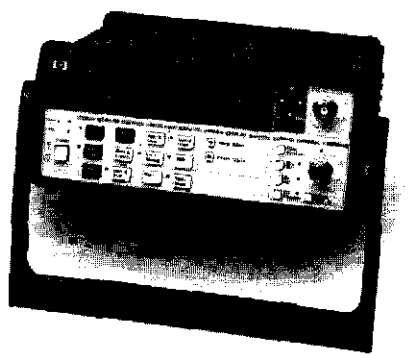
HEWLETT® PACKARD

HP 53100-Series Counters

High-performance, low-cost counters simplify and speed systems and bench frequency measurements

- **225 MHz bandwidth (optional 3 GHz or 5 GHz)**
- **10- or 12-digit resolution with 1s gate time**
- **HP-IB interface standard**
- **Data transfer rate of 200 fully formatted measurements/sec**





A family of universal and RF counters to meet your needs

HP 53100-series high-performance counters give you fast, precise frequency measurements at an affordable price. These counters feature an intuitive user interface and one-button access to frequently used functions so you can make accurate measurements quickly and easily.

These instruments use real-time digital signal processing technology to analyze data while simultaneously taking new readings, speeding measurement throughput. The technology, developed for HP's high-end line of modulation domain analyzers, allows the counters to gather more data for each measurement, so you get higher-resolution measurements in a fraction of the time it takes a conventional reciprocal counter.

All HP 53100-series counters offer built-in statistics and math functions so you can scale measurements and simultaneously measure and track average, min/max and standard deviation. Automated limit testing lets you set upper and lower limits for any measurement. An analog display mode lets you see at a glance whether a measurement is within pass/fail limits. The counters flag out-of-limit conditions and can generate an output signal to trigger external devices when a limit is exceeded. For quick access to frequently used tests, a single keystroke recalls up to 20 different stored front-panel set-ups.

For computer-controlled systems applications, each HP 53100-series counter includes a standard HP-IB interface with full SCPI-compatible programmability and a data transfer rate of more than 200 fully formatted measurements per second. The standard RS-232 talk-only interface provides printer support or data transfer to a computer through a terminal-emulation program.

HP 53131A Universal Counter

The two-channel HP 53131A counter offers 10 digits per second of resolution and a bandwidth of 225 MHz. An optional third channel provides frequency measurements up to 3 GHz or up to 5 GHz. Standard measurements include frequency, period, ratio, time interval, pulse width, phase angle, duty cycle, totalize, peak voltage and rise time. Time interval resolution is specified at 500 ps.

HP 53132A Universal Counter

For applications requiring higher resolution, the HP 53132A offers the same features and functions as the HP 53131A, with up to 12 digits/sec resolution. Time interval resolution is specified at 150 ps.

HP 53181A RF Counter

Optimized for RF applications, the single-channel 10 digit/s HP 53181A measures frequency, period and peak voltage. A digit-blanking function lets you easily eliminate unnecessary digits when you want to read measurements quickly. For higher-frequency measurements, choose an optional second channel that provides measurements up to 1.5 GHz, 3 GHz or 5 GHz. A self-guided shallow menu makes this counter exceptionally easy to use.

HP BenchLink Meter turns your counter into a single-channel data acquisition system

Used in conjunction with an HP 53100-series counter, HP BenchLink Meter software gives you the flexibility to configure and run tests from your PC, making data gathering more convenient. HP BenchLink Meter also lets you get more information from your data by providing a variety of basic display modes and analysis tools so you can see your data the way you need it.

HP BenchLink Meter lets you:

- completely configure tests using HP 53100-series counters, including measurement type, number of readings, measurement speed, and more.
- choose display modes from real-time strip chart, histogram, readout, and table mode
- scale measurements data and make it look the way you want it
- easily copy captured data to other programs for more complex analysis.

Optional timebases offer increased stability

Optional timebases are available for HP 53100-series counters to increase measurement accuracy. Option 012 provides an ultra-high stability oven timebase with aging of less than 2×10^{-8} per year.

3-year warranty

Each HP 53100-series counter comes with operating, programming and service manuals, a power cord and a full 3-year warranty.

