



# Agilent 5335A Universal Counter, 200 MHz

Data Sheet

## Product Specifications

### INPUT CHARACTERISTICS (Channels A and B)

#### Range:

DC coupled, 0 to 100 MHz.

AC 1 Mohm, 30 Hz to 100 MHz.

AC 50 ohm, 200 kHz to 100 MHz.

**Note:** Channel A range 200 MHz when in Frequency A and Ratio modes.

#### Sensitivity (×1):

25 mV rms sine wave.

75 mV peak-to-peak pulse at minimum pulse width of 5 ns.

#### Dynamic Range (×1):

75 mV to 5V peak-to-peak, to 100 MHz.

75 mV to 2.5V peak-to-peak, >100 MHz.

#### Signal Operating Range (×1, DC): -5V dc to +5V dc.

**Crosstalk (×1):** <500 mV rms, 0 to 100 MHz, or <250 mV rms, 100 to 200 MHz, sine wave in either channel will not affect other channel.

#### Trigger Level Range (×1):

##### Auto Trigger OFF:

**Preset:** Set to 0V dc NOMINAL.

**Adjustable:** -5V dc to +5V dc.

##### AutoTrigger ON:

**Preset:** Set to NOMINAL 50% point of input signal.

**Adjustable:** NOMINALLY between + and - peaks of input signal.

#### Auto Trigger (×1):

##### Range (50% duty cycle):

DC coupled, 30 Hz to 200 MHz.

AC 1 Mohm, 30 Hz to 200 MHz.

AC 50 ohm, 200 kHz to 200 MHz.

**Minimum Signal:** 100 mV rms.

**Duty Cycle Range:** 10% to 89%.

**Response Time:** 3 seconds TYPICAL.

**NOTE:** Auto Trigger requires a repetitive signal.

### FREQUENCY A



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**Range:** 0 to 200 MHz, prescaled by 2.

**LSD Displayed:**  $((1 \text{ ns}) / (\text{Gate Time}) \times \text{FREQ. (e.g., 9 digits in a second)})$

**Resolution:**  $\pm (2 \times \text{LSD}) \pm 1.4 \times ((\text{Trigger Error}) / (\text{Gate Time})) \times \text{FREQ.}$

**Accuracy:**  $\pm (\text{Resolution}) \pm (\text{Time Base Error}) \times \text{FREQ.}$

#### PERIOD A

**Range:** 10 ns to  $10e7$  s.

**LSD Displayed:**  $((1 \text{ ns}) / (\text{Gate Time}) \times \text{PER. (e.g., 9 digits in a second)})$

**Resolution:**  $\pm (2 \times \text{LSD}) \pm 1.4 \times ((\text{Trigger Error}) / (\text{Gate Time})) \times \text{PER.}$

**Accuracy:**  $\pm (\text{Resolution}) \pm (\text{Time Base Error}) \times \text{PER.}$

**Period Average:** User selects MEAN function,  $n = 100$ , or  $n = 1,000$ .

#### TIME INTERVAL A-->B

**Range:** 0 ns to  $10e7$  s.

**LSD Displayed:** 1 ns (100 ps using MEAN).

**Resolution:**  $\pm (2 \times \text{LSD}) \pm (\text{START Trigger Error}) \pm (\text{STOP Trigger Error}).$

**Accuracy:**  $\pm (\text{Resolution}) \pm (\text{Time Base Error}) \times \text{TI} \pm (\text{Trigger Level Timing Error}) \pm (2 \text{ ns}).$

**Gate Mode:** MIN only.

**Time Interval Average:** User selects MEAN function,  $n = 100$ , or  $n = 1,000$ .

#### PULSE WIDTH A

**Range:** 5 ns to  $10e7$  s.

**Trigger Point Range:** 40% to 60% of pulse height.

**LSD Displayed:** and **Resolution** are same as Time Interval A-->B specifications.

**Accuracy:**  $\pm (\text{Resolution}) \pm (\text{Time Base Error}) \times \text{PULSE} \pm (\text{Trigger Level Timing Error}) \pm 2 \text{ ns.}$

#### STATISTICS AND MATH

**Sample Size:** Selectable between either  $N = 100$  or  $N = 1000$  samples.

**Std. Dev.:** Displays a standard deviation of selected sample size.

**Mean:** Displays mean estimate of selected sample size.

**Smooth:** Performs a weighted running average and truncates unstable least significant digits from display.

**NOTE:** Statistics functions performed after Math functions.

**Math:** All measurement functions with exception of GATE TIME, TOTALIZE in scale mode, and TRIG LVL, may be operated upon by Math functions. Offset, Normalize, and Scale may be used independently or together.

#### GENERAL

**Function Memory:** Front panel settings for Math, Statistics, Range Hold, Ext. Arm Enable, Gate, and Cycle stored for current function and immediately preceding function. GATE TIME and TRIG LVL do not affect memory.

**Cycle:** Determines delay between measurements.

**NORM:** No more than 4 readings per second NOMINAL.

**MIN:** Minimum gate time. Actual time depends on function. For FREQ A, (FREQ B), FREQ C, and PER A, minimum gate time = (one period of input)  $\times$  (prescale factor).

**SINGLE:** One measurement taken with each press of button.

**Display:** 12 digit LED display in engineering format; exponent range of +18 to -18.

**Overflow:** All measurements which would theoretically cause a display of more than 12 digits will display 12 most significant digits.

**Operating Temperature:** 0 to 50 degrees C.

**Power Requirements:** 100, 120, 220, 240 VAC (+5%, -10%), 48-66 Hz; 130 VA max.

**Dimensions:** 425.5 mmW  $\times$  132.6 mm H  $\times$  345.4 mm D (16 $\frac{3}{4}$ "  $\times$  5 $\frac{1}{4}$ "  $\times$  13 $\frac{1}{2}$ "), not including removable handles.

#### Selectable Resolution

Digital gate time selection makes it easy to trade off resolution and measurement time. Resolution is 9 digits per second of gate time to 100 MHz for period and 200 MHz for frequency.

**Measurements**

In addition to standard universal counter measurements of frequency, period, time interval, ratio and totalize, the 5335A provides pulse width, rise and fall time, duty cycle, slew rate, relative phase, and inverse time interval.

**External Arming**

External arming/gating allows synchronization with external events. This feature lets you easily make pulsed RF communications and radar signal measurements to 1.3 GHz.

**Full Function**

Two ratio functions of A/B and C/A use the full bandwidth, sensitivity, and input signal conditioning controls of the A, B, and C input channels.

