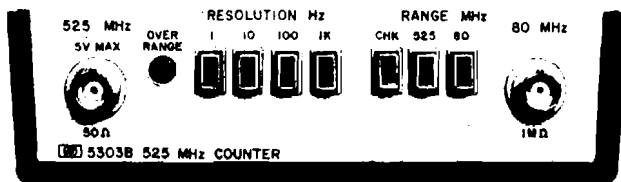


- CW or burst to 525 MHz
- Automatic gain control and fused input
- FCC type approved



5303B

5303B Frequency counter module

This counter module was especially designed for servicing and calibrating mobile communications equipment and AM & FM broadcast equipment. An automatic gain control (AGC) amplifier has been provided on the 80 MHz channel. This provides ease-of-use by compensating for input level variations and rejecting noise up to 50% of the peak-to-peak level of the input signal. The front end circuitry of the 525 MHz channel is fuse-protected against high input signal levels that would normally cause expensive front end damage. The addition of the battery pack makes this an ideal portable instrument for the lab or the field.

Input channel A (CW or burst)

Range: DC to 525 MHz, prescaled by 8.

Sensitivity (fixed):

100 mV rms sine wave, dc to 500 MHz.

125 mV rms sine wave, 500 MHz to 525 MHz.

Signal must pass through zero.

Impedance: 50Ω.

Overload protection: 5 V rms (input circuitry fuse-protected).

Input channel B (CW or burst)

Range: 50 Hz to 80 MHz, direct.

Sensitivity (automatic):

25 mV rms sine wave, 100 Hz to 50 MHz.

50 mV rms sine wave, 50 Hz to 100 Hz and 50 MHz to 80 MHz.

Sensitivity is adjusted automatically by AGC (automatic gain control). Effective up to input clipping levels of 10 V p-p.

Impedance: 1 MΩ shunted by less than 40 pF.

Overload protection: 250 V rms, 50 Hz to 10 KHz declining to 10 V rms above 10 MHz.

Frequency measurement

Resolution: (selectable): 1, 10, 100, 1000 Hz.

Accuracy: ± 1 digit ± time base accuracy.

General

Check: counts internal 10 MHz reference frequency.

Overflow: light indicates display exceeded.

Operating temperature: 0° to 50°C.

Power requirements: including mainframe, nominally 10 watts.

Weight: net, 0.9 kg (2 lb). Shipping, 1.5 kg (3¼ lb).

Dimensions: see mainframe.

5303B 525 MHz Counter

Opt 001:

High stability time base (for use with 5300A)

Frequency: 10 MHz.

Stability

Aging rate: < 1.2 part in 10⁶/year.

Temperature: < ± 5 parts in 10⁷, 0° to 50°C.

Line voltage: < ± 5 parts in 10⁶ for 10% line variation.

Oscillator output: 10 MHz, approximately 1 V rms at rear panel BNC, 200Ω source impedance.

External input: 1 to 10 MHz, 1 V rms into 500Ω.

*For any waveshape, trigger error is less than

$$+ \frac{0.005 \mu s}{\text{Signal Slope (V/\mu s)}}$$

**Trigger error is less than ± 0.3% of one period + periods averaged for 40 dB or better signal-to-noise ratio.

- Matched input amplifiers
- Time interval hold-off
- 100 nsec time interval resolution



5304A

5304A Timer/counter module

Input channels A and B

Range: DC coupled; 0 to 10 MHz, AC coupled; 100 Hz to 10 MHz.

Sensitivity (min): 25 mV rms sine wave to 1 MHz, 50 mV rms sine wave to 10 MHz, 150 mV p-p pulse at minimum pulse width, 40 nsec. Sensitivity can be decreased by 10 or 100 times using ATTENUATOR switch.

Impedance: 1 MΩ shunted by less than 30 pF.

Overload protection: 250 V rms on X10 and X100 attenuator settings. On X1 attenuator setting 120 V rms up to 1 kHz, decreasing to 10 V rms at 10 MHz.

Trigger-level: PRESET position centers triggering about 0 volts, or continuously variable over the range of -1 V to +1 V times attenuator setting.

Slope: independent selection of triggering on positive or negative slope.

Channel inputs: common or separate lines.