Time Base

Internal Time Base Stability

		Standard (0° to 50° C)	Medium Oven (Option 001)	High Oven (Option 010)	Ultra Oven (Option 012)
Temperature Stability (referenced to 25°C)		$< 5 \times 10^{-6}$	$< 2 \times 10^{-7}$	$< 2.5 \times 10^{-8}$	$< 2.5 \times 10^{-9}$
Aging Rate (after 30 days)	Per Day:		$< 4 \times 10^{-8}$	$< 5 \times 10^{-10}$	$< 1 \times 10^{-10}$
	Per Month:	$< 3 \times 10^{-7}$	$< 2 \times 10^{-7}$	$< 1.5 \times 10^{-8}$	$< 3 \times 10^{-9}$
	Per Year:				$< 2 \times 10^{-8}$
Turn-on stability vs. time (in 10 minutes)			$< 2 \times 10^{-7}$ referenced to 2 Hr	$< 5 \times 10^{-9}$ referenced to 24 Hr	$< 5 \times 10^{-9}$ referenced to 24 Hr
Calibration		Manual Adjust	Electronic	Electronic	Electronic

Note that power to the time base is maintained when the universal counter is placed in standby via the front panel switch. The internal fan will continue to operate when in standby to maintain long-term measurement reliability. See graph 3 for timebase contribution to measurement error.

Instrument Inputs

Input Specifications[1]
Channel 1 & 2 (53131A, 53132A)
Channel 1 (53181A)

Frequency Range	
dc Coupled	dc to 225 MHz
ac Coupled	1 MHz to 225 MHz (50 Ω)
	30 Hz to 225 MHz (1 MΩ)
FM Tolerance	25%

Voltage Range and Sensitivity (Sinusoid)[2]	
dc to 100 MHz	20 mVrms to ±5 V ac + dc
100 MHz to 200 MHz	30 mVrms to ±5 V ac + dc
200 MHz to 225 MHz	40 mVrms to ±5 V ac + dc (all specified at 75 mVrms with opt. rear connectors)[3]

[1] Specifications and Characteristics for Channels 1 and 2 are identical for both Common and Separate configurations.

Voltage Range and Sensitivity (Single-Shot Pulse)[2]	
4.5 ns to 10 ns Pulse Width	100 mVpp to 10 Vpp (150 mVpp with optional rear connectors)[3]
>10 ns Pulse Width	50 mVpp to 10 Vpp (100 mVpp with optional rear connectors)[3]

Trigger Level[2]	
Range	± 5.125 V
Accuracy	± (15 mV + 1% of trigger level)
Resolution	5 mV

[2] Values shown are for X1 attenuator setting. Multiply all values by 10 (nominal) when using the X10 attenuator setting.

[3] When ordered with optional rear terminals, the Channel 1 and 2 inputs are active on both the front and rear of the universal counter. For this condition, specifications indicated for the rear connections also apply to the front connections.

Damage Level	
50 Ω	5 Vrms
0 to 3.5 kHz, 1 MΩ	350 Vdc + ac pk
3.5 kHz to 100 kHz, 1 MΩ	350 Vdc + ac pk linearly derated to 5 Vrms
>100 kHz, 1 MΩ	5 Vrms

[4] Channel 3 is available as an option for 53131A and 53132A. Channel 2 is available as an option for 53181A.

[5] When ordered with optional rear terminals, the Channel 3 connector on the front panel will be removed. There is no degradation in specifications for this input.

[6] When 53181A is ordered with your terminals, the channel 2 connector on the front panel will be removed. There is no degradation in specifications for this input.

[7] See Specifications for Pulse Width and Rise/Fall Time measurements for additional restrictions on signal timing characteristics

[8] Restrictions noted on page 8 for Auto Trigger apply to the proper operation of these measurements

Input Characteristics[1]
Channel 3 (53131A, 53132A)
Channel 2 (53181A)

Impedance	1MΩ or 50Ω
1 MΩ Capacitance	30 pF
Coupling	ac or dc
Low-Pass Filter	100 kHz, switchable -20 dB at > 1 MHz
Input Sensitivity	Selectable between Low, Medium, or High (default). Low is approximately 2x High Sensitivity.
Trigger Slope	Positive or Negative
Auto Trigger Level	
Range	0 to 100% in 10% steps
Frequency	> 100 Hz
Input Amplitude	> 100 mVpp (No amplitude modulation)
Attenuator	
Voltage Range	x10
Trigger Range	x10