Gate output: rear panel BNC. TTL low level while gate is open.

Time Interval

Range: 500 ns to 10⁴ sec.

Input: channels A and B; can be common or separate.

Resolution: 100 ns to 10 ms in decade steps.

Accuracy: ± 1 count ± time base accuracy ± trigger error.*

Time interval holdoff: front panel concentric knob which inserts variable delay of approximately 100 μs to 100 ms between START (channel A) and enabling of STOP (channel B); may be disabled. Electrical inputs during delay time are ignored. Delay may be digitally measured in CHECK and TIME INTERVAL positions. Delay output: rear panel BNC. TTL low level during delay time.

Period average

Range: 10 Hz to 1 MHz.

Input: channel A.

Periods averaged: 1 to 10³ automatically selected.

Frequency counted: 10 MHz.

Accuracy: ± 1 count ± time base accuracy ± trigger error.**

Frequency

Range: 0 to 10 MHz.

Input: channel A.

Gate times: manually selected 0.1, 1, or 10 seconds. AUTO position selects gate time to 1 second for maximum resolution.

Accuracy: ± 1 count ± time base accuracy.

Open/close (totalizing)

Range: 10 MHz max.

Input: channel A opening and closing of gate initiated by front panel pushbutton switch.

General

Check: inserts internal 10 MHz reference frequency into channels A and B.

Operating temperature: 0° to 50°C

Power requirements: including mainframe, nominally 10 watts.

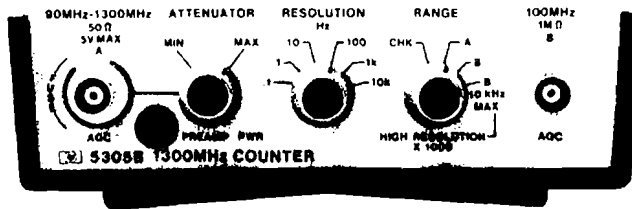
Weight: net, 0.9 kg (2 lb). Shipping, 1.5 kg (3¼ lb).

Dimensions: see mainframe.

5304A Timer/counter module

5300A/B System (cont.)

- 1300 MHz
- Preamp Power
- Fast high resolution tone measurements



5305B

5305B 1300 MHz frequency counter module

Input Channel A (CW or burst)

Range: 90 MHz to 1300 MHz, prescaled by 16.

Sensitivity: 20 mV rms.

Impedance: 50Ω.

Attenuator: continuously variable to give optimum noise suppression for signals up to 3.5 V rms.

Overload protection: 5 V rms, maximum. Input circuitry is fuse protected; fuse is located in BNC connector and is accessible from the front panel.

Operating dynamic range: >47 dB

Input Channel B (Normal and High Resolution mode)

Range: 50 Hz to 100 MHz, direct count in normal mode. 50 Hz to 10 kHz in high resolution mode. In the high resolution mode the 5305B uses a phase-locked multiplier to increase resolution X1000 over normal measurement resolution.

Sensitivity: 20 mV rms.

Impedance: 1 MΩ shunted by less than 40 pF.

Overload protection: 250 V rms from 50 Hz to 10 kHz, declining to 10 V rms above 10 MHz.

Automatic hold: in high resolution mode, the last valid reading is held in display when input is terminated.

Frequency Measurement

Resolution (selectable)

Normal mode (50 Hz to 1300 MHz): 0.1 Hz to 10,000 Hz in decade steps corresponding to gate times of 10 s to 0.0001 s in decade steps on channel B and to gate times of 160 s to 0.0016 s in decade steps on channel A.

High resolution mode (50 Hz to 10 kHz): 0.0001, 0.001, 0.01, 0.1, 1, 10 Hz corresponding to 10, 1, 0.1, 0.01, 0.001, 0.0001 second gate times on channel B.

Accuracy: ±1 digit displayed ± time base accuracy.

Display: Hz, kHz, MHz with positioned decimal point.

General

Check: counts internal 10 MHz reference frequency to check counting circuits.

Operating temperature: 0°C to 50°C.

Power requirements: nominally 12 watts including mainframe.

Weight: net, 1.0 kg (2¼ lb). Shipping, 1.8 kg (4 lb).