Input Specifications[4,5,6]
Channel 3 (53131A, 53132A)
Channel 2 (53181A)

Option 015	
Frequency Range	100 MHz to 1.5 GHz (see Option 030 for additional specs)
Option 030	
Frequency Range	100 MHz to 3.0 GHz
Power Range and Sensitivity Sinusoid)	100 MHz to 2.7 GHz -27 dBm to +19 dBm 2.7 GHz to 3 GHz -21 dBm to +13 dBm
Damage Level	5 Vrms
Impedance	50 Ohms
Coupling	ac
VSWR	<2.5:1
Option 050	
Frequency Range	150 MHz to 5.0 GHz
Power Range and Sensitivity Sinusoid)	150 MHz to 5 GHz -27 dBm to +13 dBm
Damage Level	34 dBm
Impedance	50 Ohms
Coupling	ac

External Arm Input Specifications

Signal Input Range	
High-Level Input:	> 3.0 V
Low-Level Input:	< 1.5 V
Timing Restrictions	
Pulse Width	> 50 ns
Transition Time	< 250 ns
Start-to-Stop Time	> 50 ns
Damage Level	10 Vrms

External Time Base Input Specifications

Voltage Range	200 mVrms to 10 Vrms
Damage Level	10 Vrms
Frequency	1 MHz, 5 MHz, and 10 MHz (53132A 10 MHz only)

Time Base Output Specifications

Output Frequency	10 MHz
Voltage	> 1 Vpp into 50 Ω (centered around 0 V)

Measurement Specifications

Frequency (53131A, 53132A, 53181A)

Channel 1 and 2 (53131, 53132); Channel 1 (53181)

Range	0.1 Hz to 225 MHz
Option 015	100 MHz to 1.5 GHz
Option 030	100 MHz to 3 GHz
Option 050	150 MHz to 5 GHz

(Period 2 or 3 selectable via HP-IB only)

Trigger Default Setting Auto Trigger at 50%

Period (53131, 53132, 53181)

Channel 1 and 2 (53131, 53132); Channel 1 (53181)

Range	4.44 ns to 10 s
Option 015 Range	0.66 ns to 10 ns
Option 030 Range	0.33 ns to 10 ns
Option 050 Range	0.2 ns to 6.67 ns

(Period 2 or 3 selectable only via the HP-IB interface)

Trigger Default setting is Auto Trigger at 50%

Frequency Ratio (53131, 53132, 53181)

Measurement is specified over the full signal range of each input.

Results Range	10^{-18} to 10^{11}
'Auto' Gate Time	100 ms

For Automatic or External Arming: (and signals < 100 Hz using Timed Arming)

LSD Displayed: $\left(\frac{t_{res}}{Gate\ Time}\right) \times$ *Frequency or Period*

RMS Resolution: $\left(\frac{\sqrt{t^2_{res} + (2 \times Trigger\ Error^2)}}{Gate\ Time}\right) \times$ *Frequency or period*

	HP 53131A t_{res}	HP 53132A t_{res}	HP 53181A t_{res}
typical	650 ps	200 ps	650 ps

see graphs for worst case resolution performance

For Automatic Arming: $Gate\ Time = \frac{N}{Frequency}$

where N = 1 for standard channel Frequency < 1 MHz
4 for standard channel Frequency > 1 MHz
128 for optional channel

Systematic Uncertainty: $\left(\pm Time\ Base\ Error \pm \frac{t_{acc}}{Gate\ Time}\right) \times$ *Frequency or Period*

	HP 53131A t_{acc}	HP 53132A t_{acc}	HP 53181A t_{acc}
typical	350 ps	100 ps	350 ps
worst case	1.25 ns	500 ps	1.25 ns

Trigger: Default setting is Auto Trigger at 50%

For Time or Digits Arming:

LSD Displayed: $\left(\frac{2\sqrt{2} \times t_{res}}{Gate\ Time \times \sqrt{Number\ of\ Samples}} + \frac{t_{jitter}}{Gate\ Time}\right) \times$ *Frequency or Period*

RMS Resolution (see graph 2):

$\left(\frac{4 \times \sqrt{t^2_{res} + (2 \times Trigger\ Error^2)}}{Gate\ Time \times \sqrt{Number\ of\ Samples}} + \frac{t_{jitter}}{Gate\ Time}\right) \times$ *Frequency or Period*

	HP 53181A, HP 53131A t_{res}	HP 53181A, HP 53131A t_{jitter}	HP 53132A t_{res}	HP 53132A t_{jitter}
typical	500 ps	50 ps	225 ps	3 ps

see graphs for worst case resolution performance

Number of Samples =
Gate Time x Frequency (Frequency < 200 kHz)
Gate Time x 200,000 (Frequency > 200 kHz)

Systematic Uncertainty: $\left(\pm Time\ Base\ Error \pm \frac{t_{acc}}{Gate\ Time}\right) \times$ *Frequency or Period*

	HP 53181A, HP 53131A t_{acc}	HP 53132A t_{acc}
typical	100 ps	10 ps
worst case	150 ps	100 ps

Trigger: Default setting is Auto Trigger at 50%

Time Interval (53131A, 53132A)

Measurement is specified over the full signal ranges[7] of Channels 1 and 2.

Results Range	-1 ns to 10^5 s
LSD	500 ps (53131)/150 ps (53132)

Phase (53131A, 53132A)

Measurement is specified over the full signal range of Channels 1 and 2.

Results Range:	-180° to +360°

Duty Cycle (53131A, 53132A)

Measurement is specified over the full signal range of Channel 1. However, both the positive and negative pulse widths must be greater than 4 ns.

Results Range:	0 to 1 (e.g. 50% duty cycle would be displayed as .5)

Rise/Fall Time (53131A, 53132A)

Measurement is specified over the full signal ranges of Channel 1. The interval between the end of one edge and start of a similar edge must be greater than 4 ns.

Edge Selection	Positive or Negative
Trigger	Default setting is Auto Trigger[8] at 10% and 90%
Results Range	5 ns to 10^5 s
LSD	500 ps (53131)/150 ps (53132)

Pulse Width (53131A, 53132A)

Measurement is specified over the full signal range of Channel 1. The width of the opposing pulse must be greater than 4 ns.

Pulse Selection	Positive or Negative
Trigger	Default setting is Auto Trigger[8] at 50%
Results Range	5 ns to 10^5 s
LSD	500 ps (53131)/150 ps (53132)

Totalize (53131A, 53132A)

Measurement is specified over the full signal range of Channel 1.

Results Range	0 to 10^{15}
Resolution	± 1 count

Peak Volts (53131A, 53132A, 53181A)

Measurement is specified on Channels 1 and 2 for dc signals; or for ac signals of frequencies between 100 Hz and 30 MHz with peak-to-peak amplitude greater than 100 mV.

Results Range	-5.1 V to +5.1 V
Resolution	10 mV

Peak Volts Systematic Uncertainty

for ac signals: 25 mV + 10% of V

for dc signals: 25 mV + 2% of V

Use of the input attenuator multiplies all voltage specifications (input range, results range, resolution and systematic uncertainty) by a nominal factor of 10.

Time Interval, Pulse Width, Rise/Fall Time (53131 and 53132 only):

RMS Resolution: $\sqrt{(t_{res})^2 + Start\ Trigger\ Error^2 + Stop\ Trigger\ Error^2}$

Systematic Uncertainty:

± (Time Base Error x Measurement) ± Trigger Level Timing Error ± 1.5 ns Differential Channel Error (53131A)

± (Time Base Error x Measurement) ± Tngger Level Timing Error ± 900 ps Differential Channel Error (53132A)

where t_{res} = 750 ps for the 53131A; 300 ps for the 53132A

Frequency Ratio: $\frac{Ch1}{Ch2}, \frac{Ch1}{Ch3}, \frac{Ch2}{Ch1}, \frac{Ch3}{Ch1}$ **(53131A and 53132A)** $\frac{Ch1}{Ch2}\ \frac{Ch2}{Ch1}$ **(53181A)**

LSD: Ratio $\frac{1}{2}$: $\frac{1}{Ch2\ Freq \times Gate\ Time}$ **Ratio $\frac{2}{1}$:** $\frac{Ch2\ Freq}{(Ch1\ Freq)^2 \times Gate\ Time}$

RMS Resolution:

Ratio $\frac{1}{2}$: $\frac{2\times\sqrt{1 + (Ch1\ Freq \times Ch2\ Trigger\ Error)^2}}{Ch2\ Freq \times Gate\ Time}$

Ratio $\frac{2}{1}$: $\frac{2 \times Ch2\ Freq \times\sqrt{1 + (Ch1\ Freq \times Ch2\ Trigger\ Error)^2}}{(Ch1\ Freq)^2 \times Gate\ Time}$

For measurements using Ch3, substitute Ch3 for Ch2 in these equations. To minimize relative phase measurement error, connect the higher frequency signal to channel 1.