Size: with mainframe, 89 mm H (3½") x 160 mm W (6¼") x 248 mm L (9¾").

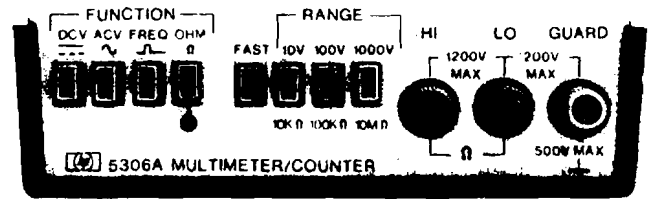
Compatible mainframes: 5300B (8 digits).

Accessory

10855A Preamp: 22dB gain with ±1 dB flatness from 2 MHz to 1300 MHz. See 312

5305B 1300 MHz counter

- DC volts, AC volts, ohms and frequency



5306A

5306A Digital multimeter/counter module

DC voltage

Range	Accuracy (60 days, 23°C ± 5°C, <80% RH)	Sensitivity
10 V	± (0.03% of reading + 0.003% of range)	100 μV
100 V	± (0.03% of reading + 0.003% of range)	1 mV
1000 V	± (0.097% of reading + 0.03% of range)	10 mV

Temperature coefficient: ± (0.002% of reading/°C + 0.0002% of range/°C).

Sample times: normal, 0.5 sec; fast, 0.05 sec.

Input: floating pair, 10 MΩ resistance, all ranges.

Effective common mode rejection (1 kΩ imbalance): DC: >80 dB; 50 Hz or 60 Hz ± 0.1%: >80 dB.

Normal mode rejection: 50 Hz or 60 Hz ± 0.1%: >50 dB.

Maximum input

High to low: 1100 V dc all ranges.

Low to guard: ± 200 V dc or peak ac.

Guard to ground: ± 500 V dc or 240 V rms at 50 or 60 Hz.

AC voltage

Range	Frequency	Accuracy (60 days, 23°C ± 5°C, <80% RH)
10 V	40 Hz to 10 kHz	± (0.98% of reading + 0.02% of range)
	10 kHz to 100 kHz	± (0.98% of reading + 0.10% of range)
100 V	40 Hz to 500 Hz	± (1.5% of reading + 0.05% of range)
	40 Hz to 500 Hz	± (1.5% of reading + 0.05% of range)

Temperature coefficient

10 V and 100 V range: ± (0.5% of reading + .003% of range/°C).

1000 V range: ± (0.5% of reading + .003% of range/°C).

Input impedance: 10 MΩ shunted by <75 pF maximum.

Maximum input voltage: see DC voltage specification.

Effective common mode rejection (1 kΩ imbalance): DC: >80 dB; 50 Hz or 60 Hz ± 0.1%: >50 dB (10 V range).

Ohms

Range	Accuracy (60 days, 23°C, ± 5°C, <80% RH)	Sensitivity
10 kΩ	± (0.5% of reading + 0.003% of range)	0.1Ω
100 kΩ	± (0.5% of reading + 0.003% of range)	1Ω
10 MΩ	± (0.75% of reading + 0.003% of range)	100Ω

Temperature coefficient: ± (0.0002% of range/°C).

Current through unknown: 1 mA on 10 kΩ range; 100 μA on 100 kΩ range; 1 μA on 10 MΩ range.

Overload protection: 10 kΩ range; 240 V rms for 1 min. 140 V rms continuous (warning lamp indicates overvoltage). 100 kΩ, 10 MΩ ranges; 240 V rms continuous.

Frequency

Range: 40 Hz to 10 MHz.

Sensitivity (min): 50 mV rms to 1 MHz; 125 mV rms to 10 MHz.

Trigger level: automatically adjust to 40% of peak level of input.

Overload protection: 1000 V rms. On 10 V range: 240 V rms from 40 Hz to 400 kHz, 10⁸ V Hz from 400 kHz to 10 MHz.

Gate times: normal: 1 sec, fast: 0.1 sec.

Accuracy: ± 1 count ± time base accuracy.

Power requirements: including mainframe, nominally 12 watts.

Weight: net, 1.1 kg (2.3 lb). Shipping, 1.7 kg (3.6 lb).

5306A Digital Multimeter/Counter