Systematic Uncertainty: ± 2x resolution

Phase (53131 and 53132)

RMS Resolution: $\sqrt{((t_{res})^2 + (2 \times Trigger\ Error^2))} \times \left(1 + \left(\frac{Phase}{360°}\right)^2\right) \times Frequency \times 360°$

Systematic Uncertainty: (± *Trigger Level Timing Error ± 1.5 ns Differential Channel Error*) x *Frequency* x *360°* (53131)

(± *Trigger Level Timing Error ± 900 ps Differential Channel Error*) x *Frequency* x *360°* (53132)

Duty Cycle (53131 and 53132)

RMS Resolution: $\sqrt{((t_{res})^2 + (2 \times Trigger\ Error^2)) \times (1 + Duty\ Cycle^2)} \times Frequency$

Systematic Uncertainty: (± *Trigger Level Timing Error ± 1.5 ns Differential Channel Error*) x *Frequency* (53131)

(± *Trigger Level Timing Error ± 900 ps Differential Channel Error*) x *Frequency* (53132)

[9]When used with external time base, this equation represents typical performance.

Gate Time

53131A, 53132A Auto Mode, or 1 ms to 1000 s

Measurement Throughput

HP-IB ASCII 200 measurements/s (maximum)

Measurement Arming

Start Measurement	Free Run, Manual, or External
Stop Measurement	Continuous, Single, External, or Timed
Time Interval Delayed Arming	100 µs to 10 s

Arming Modes
(Note that not all arming modes are available for every measurement function.)

Auto Arming: Measurements are initiated immediately and acquired as fast as possible, using a minimum number of signal edges.

Timed Arming: The duration of the measurement is internally timed to a user-specified value (also known as the "gate time").

Digits Arming: Measurements are performed to the requested resolution (number of digits) through automatic selection of the acquisition time.

External Arming: An edge on the External Arm Input enables the start of each measurement. Auto Arming, Timed arming modes or another edge on the External Arm Input may be used to complete the measurement.

Time Interval Delayed Arming: For Time Interval measurements, the Stop Trigger condition is inhibited for a user-specified time following the Start Trigger.

Measurement Limits

Limit Checking: The measurement value is checked against user-specified limits at the end of each measurement.

Display Modes: The measurement result may be displayed as either the traditional numeric value or graphically as an asterisk moving between two vertical bars.

Out-of-Limits Indications:

- The limits annunciator will light on the front panel display.
- The instrument will generate an SRQ if enabled via HP-IB.
- The limits hardware signal provided via the RS-232 connector will go low for the duration of the out-of-limit condition.
- If the Analog Display mode is enabled, the asterisk appears outside the vertical bars, which define the upper and lower limits.

- **Fractional Time Base Error (see graph 3)**

Time base error is the maximum fractional frequency variation of the time base due to aging or fluctuations in ambient temperature or line voltage. Multiply this quantity by the measurement result to yield the absolute error for that measurement. Averaging will not reduce this error. Since the HP 53131A, HP 53132A and HP 53181A exhibit negligible sensitivity to line voltage variations, this term may be ignored.

- **Trigger Error**

External (E_{signal}) and internal (E_{input}) noise, along with the slew rate of the measured signal, affect the trigger points that define a measurement. The (rms) trigger error associated with a single trigger point is:

E_{signal} = RMS noise of the input signal over a 225 MHz bandwidth (100 kHz when filter enabled)

E_{input} = RMS noise of the input amplifier. (Nominal value: 1 mVrms. Typical: <350µVrms)

For two-trigger-point measurements (e.g. rise time, pulse width), the trigger errors will be referred to independently as Start Trigger Error and Stop Trigger Error.

$$\text{Trigger Error} = \frac{\sqrt{(E_{input})^2 + (E_{signal})^2}}{\textit{Input Signal Slew Rate at Trigger Point}} \text{ (in seconds)}$$

- **Trigger Level Timing Error (see graph 6)**

Trigger level timing error results from a deviation of the actual trigger level from the specified level. The magnitude of this error depends on resolution and accuracy of the trigger level circuit, input amplifier fidelity, input signal slew rate, and width of the input hysteresis band.

The following equations should be summed together to obtain the overall Trigger Level Timing Error. At the "High" sensitivity input setting, the hysteresis band can be assumed to be the sensitivity of the counter input (20mVrms for a dc to 100 MHz sine wave; see page 2). Reduction of input sensitivity or use of the attenuator will increase the size of this band.

Input Hysteresis Error: $\dfrac{0.5 \times \textit{Hysteresis Band}}{\textit{Input Signal Slew Rate at Start Trigger Point}} - \dfrac{0.5 \times \textit{Hysteresis Band}}{\textit{Input Signal Slew Rate at Stop Trigger Point}}$

Trigger Level Setting Error: $\pm \dfrac{15\ mV \pm (1\% \times \textit{Start Trigger Level Setting})}{\textit{Input Signal Slew Rate at Start Trigger Point}} \pm \dfrac{15\ mV \pm (1\% \times \textit{Stop Trigger Level Setting})}{\textit{Input Signal Slew Rate at Stop Trigger Point}}$

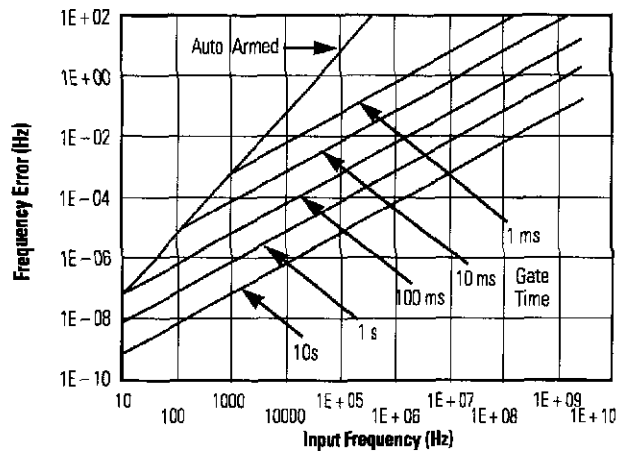
- **Differential Channel Error**

The 1.5 ns error term stated in several Systematic Uncertainty equations accounts for channel-to-channel mismatch and internal noise. This error can be substantially reduced by performing a TI calibration (accessible via the Utility Menu) in the temperature environment in which future measurements will be made.

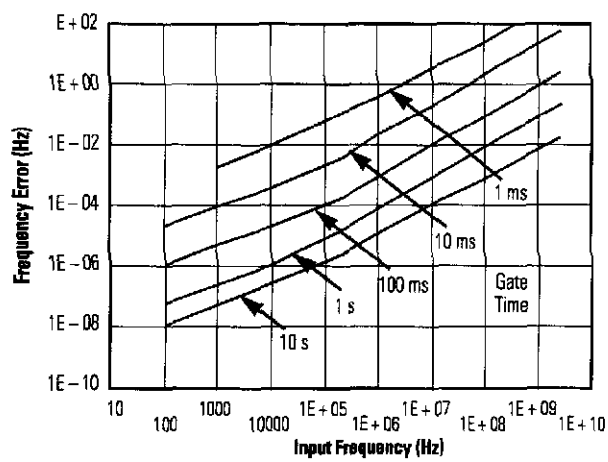
Graph 1:
HP 53131A - Worst Case RMS Resolution
(Automatic or External Arming)

The graphs may also be used to compute errors for Period Measurements. To find the Period error, invert the Period (P) of the input signal and find the frequency error (ΔF):

$$F = \frac{1}{P} \qquad \left(\frac{\Delta F}{F}\right) \times P$$



Graph 2:
HP 53131A - Worst Case RMS Resolution
(Time or Digits Arming)



Graph 3:
Timebase Error

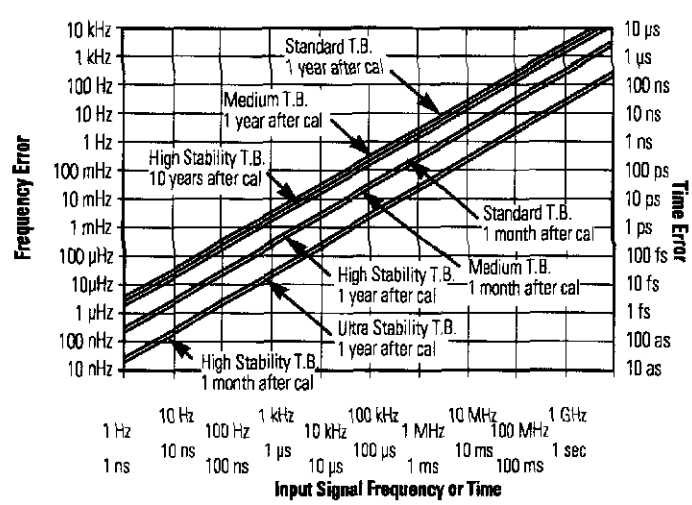
Graphs 1, 2, 4 and 5 do not reflect the effects of trigger error. To place an upper bound on the added effect of this error term, determine the frequency error from the appropriate graph and add a trigger error term as follows:

Time or Digit Arming

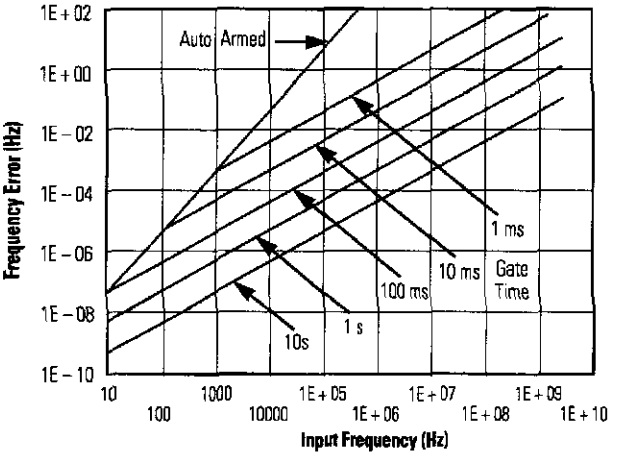
$$\text{Frequency Error} + \left(\frac{4 \times \sqrt{2} \times \text{Trigger Error}}{\text{Gate Time} \times \text{Number of Samples}}\right) \times \begin{matrix}\text{Frequency}\\ \text{or}\\ \text{period}\end{matrix}$$

Automatic or External Arming

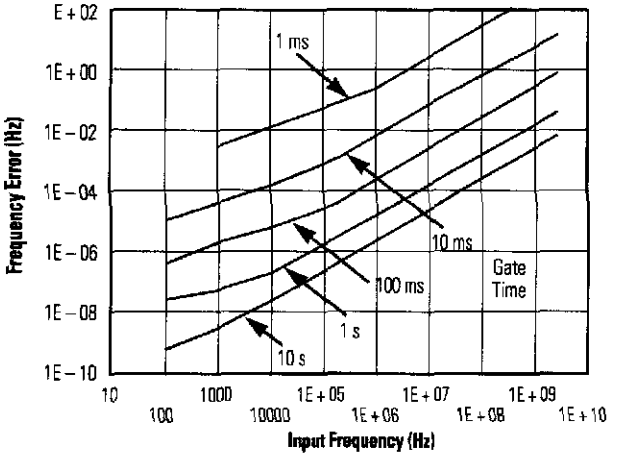
$$\text{Frequency Error} + \left(\frac{\sqrt{2} \times \text{Trigger Error}}{\text{Gate Time}}\right) \times \begin{matrix}\text{Frequency}\\ \text{or}\\ \text{period}\end{matrix}$$



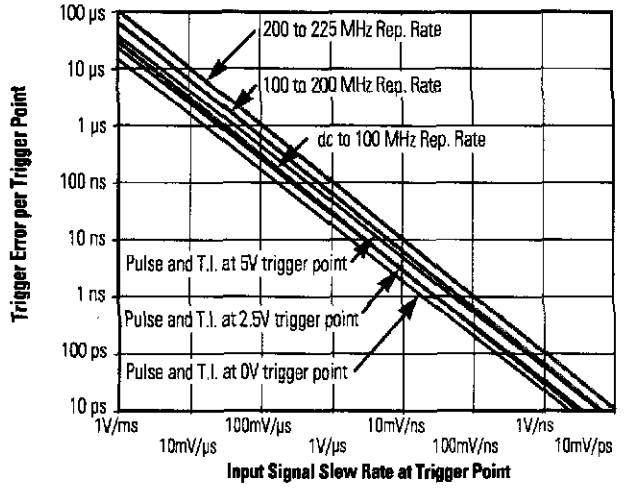
Graph 4: HP 53132A - Worst Case RMS Resolution
(Automatic or External Arming)



Graph 5: HP 53132A - Worst Case RMS Resolution
(Time or Digits Averaging)



Graph 6: Trigger Level Timing Error
(Level Setting Error and Input Hysteresis)



Measurement Statistics

Available Statistics:	Mean, Minimum, Maximum, Standard Deviation
Number of Measurements:	2 to 1,000,000. Statistics may be collected on all measurements or on only those which are between the limit bands. When the Limits function is used in conjunction with Statistics, N (number of measurements) refers to the number of in-limit measurements. In general, measurement resolution will improve in proportion to $\sqrt{N}$, up to the numerical processing limits of the instrument.
Measurements:	Statistics may be collected for all measurements except Peak Volts and Totalize.

General Information

Save and Recall:
Up to 20 complete instrument setups may be saved and recalled later. These setups are retained when power is removed from the counter.

Rack Dimensions (HxWxD):	88.5 mm x 212.6 mm x 348.3 mm
Weight:	3.5 kg maximum
Warranty:	3 years
Power Supply:	
ac	90 to 132 Vac, 45 to 66 Hz or 360 to 440 Hz 198 to 264 Vac, 45 to 66 Hz
dc (Option 002)	10 to 32 Vdc, 4A inrush
ac Line Selection:	Automatic
Power Requirements:	170 VA maximum (30 W typical)
Environment:	0°C to 55°C operating –40°C to 71°C storage
Remote Interface:	HP-IB (IEEE 488.1-1987, IEEE 488.2-1987)
Remote Programming Language:	SCPI-1992.0 (Standard Commands for Programmable Instruments)
Safety:	Designed in compliance with IEC-1010, UL-3111-1 (draft), CAN/CSA 1010.1
EMC:	CISPR-11, EN50082-1, IEC 801-2, -3, -4
Radiated Immunity Testing:	When the universal counter is operated at maximum sensitivity (SENSTVTY: HI) and tested at 3 V/m according to IEC 801-3/1984, external 100 MHz to 200 MHz electric fields may cause frequency miscounts.

Ordering Information

HP 53100-Series Counters
HP 53131A 10-digit Universal Counter
HP 53132A 12-digit Universal Counter
HP 53181A 10-digit RF Counter

Accessories included

Operating, programming, and service manuals and AC power cord.

Manual options (please specify one when ordering HP 53131A or 53132A)

ABA US English
ABD German
ABE Spanish
ABF French
ABJ Japanese
ABZ Italian
ABO Taiwan Chinese
AB1 Korean
AB2 Chinese

Other options

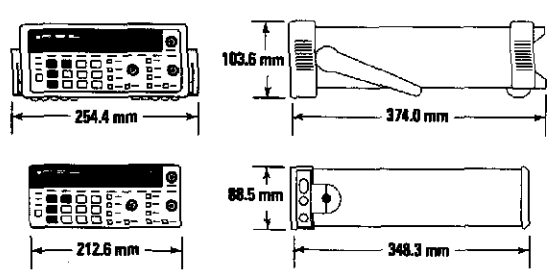
Opt. 001 Medium-stability timebase
Opt. 002 External dc power
Opt. 010 High-stability timebase
Opt. 012 Ultra-stability timebase
Opt. 015 1.5 GHz RF input (HP 53181A only)
Opt. 030 3 GHz RF input (Ch 2 on HP 53181A)
Opt. 050 5 GHz RF input with type N connector Ch 3 (Ch 2 on HP 53181A)
Opt. 060 Rear-panel connectors
Opt. 080 Delete Manual Set
Opt. 1BP MIL-STD-45662A Calibration with test data
Opt. 1CM Rack Mount Kit* (P/N 5062-3972)
Opt. W50 Additional 2-year warranty (5-year total)**

* For racking two side-by-side, order both items below
Lock-link Kit (P/N 5061-9694)
Flange Kit (P/N 5062-3974)

** Call HP DIRECT for more information on Opt. W50 prices.

Accessories

HP 34161A Accessory pouch
HP 34812A BenchLink Meter software



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